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**Department of Defense  
Fiscal Year (FY) 2022 Budget Estimates**

May 2021



**Air Force**

*Justification Book Volume 3a of 3*

***Research, Development, Test & Evaluation, Air Force***

**Vol-III Part 1**

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Air Force • Budget Estimates FY 2022 • RDT&E Program

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## Fiscal Year (FY) 2022 Budget Estimates RDT&E Descriptive Summaries Budget Activities May 2021

### INTRODUCTION AND EXPLANATION OF CONTENTS

#### GENERAL

- This document has been prepared to provide information on the United States Air Force (USAF) Research, Development, Test and Evaluation (RDT&E) program elements and projects in the FY 2022 President's Budget (PB).
  - All exhibits in this document have been assembled in accordance with DoD 7000.14R, Financial Management Regulation, Volume 2B, Chapter 5.
  - Other comments on exhibit contents in this document:
    - Exhibits R-2/2a and R-3 provide narrative information for all RDT&E program elements and projects within the USAF FY 2022 RDT&E program with the exception of classified program elements. The format and contents of this document are in accordance to the guidelines and requirements of the Congressional committees in so far as possible.
    - The "Other Program Funding Summary portion of the R-2 includes, in addition to RDTE& funds, Procurement funds and quantities, Military Construction appropriation funds on specific development programs, Operations and Maintenance appropriation funds where they are essential to the development effort described, and where appropriate, Department of Energy (DOE) costs.

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### CLASSIFICATION

- All exhibits contained in Volumes I, II, and III are unclassified. Classified exhibits are not included in the submission due to the level of security classification and necessity of special security clearances.

### Exhibit footnotes for FY 2020 actuals and FY 2021 Enacted:

- a. FY 2020 Actuals: **“Includes Division A, Title IX and X of the Consolidated Appropriations Act, 2020 (P.L. 116-93), Division F, Title IV and V from the Further Consolidated Appropriations Act, 2020 (P.L. 116-94) and the Coronavirus Aid, Relief, and Economic Security Act (P.L. 116-136).”**
- b. FY 2021 Enacted (for every appropriation except O&M, Army, O&M, Navy, and O&M, AF): **“Includes Division C, Title IX and Division J, Title IV of the Consolidated Appropriations Act, 2021 (P.L. 116-260).”**
- c. FY 2021 Enacted (for O&M, Army, O&M, Navy, and O&M, AF): “Includes Division C, Title IX and Division J, Title IV of the Consolidated Appropriations Act, 2021 (P.L. 116-260) and funds provided by the Congress as OCO to Base Requirements in O&M Army, O&M Navy, and O&M AF.”

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Summary Recap of Budget Activities -----	FY 2020 Actual*	FY 2021 Enacted**	FY 2022 Request
Basic Research	517,217	536,314	490,706
Applied Research	1,687,989	1,777,710	1,488,286
Advanced Technology Development	956,409	1,000,257	810,639
Advanced Component Development & Prototypes	8,137,663	8,794,661	10,516,657
System Development & Demonstration	6,521,351	6,197,754	5,909,640
Management Support	3,911,806	3,153,492	3,371,430
Operational Systems Development	24,069,528	25,290,981	27,290,550
Software and Digital Technology Pilot Programs		149,742	572,807
Total Research, Development, Test & Evaluation	45,801,963	46,900,911	50,450,715
 Summary Recap of FYDP Programs -----			
Strategic Forces	783,840	1,000,079	1,173,877
General Purpose Forces	3,638,050	3,811,478	4,488,007
Intelligence and Communications	1,187,219	1,127,255	1,013,665
Mobility Forces	883,396	1,010,820	844,787
Research and Development	15,377,077	14,184,508	15,653,055
Central Supply and Maintenance	35,898	113,472	86,648
Training Medical and Other	8,302	7,061	10,944
Administration and Associated Activities	87,640	69,398	35,212
Support of Other Nations	3,922	3,592	2,420

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	FY 2020 Actual*	FY 2021 Enacted**	FY 2022 Request
	-----	-----	-----
Space	6,114,555	6,892,677	6,798,318
Classified Programs	17,682,064	18,680,571	20,343,782
Total Research, Development, Test & Evaluation	45,801,963	46,900,911	50,450,715



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Appropriation: 3600F Research, Development, Test & Eval, AF

Line No	Program Element Number	Item	Act	FY 2020 Actual*	FY 2021 Enacted**	FY 2022 Request	Se
1	0601102F	Defense Research Sciences	01	331,102	324,755	328,303	U
2	0601103F	University Research Initiatives	01	172,379	196,502	162,403	U
3	0601108F	High Energy Laser Research Initiatives	01	13,736	15,057		U
		Basic Research		517,217	536,314	490,706	
4	0602020F	Future AF Capabilities Applied Research	02		79,854	79,901	U
5	0602102F	Materials	02	212,551	237,847	113,460	U
6	0602201F	Aerospace Vehicle Technologies	02	148,176	164,426	163,032	U
7	0602202F	Human Effectiveness Applied Research	02	128,434	133,877	136,273	U
8	0602203F	Aerospace Propulsion	02	214,814	201,048	174,683	U
9	0602204F	Aerospace Sensors	02	210,940	232,876	193,514	U
10	0602212F	Defense Laboratories R&D Projects (10 U.S.C, Sec 2358)	02	100,519			U
11	0602298F	Science and Technology Management - Major Headquarters Activities	02	8,346	8,910	8,891	U
12	0602602F	Conventional Munitions	02	132,090	127,193	151,757	U
13	0602605F	Directed Energy Technology	02	114,297	130,375	121,869	U
14	0602788F	Dominant Information Sciences and Methods	02	214,376	215,275	169,110	U
15	0602890F	High Energy Laser Research	02	47,462	29,155		U
16	1206601F	Space Technology	02	155,984			U
		Applied Research		1,687,989	1,560,836	1,312,490	
17	0603032F	Future AF Integrated Technology Demos	03		147,350	131,643	U
18	0603112F	Advanced Materials for Weapon Systems	03	58,657	60,059	31,905	U
19	0603199F	Sustainment Science and Technology (S&T)	03	14,376	16,902	21,057	U

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20	0603203F	Advanced Aerospace Sensors	03	40,116	35,274	44,730	U
21	0603211F	Aerospace Technology Dev/Demo	03	95,730	62,117	70,486	U
22	0603216F	Aerospace Propulsion and Power Technology	03	161,352	144,229	75,273	U
23	0603270F	Electronic Combat Technology	03	45,882	35,841	46,591	U
24	0603401F	Advanced Spacecraft Technology	03	75,405	87,608		U
25	0603444F	Maui Space Surveillance System (MSSS)	03	11,343	12,068		U
26	0603456F	Human Effectiveness Advanced Technology Development	03	32,827	31,667	24,589	U
27	0603601F	Conventional Weapons Technology	03	202,048	133,900	157,423	U
28	0603605F	Advanced Weapons Technology	03	32,578	31,388	28,258	U
29	0603680F	Manufacturing Technology Program	03	133,059	138,748	45,259	U
30	0603788F	Battlespace Knowledge Development and Demonstration	03	53,036	63,106	56,772	U
		Advanced Technology Development		956,409	1,000,257	733,986	
31	0603260F	Intelligence Advanced Development	04	5,672	4,312	5,795	U
32	0603742F	Combat Identification Technology	04	31,367	26,348	21,939	U
33	0603790F	NATO Research and Development	04	4,774	3,640	4,114	U
34	0603851F	Intercontinental Ballistic Missile - Dem/Val	04	29,881	32,899	49,621	U
35	0603859F	Pollution Prevention - Dem/Val	04	2,890			U
36	0604001F	NC3 Advanced Concepts	04			6,900	U
37	0604002F	Air Force Weather Services Research	04	747	2,234	986	U
38	0604003F	Advanced Battle Management System (ABMS)	04	139,203	158,492	203,849	U
39	0604004F	Advanced Engine Development	04	647,850	665,280	123,712	U

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40	0604006F	Architecture Initiatives	04			82,438	U
41	0604015F	Long Range Strike - Bomber	04	2,878,798	2,843,214	2,872,624	U
42	0604032F	Directed Energy Prototyping	04	42,390	19,429	10,820	U
43	0604033F	Hypersonics Prototyping	04	566,935	386,157	438,378	U
44	0604201F	PNT Resiliency, Mods, and Improvements	04	120,267		39,742	U
45	0604257F	Advanced Technology and Sensors	04	23,145	24,702	23,745	U
46	0604288F	Survivable Airborne Operations Center	04	12,205	59,390	133,253	U
47	0604317F	Technology Transfer	04	37,269	16,980	15,768	U
48	0604327F	Hard and Deeply Buried Target Defeat System (HDBTDS) Program	04	111,506	52,825	15,886	U
49	0604414F	Cyber Resiliency of Weapon Systems-ACS	04	54,676	69,656	71,229	U
50	0604776F	Deployment & Distribution Enterprise R&D	04	27,618	25,788	40,103	U
51	0604858F	Tech Transition Program	04	322,793	305,943	343,545	U
52	0605230F	Ground Based Strategic Deterrent	04	538,643	1,447,113	2,553,541	U
53	0207100F	Light Attack Armed Reconnaissance (LAAR) Squadrons	04	1,982			U
54	0207110F	Next Generation Air Dominance	04	872,539	902,440	1,524,667	U
55	0207455F	Three Dimensional Long-Range Radar (3DELRR)	04	22,469	19,321		U
56	0207522F	Airbase Air Defense Systems (ABADS)	04		8,721	10,905	U
57	0208030F	War Reserve Materiel - Ammunition	04			3,943	U
58	0208099F	Unified Platform (UP)	04	9,634	5,979		U
59	0305236F	Common Data Link Executive Agent (CDL EA)	04	36,893	39,221	43,881	U
60	0305251F	Cyberspace Operations Forces and Force Support	04		20,000		U

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61	0305601F	Mission Partner Environments	04	8,237	11,409	16,420	U
62	0306250F	Cyber Operations Technology Support	04	194,958	234,395	242,499	U
63	0306415F	Enabled Cyber Activities	04	16,024	10,541	16,578	U
64	0401310F	C-32 Executive Transport Recapitalization	04		6,197		U
65	0708051F	Rapid Sustainment Modernization (RSM)	04	5,802	19,964		U
66	0901410F	Contracting Information Technology System	04	22,266	5,662	20,343	U
67	1203164F	NAVSTAR Global Positioning System (User Equipment) (SPACE)	04	308,215			U
68	1203710F	EO/IR Weather Systems	04	121,723			U
69	1206422F	Weather System Follow-on	04	195,495			U
70	1206425F	Space Situation Awareness Systems	04	29,013			U
71	1206427F	Space Systems Prototype Transitions (SSPT)	04	137,470			U
72	1206438F	Space Control Technology	04	56,270			U
73	1206730F	Space Security and Defense Program	04	56,385			U
74	1206760F	Protected Tactical Enterprise Service (PTES)	04	101,583			U
75	1206761F	Protected Tactical Service (PTS)	04	154,237			U
76	1206855F	Evolved Strategic SATCOM (ESS)	04	161,882			U
77	1206857F	Space Rapid Capabilities Office	04	25,957			U
		Advanced Component Development & Prototypes		8,137,663	7,428,252	8,937,224	
78	0604200F	Future Advanced Weapon Analysis & Programs	05	4,993	22,894	23,499	U
79	0604201F	PNT Resiliency, Mods, and Improvements	05	202,354	38,494	167,520	U
80	0604222F	Nuclear Weapons Support	05	4,249	26,057	30,050	U

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81	0604270F	Electronic Warfare Development	05	1,994	2,094	2,110	U
82	0604281F	Tactical Data Networks Enterprise	05	182,691	121,188	169,836	U
83	0604287F	Physical Security Equipment	05	11,122	6,740	8,469	U
84	0604329F	Small Diameter Bomb (SDB) - EMD	05	44,530			U
85	0604602F	Armament/Ordnance Development	05	29,505	23,034	9,047	U
86	0604604F	Submunitions	05	3,043	3,085	2,954	U
87	0604617F	Agile Combat Support	05	31,133	18,980	16,603	U
88	0604618F	Joint Direct Attack Munition	05		6,806		U
89	0604706F	Life Support Systems	05	14,137	28,608	25,437	U
90	0604735F	Combat Training Ranges	05	52,678	23,854	23,980	U
91	0604800F	F-35 - EMD	05	7,420	5,413		U
92	0604932F	Long Range Standoff Weapon	05	701,866	384,727	609,042	U
93	0604933F	ICBM Fuze Modernization	05	155,476	156,693	129,709	U
94	0605030F	Joint Tactical Network Center (JTNC)	05	2,326			U
95	0605056F	Open Architecture Management	05	28,902	30,491	37,109	U
96	0605221F	KC-46	05	52,623		1	U
97	0605223F	Advanced Pilot Training	05	328,414	248,216	188,898	U
98	0605229F	HH-60W	05	238,457	63,054	66,355	U
99	0605931F	B-2 Defensive Management System	05	224,358			U
100	0101125F	Nuclear Weapons Modernization	05	10,157	9,665		U
101	0207171F	F-15 EPAWSS	05	46,040	170,368	112,012	U

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102	0207328F	Stand In Attack Weapon	05	151,534	150,371	166,570	U
103	0207701F	Full Combat Mission Training	05	11,238	9,405	7,064	U
104	0305176F	Combat Survivor Evader Locator	05		971		U
105	0401221F	KC-46A Tanker Squadrons	05		76,023	73,458	U
106	0401310F	C-32 Executive Transport Recapitalization	05	62			U
107	0401319F	VC-25B	05	730,183	799,429	680,665	U
108	0701212F	Automated Test Systems	05	2,685	10,654	15,445	U
109	0804772F	Training Developments	05		4,471	4,482	U
110	0901299F	AF A1 Systems	05		7,453		U
111	1203176F	Combat Survivor Evader Locator	05	1,949			U
112	1203269F	GPS III Follow-On (GPS IIIF)	05	427,210			U
113	1203940F	Space Situation Awareness Operations	05	51,749			U
114	1206421F	Counterspace Systems	05	26,246			U
115	1206422F	Weather System Follow-on	05	2,155			U
116	1206425F	Space Situation Awareness Systems	05	349,612			U
117	1206431F	Advanced EHF MILSATCOM (SPACE)	05	111,023			U
118	1206432F	Polar MILSATCOM (SPACE)	05	385,665			U
119	1206433F	Wideband Global SATCOM (SPACE)	05	1,855			U
120	1206441F	Space Based Infrared System (SBIRS) High EMD	05	1			U
121	1206442F	Next Generation OPIR	05	1,470,278			U
122	1206445F	Commercial SATCOM (COMSATCOM) Integration	05	4,817			U

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--	-----	-----	---	-----	-----	-----	c
123	1206853F	National Security Space Launch Program (SPACE) - EMD	05	414,621			U
		System Development & Demonstration		6,521,351	2,449,238	2,570,315	
124	0604256F	Threat Simulator Development	06	58,906	57,620	41,909	U
125	0604759F	Major T&E Investment	06	106,014	208,299	130,766	U
126	0605101F	RAND Project Air Force	06	33,968	35,738	36,017	U
127	0605502F	Small Business Innovation Research	06	884,237			U
128	0605712F	Initial Operational Test & Evaluation	06	13,288	13,532	12,582	U
129	0605807F	Test and Evaluation Support	06	795,626	761,307	811,032	U
130	0605826F	Acq Workforce- Global Power	06	256,906	270,781		U
131	0605827F	Acq Workforce- Global Vig & Combat Sys	06	264,506	254,768	243,796	U
132	0605828F	Acq Workforce- Global Reach	06	159,011	157,964	435,930	U
133	0605829F	Acq Workforce- Cyber, Network, & Bus Sys	06	241,623	254,838	435,274	U
134	0605830F	Acq Workforce- Global Battle Mgmt	06	166,552	177,811		U
135	0605831F	Acq Workforce- Capability Integration	06	239,728	219,467	243,806	U
136	0605832F	Acq Workforce- Advanced Prgm Technology	06	38,517	58,477	103,041	U
137	0605833F	Acq Workforce- Nuclear Systems	06	135,770	179,318	226,055	U
138	0605898F	Management HQ - R&D	06	5,932	5,724	4,079	U
139	0605976F	Facilities Restoration and Modernization - Test and Evaluation Support	06	88,445	70,856	70,788	U
140	0605978F	Facilities Sustainment - Test and Evaluation Support	06	29,424	29,826	30,057	U
141	0606017F	Requirements Analysis and Maturation	06	81,734	68,256	85,799	U
142	0606398F	Management HQ - T&E	06	6,213	5,774	6,163	U

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143	0303166F	Support to Information Operations (IO) Capabilities	06			537	U
144	0303255F	Command, Control, Communication, and Computers (C4) - STRATCOM	06		21,525	25,340	U
145	0308602F	ENTEPRISE INFORMATION SERVICES (EIS)	06	10,239	9,865	28,720	U
146	0702806F	Acquisition and Management Support	06	5,696	13,384	37,211	U
147	0804731F	General Skill Training	06	6,238	1,260	1,506	U
148	0804772F	Training Developments	06			2,957	U
149	0909999F	Financing for Cancelled Account Adjustments	06	4,703			U
150	1001004F	International Activities	06	3,922	3,592	2,420	U
151	1206116F	Space Test and Training Range Development	06	14,515			U
152	1206392F	ACQ Workforce - Space & Missile Systems	06	187,110			U
153	1206398F	Space & Missile Systems Center - MHA	06	10,170			U
154	1206860F	Rocket Systems Launch Program (SPACE)	06	15,613			U
155	1206862F	Tactically Responsive Launch	06	21,965			U
156	1206864F	Space Test Program (STP)	06	25,235		3	U
		Management Support		3,911,806	2,879,982	3,015,788	
157	0604233F	Specialized Undergraduate Flight Training	07	2,492	11,556	5,509	U
158	0604445F	Wide Area Surveillance	07	19,268		2,760	U
159	0604776F	Deployment & Distribution Enterprise R&D	07	870	499		U
160	0604840F	F-35 C2D2	07	624,973	695,869	985,404	U
161	0605018F	AF Integrated Personnel and Pay System (AF-IPPS)	07	39,275	26,986	22,010	U
162	0605024F	Anti-Tamper Technology Executive Agency	07	46,934	47,107	51,492	U

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163	0605117F	Foreign Materiel Acquisition and Exploitation	07	68,397	71,099	71,391	U
164	0605278F	HC/MC-130 Recap RDT&E	07	16,523	19,491	46,796	U
165	0606018F	NC3 Integration	07	25,414	26,308	26,532	U
166	0606942F	Assessments and Evaluations Cyber Vulnerabilities	07		3,000		U
167	0101113F	B-52 Squadrons	07	308,048	482,741	715,811	U
168	0101122F	Air-Launched Cruise Missile (ALCM)	07	10,116	1,430	453	U
169	0101126F	B-1B Squadrons	07	1,000	15,737	29,127	U
170	0101127F	B-2 Squadrons	07	85,742	181,068	144,047	U
171	0101213F	Minuteman Squadrons	07	90,595	89,306	113,622	U
172	0101316F	Worldwide Joint Strategic Communications	07	25,312	31,166	15,202	U
173	0101324F	Integrated Strategic Planning & Analysis Network	07	23,542	24,227		U
174	0101328F	ICBM Reentry Vehicles	07	63,484	112,547	96,313	U
176	0102110F	UH-1N Replacement Program	07	165,844	41,388	16,132	U
177	0102326F	Region/Sector Operation Control Center Modernization Program	07		10,704	771	U
178	0102412F	North Warning System (NWS)	07		100	99	U
179	0102417F	Over-the-Horizon Backscatter Radar	07			42,300	U
180	0202834F	Vehicles and Support Equipment - General	07			5,889	U
181	0205219F	MQ-9 UAV	07	122,919	106,885	85,135	U
182	0205671F	Joint Counter RCIED Electronic Warfare	07	3,854	4,080	3,111	U
183	0207040F	Multi-Platform Electronic Warfare Equipment	07			36,607	U
184	0207131F	A-10 Squadrons	07	25,533	24,490	39,224	U

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185	0207133F	F-16 Squadrons	07	179,655	202,498	224,573	U
186	0207134F	F-15E Squadrons	07	640,124	288,381	239,616	U
187	0207136F	Manned Destructive Suppression	07	15,044	14,933	15,855	U
188	0207138F	F-22A Squadrons	07	537,232	663,825	647,296	U
189	0207142F	F-35 Squadrons	07	94,731	114,621	69,365	U
190	0207146F	F-15EX	07		159,470	118,126	U
191	0207161F	Tactical AIM Missiles	07	10,012	19,382	32,974	U
192	0207163F	Advanced Medium Range Air-to-Air Missile (AMRAAM)	07	53,681	51,705	51,288	U
193	0207227F	Combat Rescue - Pararescue	07	281	668	852	U
194	0207247F	AF TENCAP	07	22,115	18,820	23,685	U
195	0207249F	Precision Attack Systems Procurement	07	10,395	9,244	12,083	U
196	0207253F	Compass Call	07	30,687	15,825	91,266	U
197	0207268F	Aircraft Engine Component Improvement Program	07	108,446	125,666	103,715	U
198	0207325F	Joint Air-to-Surface Standoff Missile (JASSM)	07	73,510	70,663	117,325	U
199	0207327F	Small Diameter Bomb (SDB)	07		20,780	27,109	U
200	0207410F	Air & Space Operations Center (AOC)	07	110,651	51,094	3	U
201	0207412F	Control and Reporting Center (CRC)	07	6,642	16,012	9,875	U
202	0207417F	Airborne Warning and Control System (AWACS)	07	67,341	123,925	171,014	U
203	0207418F	AFSPECWAR - TACP	07	2,372	4,215	4,598	U
205	0207431F	Combat Air Intelligence System Activities	07	13,547	16,534	21,863	U
206	0207438F	Theater Battle Management (TBM) C4I	07		7,844	7,905	U

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207	0207439F	Electronic Warfare Integrated Reprogramming (EWIR)	07			15,000	U
208	0207444F	Tactical Air Control Party-Mod	07	4,019	12,882	13,081	U
209	0207452F	DCAPES	07	19,180	14,789	4,305	U
210	0207521F	Air Force Calibration Programs	07		1,966	1,984	U
211	0207522F	Airbase Air Defense Systems (ABADS)	07			7,392	U
212	0207573F	National Technical Nuclear Forensics	07	1,723	395	1,971	U
213	0207590F	Seek Eagle	07	28,175	29,626	30,539	U
214	0207601F	USAF Modeling and Simulation	07	15,243	17,634	17,110	U
215	0207605F	Wargaming and Simulation Centers	07	4,158	6,341	7,535	U
216	0207610F	Battlefield Abn Comm Node (BACN)	07	25,960	6,815	32,008	U
217	0207697F	Distributed Training and Exercises	07	4,146	3,384	4,007	U
218	0208006F	Mission Planning Systems	07	69,232	91,601	92,557	U
219	0208007F	Tactical Deception	07	7,173		489	U
220	0208064F	OPERATIONAL HQ - CYBER	07	7,335	5,493	2,115	U
221	0208087F	Distributed Cyber Warfare Operations	07	67,725	68,154	72,487	U
222	0208088F	AF Defensive Cyberspace Operations	07	37,309	30,108	18,449	U
223	0208097F	Joint Cyber Command and Control (JCC2)	07	11,306	38,410	79,079	U
224	0208099F	Unified Platform (UP)	07	90,002	84,491	101,893	U
228	0208288F	Intel Data Applications	07	1,156	1,224	493	U
229	0301025F	GeoBase	07	2,623	2,762	2,782	U
230	0301112F	Nuclear Planning and Execution System (NPES)	07	42,719	32,699		U

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231	0301113F	Cyber Security Intelligence Support	07			5,224	U
238	0301401F	Air Force Space and Cyber Non-Traditional ISR for Battlespace Awareness	07	3,575	1,382	2,463	U
239	0302015F	E-4B National Airborne Operations Center (NAOC)	07	58,059	3,462	26,331	U
240	0303131F	Minimum Essential Emergency Communications Network (MEECN)	07	13,132	44,640	20,700	U
241	0303133F	High Frequency Radio Systems	07	15,689			U
242	0303140F	Information Systems Security Program	07	26,732	10,351	8,032	U
243	0303142F	Global Force Management - Data Initiative	07	2,129	1,344	452	U
244	0303248F	All Domain Common Platform	07			64,000	U
246	0304260F	Airborne SIGINT Enterprise	07	85,157	127,876	97,546	U
247	0304310F	Commercial Economic Analysis	07	3,305	4,035	3,770	U
250	0305015F	C2 Air Operations Suite - C2 Info Services	07	9,022			U
251	0305020F	CCMD Intelligence Information Technology	07	1,121	1,646	1,663	U
252	0305022F	ISR Modernization & Automation Dvmt (IMAD)	07	19,000	19,230	18,888	U
253	0305099F	Global Air Traffic Management (GATM)	07	4,404	4,637	4,672	U
254	0305103F	Cyber Security Initiative	07		383	290	U
255	0305111F	Weather Service	07	34,292	36,573	26,228	U
256	0305114F	Air Traffic Control, Approach, and Landing System (ATCALs)	07	8,394	6,541	8,749	U
257	0305116F	Aerial Targets	07	8,761	448	1,528	U
260	0305128F	Security and Investigative Activities	07	409	431	223	U
261	0305145F	Arms Control Implementation	07	40,177			U
262	0305146F	Defense Joint Counterintelligence Activities	07	6,858	4,881	8,733	U

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264	0305179F	Integrated Broadcast Service (IBS)	07	8,728	8,848	21,335	U
265	0305202F	Dragon U-2	07	36,389	36,593	17,146	U
266	0305205F	Endurance Unmanned Aerial Vehicles	07	15,000			U
267	0305206F	Airborne Reconnaissance Systems	07	137,157	123,287	71,791	U
268	0305207F	Manned Reconnaissance Systems	07	11,787	14,684	14,799	U
269	0305208F	Distributed Common Ground/Surface Systems	07	25,009	14,126	24,568	U
270	0305220F	RQ-4 UAV	07	191,733	163,291	83,124	U
271	0305221F	Network-Centric Collaborative Targeting	07	10,757	15,022	17,224	U
272	0305238F	NATO AGS	07	32,567	36,664	19,473	U
273	0305240F	Support to DCGS Enterprise	07	37,774	33,486	40,421	U
274	0305600F	International Intelligence Technology and Architectures	07	13,515	17,283	14,473	U
275	0305881F	Rapid Cyber Acquisition	07	4,223	4,254	4,326	U
276	0305984F	Personnel Recovery Command & Ctrl (PRC2)	07	2,057	2,203	2,567	U
277	0307577F	Intelligence Mission Data (IMD)	07	8,614	6,266	6,169	U
278	0401115F	C-130 Airlift Squadron	07	89,532	41,896	9,752	U
279	0401119F	C-5 Airlift Squadrons (IF)	07	9,883	30,560	17,507	U
280	0401130F	C-17 Aircraft (IF)	07	20,653	9,935	16,360	U
281	0401132F	C-130J Program	07	6,919	10,656	14,112	U
282	0401134F	Large Aircraft IR Countermeasures (LAIRCM)	07	5,247	5,497	5,540	U
283	0401218F	KC-135s	07		4,583	3,564	U
284	0401219F	KC-10s	07	19			U

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285	0401318F	CV-22	07	17,355	18,385	17,189	U
286	0408011F	Special Tactics / Combat Control	07	3,543	7,659	6,640	U
287	0702207F	Depot Maintenance (Non-IF)	07	1,821			U
288	0708055F	Maintenance, Repair & Overhaul System	07	9,239	24,468	26,921	U
289	0708610F	Logistics Information Technology (LOGIT)	07	10,133	33,186	7,071	U
290	0708611F	Support Systems Development	07	522	11,816		U
291	0804743F	Other Flight Training	07	2,054	1,330	1,999	U
292	0808716F	Other Personnel Activities	07	10			U
293	0901202F	Joint Personnel Recovery Agency	07	1,985	2,088	1,841	U
294	0901218F	Civilian Compensation Program	07	3,809	3,862	3,560	U
295	0901220F	Personnel Administration	07	4,265	1,581	3,368	U
296	0901226F	Air Force Studies and Analysis Agency	07	1,390	1,195	1,248	U
297	0901538F	Financial Management Information Systems Development	07	8,983	6,993	4,852	U
298	0901554F	Defense Enterprise Acntng and Mgt Sys (DEAMS)	07	40,239	40,564		U
299	1201017F	Global Sensor Integrated on Network (GSIN)	07	3,532			U
300	1201921F	Service Support to STRATCOM - Space Activities	07	952	991		U
301	1202140F	Service Support to SPACECOM Activities	07	11,429	8,983	6,737	U
302	1203001F	Family of Advanced BLoS Terminals (FAB-T)	07	173,903			U
303	1203110F	Satellite Control Network (SPACE)	07	54,850			U
305	1203173F	Space and Missile Test and Evaluation Center	07	5,322			U
306	1203174F	Space Innovation, Integration and Rapid Technology Development	07	36,890			U

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308	1203265F	GPS III Space Segment	07	47,178			U
309	1203400F	Space Superiority Intelligence	07	14,428			U
310	1203614F	JSpOC Mission System	07	82,044			U
311	1203620F	National Space Defense Center	07	2,649			U
312	1203873F	Ballistic Missile Defense Radars	07	15,335			U
313	1203913F	NUDET Detection System (SPACE)	07	49,300			U
314	1203940F	Space Situation Awareness Operations	07	16,228			U
315	1206423F	Global Positioning System III - Operational Control Segment	07	439,560			U
316	1206770F	Enterprise Ground Services	07	114,824			U
9999	9999999999	Classified Programs		17,682,064	15,023,205	15,868,973	U
		Operational Systems Development		24,069,528	20,505,963	21,705,541	
317	0608158F	Strategic Mission Planning and Execution System - Software Pilot Program	08			96,100	U
318	0608410F	Air & Space Operations Center (AOC) - Software Pilot Program	08			186,915	U
319	0608920F	Defense Enterprise Accounting and Management System (DEAMS) - Software Pilot Pro	08			135,263	U
		Software and Digital Technology Pilot Programs				418,278	
Total Research, Development, Test & Eval, AF				45,801,963	36,360,842	39,184,328	

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Tactical Air Control Party-Mod	0207444F	208	07.....	Volume 3a - 689
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USAF Modeling and Simulation	0207601F	214	07.....	Volume 3a - 739
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Unified Platform (UP)	0208099F	224	07.....	Volume 3a - 885
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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604233F / <i>Specialized Undergraduate Flight Training</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	2.492	11.556	5.509	0.000	5.509	-	-	-	-	-	-
674101: <i>Undergraduate Remotely Piloted Aircraft Training</i>	-	0.768	0.809	0.814	0.000	0.814	-	-	-	-	-	-
676035: <i>T-6 Operational System Development</i>	-	1.141	1.832	0.223	0.000	0.223	-	-	-	-	-	-
676037: <i>T-38 Operational System Development</i>	-	0.583	8.915	4.472	0.000	4.472	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

Supports Air Education and Training Command's implementation of Specialized Undergraduate Pilot Training and the Department of Defense initiative for joint pilot training.

Undergraduate Remotely Piloted Aircraft Training supports Air Education and Training Command's implementation of Undergraduate Remotely Piloted Aircraft Training. This program provides and maintains the currency of Predator Reaper Integrated Mission Environment Desktop Training System.

T-6 Operational System Development continues follow on development activities to the T-6 including but not limited to studies & development efforts, instructional courseware, and logistics support to include Diminishing Manufacturing Sources & Materiel Shortages (DMSMS) and development activities related to DMSMS. Included is development for the Next Generation On-Board Oxygen Generation System, Crash Survivable Recorder (CSR), Controlled Flight Into Terrain - Prevention (CFIT-Prevention), Pilot Training Next (PTN) and associated upgrades. There are currently 443 aircraft in the Air Force inventory. Remaining service life is up to 39 years from the final delivery in May 2010.

The T-38 program continues studies & development efforts supporting future ACAT III Engineering Change Proposals to address DMSMS issues for the T-38 Platform and regular block upgrades for the T-38C as required to keep the system current. Block upgrades incorporate software and/or hardware improvements for the aircraft and aircrew training devices to address flight safety issues and to comply with new capabilities mandated by Department of Defense, Federal Aviation Administration, or National Airspace System.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Specialized Undergraduate Flight Training system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0.000M was expended for civilian pay expenses in this program element, and in FY21 \$0.000M is forecasted for civilian pay expenses in this program element.

This requirement supports performance of a full financial audit as required by title 10 U.S.C. Chapter 9A, Sec 240-D.

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604233F / <i>Specialized Undergraduate Flight Training</i>
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This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	2.584	8.777	5.592	0.000	5.592
Current President's Budget	2.492	11.556	5.509	0.000	5.509
Total Adjustments	-0.092	2.779	-0.083	0.000	-0.083
• Congressional General Reductions	0.000	-0.021			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	2.800			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.092	0.000			
• Other Adjustments	0.000	0.000	-0.083	0.000	-0.083

**Congressional Add Details (\$ in Millions, and Includes General Reductions)**

**Project:** 676037: *T-38 Operational System Development*

Congressional Add: *Predator Reaper Integrated Mission Environment (PRIME) Desktop Training System (DTS) Support*

Congressional Add Subtotals for Project: 676037

Congressional Add Totals for all Projects

	FY 2020	FY 2021
	0.000	2.800
	0.000	2.800
	0.000	2.800

**Change Summary Explanation**

FY 2022 Funding request was increased by \$2.800 million due to Congressional Add for PRIME DTS.



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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0604233F / <i>Specialized Undergraduate Flight Training</i>				<b>Project (Number/Name)</b> 674101 / <i>Undergraduate Remotely Piloted Aircraft Training</i>			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
674101: <i>Undergraduate Remotely Piloted Aircraft Training</i>	-	0.768	0.809	0.814	0.000	0.814	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

This effort supports Air Education and Training Command's (AETC) implementation of Undergraduate Remotely Piloted Aircraft (RPA) Training (URT). URT produces RPA pilots and Sensor Operators from accession sources to man RPA squadrons.

Success of the program is heavily dependent on Predator Reaper Integrated Mission Environment (PRIME) Desktop Training System to prepare undergraduate students for entry in RPA Formal Training Units (FTU). PRIME has completed seven Phases of development and is now at baseline functionality. PRIME is a desktop trainer similar to the Reaper training system now in use to train undergraduate RPA pilots and sensor operators. PRIME currently emulates the MQ-9 Reaper and needs to keep pace with that baseline system and expand to other RPAs in order to maintain concurrency and relevancy. Funds will also be used to develop enhancements that increase fidelity and functionality.

Funds may be used to address emerging and short-notice Diminishing Manufacturing Sources and Material Shortage (DMSMS) issues. Diminishing Manufacturing Sources efforts include removal of end-of-life software/hardware within simulators systems and move to a modular, common open system architecture that is sustainable and cyber-resilient.

Implementation requirements and standards are defined under the Simulator Common Architecture Requirements and Standards (SCARS) initiative.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver the Specialized Undergraduate Flight Training system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0.000M was expended for civilian pay expenses in this program element, and in FY21 \$0.000M is forecasted for civilian pay expenses in this program element.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022
<b>Title:</b> Predator Reaper Integrated Mission Environment (PRIME) support	0.768	0.809	0.814
<b>Description:</b> Add Phase 8 operational capabilities.			
<b>FY 2021 Plans:</b> Stand up a SIL: URT GBTS requires the development of an independent software / hardware testing capability on a stand-alone device. Effort includes researching, designing, developing, and building a SIL.			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604233F / <i>Specialized Undergraduate Flight Training</i>	<b>Project (Number/Name)</b> 674101 / <i>Undergraduate Remotely Piloted Aircraft Training</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>Air Traffic Control Integration Study: Feasibility study of Live ATC integration into the URT GBTS.</p> <p>Flight Planning Software: Replace tactical situation display software with new software solutions that have to be developed and integrated with PRIME. Development of new training simulation software to replace the current software on URTIS and PRIME to train RPA pilots.</p> <p><b>FY 2022 Plans:</b></p> <p>Transition support of PRIME from contractor support to organic sustainment at Oklahoma City Air Logistics Complex, Tinker AFB, OK. Develop and implement live air traffic control integration Study into the URT GBTS.</p> <p>Flight Planning Software: Further development of flight planning software.</p> <p>Continue development of new training simulation software to replace the current software on URTIS and PRIME to train RPA pilots. Continue effort to develop organic software capabilities and replace proprietary software.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b></p> <p>Funding increased due to economic adjustments.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	0.768	0.809	0.814

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

Transition support of PRIME from contractor support to organic sustainment at Oklahoma City Air Logistics Complex, Tinker AFB, OK.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force	Date: May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604233F / Specialized Undergraduate Flight Training	<b>Project (Number/Name)</b> 674101 / Undergraduate Remotely Piloted Aircraft Training
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<b>Product Development (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Undergraduate Remotely Piloted Aircraft Training Phased planning, design, and development of software updates	SS/FFP	Cubic Corporation : Tinker AFB, OK	-	0.698	Mar 2020	0.733	Mar 2021	0.719	Mar 2022	-		0.719	-	-	-
<b>Subtotal</b>			-	0.698		0.733		0.719		-		0.719	-	-	N/A

<b>Management Services (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Undergraduate Remotely Piloted Aircraft Training PMA Other Government Cost and Contract Services	SS/CPFF	Program Office : WPAFB, OH	-	0.070	Oct 2019	0.076	Oct 2020	0.095	Oct 2021	-		0.095	-	-	-
<b>Subtotal</b>			-	0.070		0.076		0.095		-		0.095	-	-	N/A

	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>	-	0.768	0.809	0.814	-	0.814	-	-	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604233F / <i>Specialized Undergraduate Flight Training</i>	<b>Project (Number/Name)</b> 674101 / <i>Undergraduate Remotely Piloted Aircraft Training</i>

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b><i>Predator Reaper Integrated Mission Environment (PRIME) Support</i></b>																													
Phase 8 Design/Development	██████████																												
Phase 8 Design/Development continued					████████████████████																								
Phase 9 Planning													████████████████																
Phase 9 Design/Development																													

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604233F / <i>Specialized Undergraduate Flight Training</i>	<b>Project (Number/Name)</b> 674101 / <i>Undergraduate Remotely Piloted Aircraft Training</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Predator Reaper Integrated Mission Environment (PRIME) Support</i></b>				
Phase 8 Design/Development	1	2020	2	2021
Phase 8 Design/Development continued	2	2021	1	2023
Phase 9 Planning	1	2023	1	2024
Phase 9 Design/Development	1	2024	4	2026

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0604233F / <i>Specialized Undergraduate Flight Training</i>				<b>Project (Number/Name)</b> 676035 / <i>T-6 Operational System Development</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
676035: <i>T-6 Operational System Development</i>	-	1.141	1.832	0.223	0.000	0.223	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

T-6 Operational System Development continues follow on development activities to JPATS including but not limited to studies and development efforts, instructional courseware, and logistics support to include Diminishing Manufacturing Sources (DMS) and development activities related to DMS. Included is development for the Next Generation On-Board Oxygen Generation System, Automatic Dependent Surveillance Broadcast Out (ADS-B Out), Crash Survivable Recorder (CSR), Controlled Flight Into Terrain - Prevention (CFIT-Prevention), Pilot Training Next (PTN) and associated upgrades. There are currently 443 aircraft in the Air Force inventory. Remaining service life is up to 39 years from the final delivery in May 2010.

Funding contained in this platform's documentation directly aids Air Education Training Command flying training enterprise to continue its overall pilot production increase starting in FY2020 thus reducing the USAF Pilot Shortage.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver the Specialized Undergraduate Flight Training system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0.000M was expended for civilian pay expenses in this program element, and in FY21 \$0.000M is forecasted for civilian pay expenses in this program element.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> T-6A (JPATS) Studies and Analysis	0.100	1.732	0.223
<b>Description:</b> T-6A (JPATS) studies and development activities including but not limited to: Engine Preservation/Upgrade Development, On-Board Oxygen Generation System (OBOGS) Characterization Study, Next Generation On-Board Oxygen Generation System Study, Supplemental Oxygen System Study, Cockpit Environmental Monitoring/Analysis, and Physiological Events (PE) Analysis. Includes engineering and contractor support/services and Program Management Administration (PMA) costs.			
<b>FY 2021 Plans:</b> Continue T-6A aircraft studies and development activities including but not limited to: engine preservation development, cockpit environmental monitoring/analysis, diminishing manufacturing source issues, and upgrades to on-aircraft software packages.			
<b>FY 2022 Plans:</b>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604233F / <i>Specialized Undergraduate Flight Training</i>	<b>Project (Number/Name)</b> 676035 / <i>T-6 Operational System Development</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Continue T-6A aircraft studies and development activities including but not limited to: engine preservation development, cockpit environmental monitoring/analysis, diminishing manufacturing source issues, and upgrades to on-aircraft software packages. <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreased due to reduced studies and analysis and realignment of funds.				
<b>Title:</b> Next Generation On-Board Oxygen Generation System <b>Description:</b> The Next Generation On-Board Oxygen Generation System will provide the aircraft with a system that will meet and/or exceed the Military Standard 3050 specifications. The development and fielding of this capability will directly improve the safety of pilot training. This acquisition is a direct response to Air Education and Training Command requirements and on-going Physiological Events (PE) in the T-6A aircraft. <b>FY 2021 Plans:</b> Continue RDT&E activities to include but not limited to: development, integration, test and certification of the Next Generation On-Board Oxygen Generation System that meets or exceeds Mil Standard 3050 specifications. <b>FY 2022 Plans:</b> N/A <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreased due to completion of RDT&E activities for Next Generation On-Board Oxygen Generation System in FY 2022.		0.661	0.100	0.000
<b>Title:</b> Crash Survivable Recorder (CSR) <b>Description:</b> Crash Survivable Recorder (CSR) will provide the aircraft with a system that will meet the minimum crash survivable data collection capability as outlined in Air Force Instruction 63-133 Aircraft Information Program (Change 1, 4 November 2010) and SECDEF Memo of 22 June 06, Reducing Preventable Accidents. Includes engineering and contractor support/services and PMA costs. <b>FY 2021 Plans:</b> N/A <b>FY 2022 Plans:</b> N/A <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreased due to completion of the Crash Survivable Recorder R&D efforts.		0.380	0.000	0.000
<b>Accomplishments/Planned Programs Subtotals</b>		1.141	1.832	0.223

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604233F / <i>Specialized Undergraduate Flight Training</i>	<b>Project (Number/Name)</b> 676035 / <i>T-6 Operational System Development</i>

**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 06 Line Item 000999: <i>Initial Spares/Repair Parts</i>	-	-	-	-	-	-	-	-	-	-	-
• APAF 05 Line Item JPAT00: <i>T-6</i>	11.826	23.929	8.735	-	8.735	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

The Air Force is lead service for the T-6 Operational Systems Development program and currently manages upgrades to the entire family of systems for both the Air Force and Navy. T-6 Operational Systems Development acquisition strategy for satisfying emerging software and hardware requirements is designed to enable competition and control cost. Development resulting from Diminishing Manufacturing Sources and Material Shortages requirement will be evaluated and implemented incrementally to efficiently deliver required capabilities to AETC.



**UNCLASSIFIED**

**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604233F / <i>Specialized Undergraduate Flight Training</i>	<b>Project (Number/Name)</b> 676035 / <i>T-6 Operational System Development</i>
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
T-6 Operational System Development Crash Survivable Recorder	C/FFP	Scientific Research Corp : Atlanta, GA	-	0.338	Mar 2020	1.616	Jan 2021	-		-		-	-	-	-
T-6 Operational System Development Alternative On-Board Oxygen Generation System	C/CPAF	Textron Aviation Defense : Wichita, KS	-	0.703	Feb 2020	-		-		-		-	-	-	-
<b>Subtotal</b>			-	1.041		1.616		-		-		-	-	-	N/A

**Remarks**  
The second phase of the Crash Survivable Recorder RDT&E effort awarded 2Q FY21.

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test and Evaluation	C/CPAF	Not specified. : TBD	-	-		0.216	May 2021	0.223	May 2022	-		0.223	-	-	-
Physiological Event's: Edwards Test Center	PO	Edwards Test Center : Edwards, CA	-	0.100	Oct 2019	-		-		-		-	-	-	-
<b>Subtotal</b>			-	0.100		0.216		0.223		-		0.223	-	-	N/A

**Remarks**  
Continue Unknown Physiological Event's studies at Edwards AFB. Phase II of this effort began 3Q in FY21. Phase III will begin in 3Q FY22.

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>		-	1.141	1.832	0.223	0.223	-	-	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604233F / <i>Specialized Undergraduate Flight Training</i>	<b>Project (Number/Name)</b> 676035 / <i>T-6 Operational System Development</i>

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>Joint Primary Aircraft Training System</b>																												
T-6 (JPATS) Studies																												
<b>Avionics Systems Development</b>																												
T-6 Crash Survivable Recorder																												
<b>Crew Systems Development</b>																												
T-6 Alternative On-Board Oxygen Generation System																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604233F / <i>Specialized Undergraduate Flight Training</i>	<b>Project (Number/Name)</b> 676035 / <i>T-6 Operational System Development</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Joint Primary Aircraft Training System</i></b>				
T-6 (JPATS) Studies	1	2020	4	2026
<b><i>Avionics Systems Development</i></b>				
T-6 Crash Survivable Recorder	2	2020	2	2022
<b><i>Crew Systems Development</i></b>				
T-6 Alternative On-Board Oxygen Generation System	2	2020	2	2022

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0604233F / <i>Specialized Undergraduate Flight Training</i>				<b>Project (Number/Name)</b> 676037 / <i>T-38 Operational System Development</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
676037: <i>T-38 Operational System Development</i>	-	0.583	8.915	4.472	0.000	4.472	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The T-38 is a twin engine, two seat (tandem), supersonic jet trainer used by Air Education and Training Command (AETC) as an advanced trainer in Specialized Undergraduate Pilot Training. Modifications are budgeted to enhance operational capability while improving flight safety, reliability and maintainability. There are currently 497 active T-38's in the Air Force inventory (53 T-38A, six (6) AT-38B and 438 T-38C). T-38s first entered service in 1960 and average over 50 years old.

Studies & development efforts supporting future ACAT III Engineering Change Proposals to address obsolescence issues for the T-38 platform and accomplish the regular block upgrades on the T-38C as required to keep the system current. Block upgrades will be accomplished with Operations & Maintenance funding unless the block upgrade provides additional capabilities. Block upgrades incorporate software and/or hardware improvements to comply with new capabilities mandated by Department of Defense, Federal Aviation Administration, or National Airspace System, and to address flight safety issues. The block upgrades support the T-38C aircraft and Aircrew Training Devices.

Block 11 - Updates the T-38C avionics software to include updates for the Operational Flight Program (OFF), Aircrew Training Device (ATD), Joint Mission Planning System (JMPS), and applicable Ground Station Software (GSS).

Multi-Functional Display (MFD) and the Electronic Engine Display (EED) - L3 Display Systems is unable to continue support of the T-38C MFD and EED beyond March 2026. Development of replacement displays must begin in FY21 to ensure continued AETC pilot production. There are 2 MFDs and 2 EEDs per aircraft (1,768 displays). A new Digital Fuel Mass Flow Transmitter will need to be incorporated into the EED redesign which will reduce Unscheduled Engine Removals (UER). This is a top driver of engine removals across the T-38C fleet; replacement will increase MTBF and save the USAF repair and maintenance costs.

Video Data Transfer Unit (VDTU) - The current T-38C VDTU is obsolete and the Compact Flash Cards (CFC) that record flight data are no longer procurable and are unsustainable in terms of repair cost, maintenance actions, aircraft downtime, and availability of replacement parts. A redesigned VDTU is required to interface at the higher data speeds inherent with new technology such as the recently installed Mission Display Processor. An increased data recorder sample rate will need to be incorporated as well as the Power Level Angle recording to monitor engine performance. Increase recording capability is required to handle the increased data flow.

Flight Director/Attitude Heading and Reference System (AHARS) - Requirement to develop, integrate, and replace the Attitude Director Indicator (ADI), Horizontal Situation Indicator (HSI), Attitude Gyro Control Assembly, Rate Switching Gyro, Rate Gyro Transmitter, Servo-Amplifier, and Flight Director Computer for the T-38A/AT-38B. The intent of this effort is to significantly improve sub-system reliability, suitability, and pilot safety during flight operations.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604233F / <i>Specialized Undergraduate Flight Training</i>	<b>Project (Number/Name)</b> 676037 / <i>T-38 Operational System Development</i>
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Traffic Collision Avoidance System (TCAS) - to update firmware on approximately 448 T-38C TCAS units. The need for which derives from increased TCAS II processor failures resulting from increased squitter traffic associated with Automatic Dependent Surveillance - Broadcast (ADS-B) transmissions.

T-38A & AT-38B Speed Brake Open Warning Light - Is a new requirement that will require market research and an estimate. This modification has been accomplished on the T-38C however the avionics system architecture prevent to T-38C design incorporation in to the T-38A and AT-38B.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver the Specialized Undergraduate Flight Training system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0.000M was expended for civilian pay expenses in this program element, and in FY21 \$0.000M is forecasted for civilian pay expenses in this program element.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022
<p><b>Title:</b> T-38 Avionics Component Integration (AvCI)</p> <p><b>Description:</b> T-38C Avionics System obsolescence remediation effort is developing and qualifying replacement components/Line Replaceable Units (LRU) that are becoming non-supportable. Systems include the Mission Display Processor (MDP), Heads-Up Display (HUD) and Very High Frequency (VHF) Communication and Navigation radios. Furthermore, L3 Display Systems is unable to continue support of the T-38C Multi-Functional Display (MFD) and the Electronic Engine Display (EED) beyond March 2026. Development of replacement displays must begin in FY20 to ensure continued AETC pilot production beyond March of 2026.</p> <p><b>FY 2021 Plans:</b> Begin T-38C Operational Flight Plan and Aircrew Training Device software efforts for the planned Block 11 Upgrade, including requirements development, integration, and fielding. Begin implementation of Product Improvement Change Requests which fix software bugs, provide security enhancements, and new capabilities. Begin 64 Bit development of the Joint Mission Planning Unique Product Component. Develop and implement Cyber Security requirements for the T-38C Block 11 software.</p> <p><b>FY 2022 Plans:</b> Continue Block 11 JMPS and T-38C Operational Flight Program development. Begin development of the new EED and MFD displays.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreased due to anticipated completion of Block 11 development and testing.</p>	0.583	3.759	2.760
<p><b>Title:</b> T-38 Studies and Development Efforts</p> <p><b>Description:</b> Studies and efforts to support future ACAT III Engineering Change Proposals to address obsolescence issues and the regular block upgrades that are required to keep the system current.</p> <p><b>FY 2021 Plans:</b></p>	0.000	2.356	1.712

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604233F / <i>Specialized Undergraduate Flight Training</i>	<b>Project (Number/Name)</b> 676037 / <i>T-38 Operational System Development</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Cyber Security software requirements that impact the T-38C Operational Flight Program will be resolved as part Block 11 development, which will begin in FY21.  <b>FY 2022 Plans:</b> Continue and complete Block 11 Cyber Security development and testing.  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreased due to anticipated completion of Block 11 development and testing.			
<b>Accomplishments/Planned Programs Subtotals</b>	0.583	6.115	4.472

	<b>FY 2020</b>	<b>FY 2021</b>
<b>Congressional Add:</b> Predator Reaper Integrated Mission Environment (PRIME) Desktop Training System (DTS) Support  <b>FY 2020 Accomplishments:</b> N/A  <b>FY 2021 Plans:</b> Transition support of PRIME from contractor support to organic sustainment at Oklahoma City Air Logistics Complex, Tinker AFB, OK. Upgrade current computer systems to Windows 10 to comply with DoD cybersecurity mandates.	0.000	2.800
<b>Congressional Adds Subtotals</b>	0.000	2.800

**C. Other Program Funding Summary (\$ in Millions)**

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• APAF 05 Line Item T03800: T-38	37.341	36.806	52.121	-	52.121	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**  
The T-38 Platform Operations System Development acquisition strategy for satisfying emerging software and hardware requirements is designed to enable competition and cost control. Developmental requirements resulting from Diminishing Manufacturing Sources and Material Shortages research and reporting will be evaluated and implemented incrementally to efficiently deliver required capabilities to Air Education & Training Command in support of the pilot training program. System block upgrades will be required to maintain aircraft airworthiness and will be implemented based on Air Education & Training Command requirements. An appropriate level of technical data rights is required by all current support contracts.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604233F / <i>Specialized Undergraduate Flight Training</i>	<b>Project (Number/Name)</b> 676037 / <i>T-38 Operational System Development</i>
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Contract FA8211-16-D-0001 is a Type D Indefinite Delivery, Indefinite Quantity contract competitively awarded to address T-38C avionics system obsolescence issues and provide Contractor Logistics Support follow-on support. The Avionics Component Integration contract was awarded 8 January 2016. Obsolescence remediation efforts began immediately and the follow-on Contractor Logistics Support effort began 1 April 2017. The period of performance ends 31 March 2026.

The T-38C display and VDTU obsolescence issues are within scope on the current contract with Boeing. The contract FA8211-16-D-0001 will be utilized for development and procurement.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604233F / <i>Specialized Undergraduate Flight Training</i>	<b>Project (Number/Name)</b> 676037 / <i>T-38 Operational System Development</i>
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<b>Product Development (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
T-38 Avionics System DMSMS mitigation efforts	C/CPFF	The Boeing Company : St. Louis, MO	-	0.583	Feb 2020	3.745	Jun 2021	2.706	Nov 2021	-		2.706	-	-	-
T-38C Block 11 Hardware and Software Upgrade Development	C/FFP	The Boeing Company : TBD	-	-		2.356	Jul 2021	1.668	Nov 2021	-		1.668	-	-	-
Undergraduate Remotely Piloted Aircraft Training Organic Development	MIPR	76 SWEG : Tinker AFB, OK	-	-		2.800		-		-		-	-	-	-
<b>Subtotal</b>			-	0.583		8.901		4.374		-		4.374	-	-	N/A

<b>Management Services (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
PMA Contract Services	C/FFP	Not specified. : NV	-	-		0.014	Dec 2020	0.038	Dec 2021	-		0.038	-	-	-
PMA Other Government Costs	Various	Not specified. : NV	-	0.000	Dec 2019	-		0.060	Dec 2021	-		0.060	-	-	-
<b>Subtotal</b>			-	0.000		0.014		0.098		-		0.098	-	-	N/A

<b>Project Cost Totals</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
-	-	0.583	8.915	4.472	-	4.472	-	-	N/A

**Remarks**



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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604233F / <i>Specialized Undergraduate Flight Training</i>	<b>Project (Number/Name)</b> 676037 / <i>T-38 Operational System Development</i>

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b><i>T-38C EED/MFD Development</i></b>																												
Development																												
Flight test																												
<b><i>T-38C VDTU Development</i></b>																												
Development																												
Flight Test																												
<b><i>T-38C Block 11 Upgrade</i></b>																												
Development																												
Flight Test																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604233F / <i>Specialized Undergraduate Flight Training</i>	<b>Project (Number/Name)</b> 676037 / <i>T-38 Operational System Development</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>T-38C EED/MFD Development</i></b>				
Development	3	2021	3	2023
Flight test	3	2023	3	2023
<b><i>T-38C VDTU Development</i></b>				
Development	1	2023	2	2024
Flight Test	2	2024	3	2025
<b><i>T-38C Block 11 Upgrade</i></b>				
Development	4	2021	1	2023
Flight Test	3	2022	1	2023

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604445F / <i>Wide Area Surveillance</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	0.000	19.268	0.000	2.760	0.000	2.760	-	-	-	-	-	-
675899: <i>Wide Area Surveillance</i>	0.000	19.268	0.000	2.760	0.000	2.760	-	-	-	-	-	-

**Program MDAP/MAIS Code:** 519

**Note**

This program, BA 7, PE 0604445F, project 675899, Development, Test & Fielding, is a new start.

**A. Mission Description and Budget Item Justification**

Wide Area Surveillance (WAS) consists of two advanced sensor systems, the Stateside Affordable Radar System (STARS) and Scorpion, incorporated into a single WAS System. Based on existing technological capabilities, WAS detects/tracks low, slow and other asymmetrical threats in the airspace and meets the user needs by sensing stressing airborne targets in complex environments with affordable sensors. The sensor outputs will be incorporated into the Battle Control Systems-Fixed (BCS-F) air picture and utilized as the North American Aerospace Defense Command/ Northern Command (NORAD/NORTHCOM) Command and Control (C2) air surveillance system of record.

Some aspects of the WAS program are classified. These will be provided on a need-to-know basis.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver WAS system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 0.000M was expended for civilian pay expenses in this program element, and in FY21 0.000M is forecasted for civilian pay expenses in this program element.

This requirement supports performance of a full financial audit as required by title 10 U.S.C. Chapter 9A, Sec 240-D.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604445F / <i>Wide Area Surveillance</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	0.000	0.003	0.000	0.000	0.000
Current President's Budget	19.268	0.000	2.760	0.000	2.760
Total Adjustments	19.268	-0.003	2.760	0.000	2.760
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	20.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.732	0.000			
• Other Adjustments	0.000	-0.003	2.760	0.000	2.760

**Change Summary Explanation**

FY20 Tech Adjustment approved \$19.3M for STARS (S1) Block 2 developmental prototype.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0604445F / <i>Wide Area Surveillance</i>				<b>Project (Number/Name)</b> 675899 / <i>Wide Area Surveillance</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
675899: <i>Wide Area Surveillance</i>	0.000	19.268	0.000	2.760	0.000	2.760	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Note**  
This program, BA 7, PE 0604445F, project 675899, Development, Test & Fielding, is a new start.

**A. Mission Description and Budget Item Justification**

Wide Area Surveillance (WAS) consists of two advanced sensor systems, the Stateside Affordable Radar System (STARS) and Scorpion, incorporated into a single WAS System. Based on existing technological capabilities, WAS detects/tracks low, slow and other asymmetrical threats in the airspace and meets the user needs by sensing stressing airborne targets in complex environments with affordable sensors. The sensor outputs are incorporated into the Battle Control Systems-Fixed (BCS-F) air picture and utilized as the North American Aerospace Defense Command/ Northern Command (NORAD/NORTHCOM) Command and Control (C2) air surveillance system of record. This effort is for a S1 Block 2 for the STARS system. FY22 funds will support fielding, integration, testing activities, and sustainment until an operational decision is made.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Wide Area Surveillance weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0.000M was expended for civilian pay expenses in this program element, and in FY21 \$0.000M is forecasted for civilian pay expenses in this program element.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Development, Test & Fielding	19.268	0.000	2.760
<b>Description:</b> Development, Test & Fielding			
<b>FY 2021 Plans:</b> N/A			
<b>FY 2022 Plans:</b> Support STARS (S1) Block 2 Configuration Upgrade			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY22 is a New Start and continues fielding, integration, DT/OT, and sustainment until an operational decision is made.			
<b>Accomplishments/Planned Programs Subtotals</b>	19.268	0.000	2.760

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604445F / <i>Wide Area Surveillance</i>	<b>Project (Number/Name)</b> 675899 / <i>Wide Area Surveillance</i>
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• OPAF 03 Line Item 834240: <i>Wide Area Surveillance</i>	42.118	47.538	38.794	-	38.794	-	-	-	-	-	-
• OPAF 05 861900: <i>Spares and repair parts</i>	3.007	1.904	0.013	-	0.013	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

The Wide Area Surveillance (WAS) strategy is a single step acquisition approach for full capability to develop, produce, and field highly capable and sustainable advanced sensors in the National Capital Region. Science & technology contracts were let prior to the Engineering and Manufacturing Development phase for both sub-systems. The Cost Plus Fixed-Fee (CPFF) contract for Stateside Affordable Radar System (STARS) was awarded to a single developer to design, build, integrate, and test the STARS system. A subsequent task order was awarded (Jul 17) to include pre-operational site support. The CPFF contract for Scorpion was awarded (Aug 17) to a single developer to complete the design, build, integration, and testing of the Scorpion system, and conduct pre-operational site support. This strategy includes a single delivery approach with 8 STARS and 67 Scorpion systems for a total of 75 sub-systems delivered to achieve FOC. The pre-operational contract for the Scorpion system transitioned to Interim Contract Support (ICS) in Dec 2018, STARS system transitioned to ICS in June 2019. These RDT&E funds will support a Block 2 version of the STARS system.

Air Force Program Executive Officer (PEO) DIGITAL (AFPEO DIGITAL) is the PEO for WAS. Air Force Life Cycle Management Center (AFLCMC) is the Contracting Authority for the WAS program and provides contracts, legal, and comptroller support. Air Force Program Executive Officer (PEO) DIGITAL (AFPEO DIGITAL) is the program's Milestone Decision Authority (MDA).

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604445F / <i>Wide Area Surveillance</i>	<b>Project (Number/Name)</b> 675899 / <i>Wide Area Surveillance</i>
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Wide Area Surveillance (WAS) S1 Block 2 NRE	Various	Raytheon : El Segundo, CA	0.000	8.515	Oct 2020	-		-		-		-	-	-	0.000
Wide Area Surveillance (WAS) S1 Block 2 Development	Various	Raytheon : El Segundo, CA	0.000	9.953	Apr 2021	-		0.145	Jan 2022	-		0.145	-	-	-
<b>Subtotal</b>			0.000	18.468		-		0.145		-		0.145	-	-	N/A

<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Direct Mission	Various	Various : Various	0.000	0.125	Aug 2020	-		-		-		-	-	-	-
<b>Subtotal</b>			0.000	0.125		-		-		-		-	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test Support	Various	46 Test Squadron : Eglin AFB, FL	0.000	0.050	May 2021	-		1.151	Dec 2021	-		1.151	-	-	-
<b>Subtotal</b>			0.000	0.050		-		1.151		-		1.151	-	-	N/A

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management Administration	Various	AFLCMC/HBDB : Hanscom AFB, MA	0.000	0.625	Jul 2021	-		1.464	Jul 2022	-		1.464	-	-	-
<b>Subtotal</b>			0.000	0.625		-		1.464		-		1.464	-	-	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604445F / <i>Wide Area Surveillance</i>	<b>Project (Number/Name)</b> 675899 / <i>Wide Area Surveillance</i>
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	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	0.000	19.268	0.000	2.760	-	2.760	-	-	N/A

**Remarks**  
 FY22 funds will continue to support the STARS (S1) Block 2 Configuration. They will be used for the prime contract, lease payments, environmental assessments, test support, and program management administration (PMA).



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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604445F / <i>Wide Area Surveillance</i>	<b>Project (Number/Name)</b> 675899 / <i>Wide Area Surveillance</i>
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FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>Wide Area Surveillance</b>																												
Scorpion Interim Contract Support (ICS)																												
STARS Interim Contract Support (ICS)																												
Scorpion Contractor Logistics Support (CLS)																												
STARS Contractor Logistics Support (CLS)																												
STARS and Scorpion combined CLS																												
Milestone C LRIP (November 2019)																												
Scorpion Sole Source LRIP																												
Initial Operational Test and Evaluation (IOT&E)																												
STARS Block 2 Contract Award																												
STARS Block 2 Development Effort																												
Scorpion Milestone C Full Rate Production (FRP) ( July 2021)																												
Scorpion Limited Source Competition FRP Base																												
Scorpion Limited Source Competition FRP Option																												
STARS Block 1 Site 5 Production																												
STARS FRP Decision																												
STARS Block 2 Production																												
Full Operating Capability (FOC)																												

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604445F / <i>Wide Area Surveillance</i>	<b>Project (Number/Name)</b> 675899 / <i>Wide Area Surveillance</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>Wide Area Surveillance</b>				
Scorpion Interim Contract Support (ICS)	1	2020	4	2021
STARS Interim Contract Support (ICS)	1	2020	4	2021
Scorpion Contractor Logistics Support (CLS)	4	2021	1	2024
STARS Contractor Logistics Support (CLS)	4	2021	1	2024
STARS and Scorpion combined CLS	1	2023	4	2026
Milestone C LRIP (November 2019)	1	2020	1	2020
Scorpion Sole Source LRIP	1	2020	4	2022
Initial Operational Test and Evaluation (IOT&E)	1	2021	4	2021
STARS Block 2 Contract Award	3	2021	3	2021
STARS Block 2 Development Effort	3	2021	2	2023
Scorpion Milestone C Full Rate Production (FRP) ( July 2021)	4	2021	4	2021
Scorpion Limited Source Competition FRP Base	4	2021	4	2023
Scorpion Limited Source Competition FRP Option	4	2022	4	2024
STARS Block 1 Site 5 Production	1	2021	2	2022
STARS FRP Decision	2	2023	2	2023
STARS Block 2 Production	1	2023	1	2025
Full Operating Capability (FOC)	1	2025	1	2025

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604776F / <i>Deployment &amp; Distribution Enterprise R&amp;D</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	0.870	0.499	0.000	0.000	0.000	-	-	-	-	-	-
674211: <i>GLOBAL ACCESS</i>	-	0.870	0.499	0.000	0.000	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

The \$0.200 of FY22 currently in BPAC 640215 needs to be moved into this BPAC and FY23 should have \$0.150M per approved BA7 ZBT. Additionally, \$0.019 SBIR taxes and \$0.001 mark were not deducted in FY21. \$0.479M was what was actually received in FY21.

**A. Mission Description and Budget Item Justification**

Funding supports the transition of End-to-End Distribution Model (EDEM) initiatives. EDEM is the model of record for transportation programmatic analysis

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

<b>B. Program Change Summary (\$ in Millions)</b>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>
Previous President's Budget	0.903	0.499	0.000	0.000	0.000
Current President's Budget	0.870	0.499	0.000	0.000	0.000
Total Adjustments	-0.033	0.000	0.000	0.000	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.033	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

**Change Summary Explanation**

FY2020 funding added for development of additional deployment and distribution supporting technology.

**C. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<b>Title:</b> Deployment & Distribution Enterprise	0.870	0.499	0.000	0.000	0.000

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604776F / <i>Deployment &amp; Distribution Enterprise R&amp;D</i>
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p><b>Description:</b> Develop deployment and distribution technology</p> <p><b>FY 2021 Plans:</b> Continue to develop deployment and distribution technology</p> <p><b>FY 2022 Base Plans:</b> N/A</p> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Project complete</p>					
<b>Accomplishments/Planned Programs Subtotals</b>	0.870	0.499	0.000	0.000	0.000

**D. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

FY19 internal reprogramming for \$257K processed moving funds into BA 7 so this is not a new start in FY20.

**E. Acquisition Strategy**

Transition funding for ETEM capabilities



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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604776F / <i>Deployment &amp; Distribution Enterprise R&amp;D</i>	<b>Project (Number/Name)</b> 674211 / <i>GLOBAL ACCESS</i>

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>Global Access</b>	
Develop deployment and distribution technology	[REDACTED]

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604776F / <i>Deployment &amp; Distribution Enterprise R&amp;D</i>	<b>Project (Number/Name)</b> 674211 / <i>GLOBAL ACCESS</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>Global Access</b>				
Develop deployment and distribution technology	2	2020	4	2021

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force / BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	624.973	695.869	985.404	0.000	985.404	-	-	-	-	-	-
673501: <i>Air Vehicle - Tech Refresh 3</i>	-	0.000	0.000	86.327	0.000	86.327	-	-	-	-	-	-
673502: <i>Air Vehicle Block 4 Planning &amp; Sys Eng</i>	-	0.000	0.000	324.233	0.000	324.233	-	-	-	-	-	-
673503: <i>Test and Evaluation (T&amp;E)</i>	-	0.000	0.000	262.733	0.000	262.733	-	-	-	-	-	-
673504: <i>Propulsion (PP)</i>	-	0.000	0.000	33.091	0.000	33.091	-	-	-	-	-	-
673505: <i>Maintenance Systems (MxS)</i>	-	0.000	0.000	50.409	0.000	50.409	-	-	-	-	-	-
673506: <i>Combat Data Systems (CDS)</i>	-	0.000	0.000	60.039	0.000	60.039	-	-	-	-	-	-
673507: <i>Training Systems &amp; Simulation</i>	-	0.000	0.000	72.712	0.000	72.712	-	-	-	-	-	-
673508: <i>Infrastructure &amp; Support Costs</i>	-	0.000	0.000	67.860	0.000	67.860	-	-	-	-	-	-
673509: <i>DevSecOps</i>	-	0.000	0.000	28.000	0.000	28.000	-	-	-	-	-	-
675346: <i>F-35</i>	-	624.973	695.869	0.000	0.000	0.000	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

The F-35 Joint Strike Fighter (JSF) Program will develop and field an affordable, highly common family of next generation strike aircraft for the United States Navy, United States Air Force, United States Marine Corps and International Partners countries. There are three variants the F-35A Conventional Takeoff and Landing variant; F-35B Short Take Off and Vertical Landing variant; and the F-35C Aircraft Carrier suitable variant. Maximum commonality among the variants, consistent with National Disclosure Policy, will minimize total air system life cycle costs. Planning and pre-development systems engineering for Block 4 continues as Initial Operational Capability (IOC) is met for each variant during System Development and Demonstration (SDD).

The JSF Continuous Capability Development and Delivery (C2D2) efforts provide incremental warfighting capability improvements to maintain joint air dominance against evolving threats. Block 4 capability requirements were initiated through ongoing Service-led operational analysis of warfighting gaps identified in the Fifth Generation Fighter Modernization Initial Capabilities Document (ICD), and through F-35 JSF Block 4 Mission Decomposition analysis completed in FY2014. These analyses serve as the basis for the Block 4 (CDD), staffed through the Air Force Requirements Oversight Council (AFROC) and signed by the USAF Chief of Staff in

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2
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January 2015. Joint Requirements Oversight Council (JROC) approved the CDD 21 March 2017. Modernization activities in FY2017 and FY2018 included systems engineering, risk reduction, and infrastructure required to deliver full air system Block 4 capabilities to support initial fleet availability of Block 4 upgrades in FY 2020 with the fielding of Auto Ground Collision Avoidance System (AGCAS). Modernization activities in FY2021 and FY2022 continue with the incremental releases of Block 4 capabilities.

Block 4 efforts include a robust weapons integration portfolio and provide new opportunities for International Partners to assess, integrate, and field unique capabilities based on global sovereign requirements.

The United Kingdom, Italy, Netherlands, Canada, Australia, Denmark and Norway are participants in F-35 modernization. The program shown here reflects United States Air Force funding. Total funding for all Service and International Partners is reported at the accomplishment/planned program level since activities support all aircraft variants. Foreign Military Sales are ongoing separately.

PE 0604840F replacing PE 0604800F beginning in FY2019 due to budget being moved from BA05 to BA07.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	642.371	785.336	549.279	0.000	549.279
Current President's Budget	624.973	695.869	985.404	0.000	985.404
Total Adjustments	-17.398	-89.467	436.125	0.000	436.125
• Congressional General Reductions	0.000	-1.271			
• Congressional Directed Reductions	0.000	-98.196			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	10.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-17.398	0.000	436.125	0.000	436.125

**Congressional Add Details (\$ in Millions, and Includes General Reductions)**

**Project:** 675346: F-35

Congressional Add: JASSM

Congressional Add Subtotals for Project: 675346

	<b>FY 2020</b>	<b>FY 2021</b>
	0.000	10.000
	0.000	10.000

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2
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<b>Congressional Add Details (\$ in Millions, and Includes General Reductions)</b>		<b>FY 2020</b>		<b>FY 2021</b>
	Congressional Add Totals for all Projects	0.000		10.000

**Change Summary Explanation**

The FY2021 request was reduced due to unjustified growth and included a plus-up for JASSM integration.

The FY2022 request was increased to meet warfighter requirements development and delivery timeline aligned to the May 2020 cost estimate. Specifically, the funding increase expands test capacity in order to fully support testing of Block 4 capabilities, supports the increase in development of Block 4 hardware upgrades, procures spare engines in support of the Flight Test Fleet, and invests in multiple training systems initiatives. Without the increased funding requested, needed warfighter capabilities will be delayed.

The FY2022 budget submission accomplishments/planned programs (R-2A) has been updated to mirror the Joint Strike Fighter's Program Management Office organizational structure in order to provide more transparency and visibility to development efforts across the F-35 enterprise. Also, the Project Cost Analysis (R-3) exhibit has been updated to include additional cost categories to better display executing efforts. FY2020 and FY2021 values have been updated based on actuals to date.

PE 0604840F replacing PE 0604800F beginning in FY2019 due to budget being moved from BA05 to BA07.

Technical: Not applicable.

Schedule: Not applicable.

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673501 / Air Vehicle - Tech Refresh 3
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
673501: Air Vehicle - Tech Refresh 3	-	0.000	0.000	86.327	0.000	86.327	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Beginning in FY2022, Air Vehicle - Technology Refresh 3 (TR-3) was established as a separate, distinct project within the Continuous Capability Development & Delivery (C2D2) Program Element, per Congressional direction. Efforts are continued from BPAC 675346, which is still included at the end of the R-2A for Fiscal years FY2020 & FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request.

**A. Mission Description and Budget Item Justification**

Technology Refresh 3 (TR-3) conducts post Critical Design Review (CDR) design activities. This effort will develop and deliver a TR-3 system through full flight-worthy certification and production readiness review for Lot 15. The design of TR-3 subsystems Integrated Core Processor (ICP), Aircraft Memory System (AMS), and Panoramic Cockpit Display Electronics Unit and Display Unit (PCD-EU, PCD-DU) configurations will contain new backplane technology, commercial operating systems, and modified middleware necessary to support Block 3F functionality and incorporation of all Block 4 capabilities. This work includes nonrecurring engineering for the development, test, and certification of the ICP, AMS, PCD-EU, and PCD-DU, and includes processing capacity to ensure long term viability for future capabilities.

FY22 funding totals include \$38.415M requested for the Pacific Defense Initiative.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<b>Title:</b> Technology Refresh 3 (TR-3)	0.000	0.000	86.327	0.000	86.327
<b>Description:</b> Reference Mission Description and Budget Item Justification.					
<b>FY 2021 Plans:</b> N/A					
<b>FY 2022 Base Plans:</b> The TR-3 program will continue laboratory system integration and test, modify Developmental and Operational test aircraft with TR-3 and Next Gen Distributed Aperture System (NG DAS) hardware, perform ground test activities, and perform flight test through FY2022. This will include the necessary labor and non-recurring engineering to support Developmental and Operational test aircraft modifications, as well as the necessary mission planning systems to support flight test operations. Finally, this will include multiple software releases to					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673501 / Air Vehicle - Tech Refresh 3
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
both lab and flight test, and will also result in the final software updates for Core Process Software (CPSW), Pilot Systems Software (PSSW), and TR-3 hardware.  <b>FY 2022 OCO Plans:</b> N/A  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> The decrease in funding from FY2021 to FY2022 is due to development efforts with sub tier suppliers expected to decrease in FY2022, with the focus being on the completion of qualification and flight test activities. The significant technical development up through FY2021 will not continue at the same rate in FY2022.					
<b>Accomplishments/Planned Programs Subtotals</b>	0.000	0.000	86.327	0.000	86.327

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2022 Air Force</b>											<b>Date: May 2021</b>				
<b>Appropriation/Budget Activity</b> 3600 / 7						<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2					<b>Project (Number/Name)</b> 673501 / Air Vehicle - Tech Refresh 3				

<b>Product Development (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
TR-3 Prime LM Development	C/CPIF	LM/FORT WORTH TX : TBD	-	-		-		75.878	Oct 2021	-		75.878	-	-	-
TR-3 Prime LM Next GenDAS Shipsets Proc	C/CPIF	LM/FORT WORTH TX : TBD	-	-		-		6.146	Feb 2022	-		6.146	-	-	-
TR-3 Prime LM OT NRE	C/CPIF	LM/FORT WORTH TX : TBD	-	-		-		2.049	Nov 2021	-		2.049	-	-	-
TR-3 Prime LM OT NextGen DAS NRE	C/CPIF	LM/FORT WORTH TX : TBD	-	-		-		2.049	Nov 2021	-		2.049	-	-	-
<b>Subtotal</b>			-	-		-		86.122		-		86.122	-	-	N/A

**Remarks**

1. Prime LM TR-3 Next Gen DAS Shipsets Proc - procuring shipsets in support of TR-3 development efforts

<b>Support (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
TR-3 Project Support	MIPR	Various : TBD	-	-		-		0.205	Nov 2021	-		0.205	-	-	-
<b>Subtotal</b>			-	-		-		0.205		-		0.205	-	-	N/A

**Remarks**

1. Government support at NSA/CERDEC in support of TR-3 development

<b>Project Cost Totals</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
	-	-	0.000	86.327	-	86.327	-	-	N/A

**Remarks**

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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673501 / Air Vehicle - Tech Refresh 3
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
<b>673501</b>																																
Perform Safety of Flight Qualification Testing									■																							
Conduct TR-3 System Test Readiness Review									■																							
Perform Ground Test									■																							
Perform TR-3 Flight Test									■																							
Perform Final Hardware Qualification Testing									■																							
Deliver First Shipsets of TR-3 Hardware to Lot 15 Production Line													■																			

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673501 / Air Vehicle - Tech Refresh 3
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>673501</b>				
Perform Safety of Flight Qualification Testing	1	2022	1	2022
Conduct TR-3 System Test Readiness Review	1	2022	1	2022
Perform Ground Test	2	2022	2	2022
Perform TR-3 Flight Test	2	2022	2	2023
Perform Final Hardware Qualification Testing	1	2022	3	2022
Deliver First Shipsets of TR-3 Hardware to Lot 15 Production Line	4	2022	4	2022



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2				<b>Project (Number/Name)</b> 673502 / Air Vehicle Block 4 Planning & Sys Eng			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
673502: Air Vehicle Block 4 Planning & Sys Eng	-	0.000	0.000	324.233	0.000	324.233	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Beginning in FY2022, Air Vehicle - Block 4 Planning & Sys Eng was established as a separate, distinct project within the Continuous Capability Development and Delivery (C2D2) Program Element, per Congressional direction. Efforts are continued from BPAC 675346, which is still included at the end of the R-2A for Fiscal Years FY2020 & FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request.

**A. Mission Description and Budget Item Justification**

The F-35 Air Vehicle Program Management Office (AV PMO) development portfolio includes efforts to improve the F-35 air vehicle lethality, survivability, and interoperability in response to emerging threats outlined in the National Security Strategy and Operational Plans. The AV PMO delivers these capabilities utilizing a Continuous Capability Development and Delivery (C2D2) strategy combining traditional hardware upgrades and agile software integration processes. As a function of the F-35 organizational pivot, this is the first budget cycle in which AV PMO budget requirements have been comprehensively and discretely defined within a dedicated BPAC.

F-35 Block 4 Modernization is designed to counter the full spectrum of evolving near-peer enemy threats to ensure US and Allied forces have freedom of operation even in the face of advanced adversary Anti-Access/Area Denial (A2/AD) capabilities. As designed, Block 4 consists of three principle lines of effort: development of software-based capabilities, development and integration of new and modernized aircraft hardware which enable the development of new capabilities, and new weapons integration. Efforts under the Air Vehicle / Block 4 Planning and Systems Engineering project range from requirements decomposition and preliminary design of capabilities through completion of Developmental Flight Test. These activities are a continuation of the previous Block 4 developmental contracts, and include activities required to enable the successful completion of Flight Test, to include select facility upgrades required for research, development, test and evaluation. Block 4 upgraded capabilities and continuous improvements will maintain Air System viability against the evolving threats indicated in the Electronic Warfare Initial Capabilities Document (ICD), the Fifth Generation Fighter Modernization ICD, and the Block 4 Capability Development Document (CDD). Additionally, the Block 4 capabilities will reduce life cycle cost, improve Air System Integration, and improve operational suitability. Weapons integration efforts included under this project include AARGM-ER integration, employment envelope expansion for current F-35 weapons, NRE for obsolescence, and Increased Air-to-Air Missile Carriage.

Included in the Air Vehicle (AV) / Block 4 Planning and Systems Engineering effort is both Prime and Government Systems Engineering Support needed for Avionics/ Electronic Warfare and Weapons Integration efforts to include studies, analysis and risk reduction efforts.

FY22 funding totals include \$144.283M requested for the Pacific Defense Initiative.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673502 / Air Vehicle Block 4 Planning & Sys Eng

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<p><b>Title:</b> Air Vehicle Block 4 Planning &amp; Sys Eng</p> <p><b>Description:</b> Reference Mission Description and Budget Item Justification.</p> <p><b>FY 2021 Plans:</b> N/A</p> <p><b>FY 2022 Base Plans:</b> Continue with Agile development of capabilities through Flight Test. Continue requirements decomposition and preliminary design activities for advanced Block 4 capabilities. Continue Post-PDR risk reduction activities to include Air-Ship Integration and planning. Continue development and maturity of key long lead capabilities and service unique weapons. Complete development of software drops to be available for fielding to meet warfighter need. Support efforts for airframe, air vehicle systems, air-ship integration, mission systems, future capabilities studies and weapons integration efforts. Continue support for Block 4 Capabilities and support preliminary systems engineering efforts associated with obsolescence NRE, AARGM-ER, and increased air-to-air missile carriage. Continued engineering support for avionics, weapons, studies &amp; analyses, and risk reduction efforts.</p> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> This is the initial year of Air Vehicle (AV) / Block 4 Planning and Systems Engineering being established as a separate, distinct project within the Continuous Capability Development &amp; Delivery (C2D2) Program Element. An increase in the R-2A category reflects the award of additional Block 4 scope, to include the design, development, and integration of remaining advanced Electronic Warfare hardware elements which enable F-35 dominance in the wide-band electronic spectrum. Additionally, the increase reflects initial costs of integration of advanced weapons functions including AARGM-ER, Increased Air-to-Air Missile Carriage, and Net Enabled Weapon functionality.</p>	-	0.000	324.233	0.000	324.233
<b>Accomplishments/Planned Programs Subtotals</b>	-	0.000	324.233	0.000	324.233

<b>C. Other Program Funding Summary (\$ in Millions)</b> N/A
<b>Remarks</b>

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604840F / F-35 C2D2	Project (Number/Name) 673502 / Air Vehicle Block 4 Planning & Sys Eng

**D. Acquisition Strategy**

The C2D2 acquisition strategy is to employ both Cost and Fixed Price Incentive contracts for the Block 4 engineering and development efforts. A new modernization contract structure will be established for all post SDD Block 4 efforts. In addition, a separate Basic Ordering Agreement or Indefinite Quantity/Indefinite Delivery contract is planned to provide a long term approach to upgrading and maintaining laboratories and test aircraft and supporting technology maturation for future C2D2 capabilities.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673502 / Air Vehicle Block 4 Planning & Sys Eng
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
AV Prime LM Phase II Cape/Development	C/CPIF	LM /Fort Worth TX : TBD	-	-		-		289.078	Oct 2021	-		289.078	-	-	-
AV Prime LM Phase II Fee	C/CPIF	LM /Fort Worth TX : TBD	-	-		-		10.244	Oct 2021	-		10.244	-	-	-
AV Prime LM Air Vehicle Integration	C/CPFF	LM /Fort Worth TX : TBD	-	-		-		2.500	Oct 2021	-		2.500	-	-	-
AV Systems Engineering	Various	Various : TBD	-	-		-		6.381	Dec 2021	-		6.381	-	-	-
<b>Subtotal</b>			-	-		-		308.203		-		308.203	-	-	N/A

<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
AV Mission Systems Support	Various	Various : TBD	-	-		-		10.530	Nov 2021	-		10.530	-	-	-
AV Vehicle Systems Support	Various	Various : TBD	-	-		-		0.500	Nov 2021	-		0.500	-	-	-
AV CSO Development Support	Various	Various : TBD	-	-		-		5.000	Nov 2021	-		5.000	-	-	-
<b>Subtotal</b>			-	-		-		16.030		-		16.030	-	-	N/A

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	-	-	0.000	324.233	-	324.233	-	-	N/A

**Remarks**



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673502 / Air Vehicle Block 4 Planning & Sys Eng

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>673502</b>				
Systems Engineering & Agile Capability Development - Planning Events	1	2022	4	2026
Systems Engineering & Agile Capability Development - ASIRs	1	2022	4	2026
Systems Engineering & Agile Capability Development - IPRs	1	2022	4	2026
Hardware Enablers - A/C Cooling	4	2022	4	2022
Hardware Enablers - FS425 Bulkhead	4	2022	4	2022
Production LOT 14	2	2022	1	2023

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673503 / Test and Evaluation (T&E)
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
673503: Test and Evaluation (T&E)	-	0.000	0.000	262.733	0.000	262.733	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Beginning in FY2022, Test and Evaluation (T&E) was established as a separate, distinct project within the Continuous Capability Development and Delivery (C2D2) Program Element, per Congressional direction. Efforts are continued from BPAC 675346, which is still included at the end of the R-2A for Fiscal Years FY2020 & FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request.

**A. Mission Description and Budget Item Justification**

The F-35 Test and Evaluation (T&E) development portfolio is aligned with the program's Continuous Capability Development and Delivery (C2D2) efforts and is organized in five primary lines of effort; Development Foundation Contract, Development Test, Operational Test, Future Flight Test Capabilities/Investments, Ground Test and Simulation Infrastructure. This breakout is intended to categorize the developmental test efforts with more specificity and transparency.

Integrated Test activities in support of C2D2, to include Lockheed Martin support at all test sites. Non-recurring engineering required to plan for the service life extension of existing DT aircraft and modification necessary to bring DT aircraft fleet to a more production representative and sustainable configuration, and to develop flight test instrumentation and release test software to meet Block 4 requirements. Additional upgrades required to support development and evaluation of improvements driven by changes in the threat environment and as identified in the Electronic Warfare Initial Capabilities Document (ICD), the Fifth Generation Fighter Modernization Initial Capabilities Document (ICD), and the Block 4 Capability Development Document (CDD). Ground test and simulation infrastructure include efforts for laboratory developments of Improvement & Modernization (I&M) assets, development of Ground Test & Evaluation Capabilities for digital and non-digital installed systems verification, and cyber testing.

Costs in the Accomplishments/Planned and Program R-2A section have been broken out into the following categories: Development Foundation Contract, Development Test, Operational Test, Future Flight Test Capabilities/Investments, Ground Test and Simulation Infrastructure. This breakout is intended to categorize the developmental test efforts with more specificity and transparency.

FY22 funding totals include \$116.915M requested for the Pacific Defense Initiative.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<b>Title:</b> Development Foundation Contract (DFC) Flight Test and Tech Refresh	-	0.000	90.258	0.000	90.258
<b>Description:</b> Flight test infrastructure at Edwards Air Force Base (AFB) and Pax River Naval Air Station (NAS) and F-35 tech refresh for laboratory development at Fort Worth, TX for Lockheed Martin Aeronautics and its					

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673503 / Test and Evaluation (T&E)
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**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>subcontractors (LM Aero). This includes investment planning and other test planning activities required for Block 4 development, integration, developmental test and evaluation. Funding is required for the Lockheed Martin Integrated Test Force contractor labor, suppliers, and material. Other support efforts are provided for airframe, air vehicle systems, air-ship integration, mission systems, weapons integration, offboard mission support, autonomic logistics development, joint reprogramming enterprise and modeling and joint simulation environment activities, including Nimble Lightning efforts. Other costs in support of ranges, chase planes and DT site operations.</p> <p><b>FY 2021 Plans:</b> N/A</p> <p><b>FY 2022 Base Plans:</b> Continue support to F-35 capability enhancements identified in approved requirements documents. This includes flight testing new software development builds and hardware capabilities. DFC will support C2D2 flight test, and implement technology refresh and modernization to upgrade, sustain, replace, and modify hardware and software at the module level.</p> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY21 to FY22 increase due to planned program ramp up of Block 4 capabilities and development efforts such as technical refresh which includes previously deferred maintenance, replacing diminishing sourced equipment, and supplier modernization.</p>					
<p><b>Title:</b> Developmental Test (DT)</p> <p><b>Description:</b> Government test site Integrated Test activities to support development of Air Vehicle C2D2 and TR-3 programs, as well as inherent maintenance systems, training systems, and combat data systems test support. Testing includes ground, logistics, and flight testing of incremental flight software releases, weapon integration, DMS/fleet sustainment, service-life extension, hardware refresh, and regression efforts to ensure total system integration meets program requirements. Test site capabilities to meet program requirements include infrastructure, ranges, engineering, administration, logistics, maintenance, controls, information technologies, classified facilities, and service unique supporting capabilities. The sites to be funded include but are not limited to NAWCAD Pax River, NAWCAD China Lake, and Edwards AFB.</p>	-	0.000	33.599	0.000	33.599



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673503 / Test and Evaluation (T&E)
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
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**FY 2021 Plans:**  
N/A

**FY 2022 Base Plans:**  
Continue to support Integrated Test capacity and flight test execution (manpower, weapons, flight hours, range time, and chase, target & tanker support assets) to develop and verify and regression test capabilities as directed by the F-35 JPO. Major program testing includes TR-3 integration, Block 4 weapons integration, incremental software releases with new capability and bug fixes, integrated system evaluations, multi-ship operations, and mission effectiveness evaluations.

**FY 2022 OCO Plans:**  
N/A

**FY 2021 to FY 2022 Increase/Decrease Statement:**  
FY2021 to FY2022 increase is due to ramping up test capacity to accommodate testing of TR-3 integration while continuing to evaluate Block 4 warfighter capabilities.

<p><b>Title:</b> Operational Test (OT)</p> <p><b>Description:</b> Government test site Integrated Test activities to support development of Air Vehicle C2D2 and TR-3 programs, as well as inherent maintenance systems, training systems, and combat data systems test support. Testing includes ground, logistics, and flight-testing of incremental flight software releases, weapon integration, DMS/fleet sustainment, hardware refresh and regression efforts to ensure total system integration meets program requirements in an operationally representative environment. Test site capabilities to meet program requirements include infrastructure, ranges, engineering, administration, logistics; maintenance, controls, information technologies, classified facilities, and service unique supporting capabilities. The sites to be funded include but are not limited to Nellis AFB and Yuma Air Station.</p> <p><b>FY 2021 Plans:</b> N/A</p> <p><b>FY 2022 Base Plans:</b> Funding will support Integrated Test capacity and flight test execution (manpower, weapons, flight hours, range time, and chase, target &amp; tanker support assets) to develop and verify and regression test capabilities as directed by the F-35 JPO. Major program testing includes TR-3 integration, Block 4 weapons integration,</p>	-	0.000	23.974	0.000	23.974
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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673503 / Test and Evaluation (T&E)
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>incremental software releases with new capability and deficiency report fixes, integrated system evaluations, multi-ship operations and mission effectiveness evaluations in an operationally representative environment.</p> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY2021 to FY2022 increase is due to ramping up test capacity to accommodate testing of TR-3 integration while continuing to evaluate C2D2 warfighter capabilities and retrofit of OT aircraft.</p>					
<p><b>Title:</b> Future Flight Test Capabilities/Investments</p> <p><b>Description:</b> F-35 Test fleet modifications, test mission equipment/assets, instrumentation capability, and data center investments are required to continue to support Block 4 capability development and integrated test requirements. TR-3 related capability requires current test aircraft and replacement test aircraft configurations to be modified to new hardware, software, and instrumentation systems. Program priorities, flight test demand, data quantity/bandwidth upgrades, and capability delivery schedules require a steady update to test fleet configurations. Modifications and instrumentation design/procurement/install are long-lead efforts requiring stable funding and contract vehicles to meet program needs.</p> <p><b>FY 2021 Plans:</b> N/A</p> <p><b>FY 2022 Base Plans:</b> Continue incremental funding of Lot 14 Unfinalized Contract Award for FTI design, procurement and installation (CF-84 &amp; BF-154). Continues FTI design/ fabrication/installation (long-lead NRE, parts procurement, kit fabrication) for replacement test aircraft (16x unique designs). Continues NRE/procurement/installation to retrofit or maintain test aircraft viability. Additionally, development, procurement, and installation of flight test data center system upgrades to support Integrated Testing across multiple F-35 stakeholder sites. FTI development, procurement, fabrication, and installation for current/future service loaner aircraft in order to continue Integrated Testing with Service Operational Test organizations. Further, continue integration and procurement efforts for required Block 4 test mission assets, includes but not limited to weapons test vehicles, unique test mission equipment, and other test execution support equipment.</p> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b></p>	-	0.000	100.242	0.000	100.242

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673503 / Test and Evaluation (T&E)

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
FY21 to FY22 increase due to growing hardware and capability requirement updates to test infrastructure mapped thru FY26. Efforts include engineering/design of instrumentation/data/test support equipment, instrumenting/retrofitting new test aircraft with up-to-date aircraft capabilities, integrating multiple test sites with a common data system to maximize verification, and integration/procurement of test assets to support flight testing.					
<p><b>Title:</b> Ground Test and Simulation Infrastructure (GTSI)</p> <p><b>Description:</b> Ground Test &amp; Simulation Infrastructure capabilities from Block 4 early-on design and development through Installed Systems Verification activities prior to Developmental Flight Test for all variants of the F-35 aircraft. Infrastructure efforts include Laboratory Developments of Improvements &amp; Modernization (I&amp;M) assets used for design, development and test of Block 4 capabilities, and development of Ground Test &amp; Evaluation Capabilities for digital and non-digital installed systems verification. Laboratory Developments will focus on the pure development of Block 4 capabilities through a Capability Verification Infrastructure that meets required fidelities that would advance the high quality development of the Air System capabilities. Ground Test &amp; Simulation Infrastructure will also include capabilities for cyber testing for TR-3 assessments within three main areas: air vehicle, information systems, and supply chain.</p> <p><b>FY 2021 Plans:</b> N/A</p> <p><b>FY 2022 Base Plans:</b> Continue Ground Test &amp; Simulation Infrastructure improvements and modernization capabilities needed for Block 4 air system developments. Test infrastructure improvements include vendor lab needed capabilities to develop scheduled Block 4 software drop aircraft deliverables, and tech refresh efforts for aging equipment and OS migration to meet ATO needs. Develop F-35 mission threads for continued digital verification automated capabilities for early-on software development, and continue aircraft cyber improvements and testing efforts.</p> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase due to build up F-35 specific capabilities for other government costs funding to USG Test Facilities to support ramp up of Block 4 capabilities, programmed expansion of Modeling &amp; Simulation capabilities to</p>	-	0.000	14.660	0.000	14.660

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673503 / Test and Evaluation (T&E)
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
augment Flight Test and bring software quality escape discoveries into the Lab Infrastructure. Cyber Testing is also now captured under Ground Test & Simulation Infrastructure instead of under developmental testing.					
<b>Accomplishments/Planned Programs Subtotals</b>	-	0.000	262.733	0.000	262.733

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

The new Test & Evaluation Project will make maximum use of existing F-35 contracts, where possible, for the various T&E related capabilities and investments outlined in the above Mission Description and Budget Item Justification. For example, provisions for new instrumentation on new flight test aircraft are being implemented via existing Production contracts in order to allow installation of the required hardware while those airframes are still on the assembly line. This will save significant costs and effort that would be required if we waited to install instrumentation after aircraft delivery. Other modifications and/or non-recurring engineering (NRE) may be implemented via existing contracts being managed by the Air Vehicle Program Management Office as part of the Block 4 engineering and development efforts. In addition, a separate Cost-Plus-Incentive-Fee-type contract is planned to provide a long-term approach to upgrading and maintaining laboratories and also for maintaining the older existing SDD test aircraft. Viability modifications to the SDD test aircraft are being contracted via a combination of Streamlined Delivery Orders for NRE and hardware as well as a Cost Plus-type contract, using both to expedite the right modifications as needed at the right time in order to avoid test aircraft grounding and maximize their availability. In addition, separate Basic Ordering Agreements or Indefinite Quantity/Indefinite Delivery contracts may be used to implement a long-term approach to upgrading and maintaining laboratories and test aircraft and supporting technology maturation for future capabilities.

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2022 Air Force</b>											<b>Date: May 2021</b>				
<b>Appropriation/Budget Activity</b> 3600 / 7						<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2					<b>Project (Number/Name)</b> 673503 / Test and Evaluation (T&E)				

<b>Product Development (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
DFC - Prime LM Developmental Foundation Contract	C/CPIF	LM; Fort Worth TX : TBD	-	-		-		90.258	Nov 2021	-		90.258	-	-	-
OT - Prime LM Operation Test Aircraft Modification	C/CPIF	LM; Fort Worth TX : TBD	-	-		-		4.540	Jun 2022	-		4.540	-	-	-
FI - Prime LM DT AC Viability	C/CPIF	LM; Fort Worth TX : TBD	-	-		-		24.584	Dec 2021	-		24.584	-	-	-
FI - Flight Test Asset	Various	LM; Fort Worth TX : TBD	-	-		-		56.072	Dec 2021	-		56.072	-	-	-
<b>Subtotal</b>			-	-		-		175.454		-		175.454	-	-	N/A

**Remarks**

R-3 Acronyms correspond to R-2A categories, per below breakout:  
 DFC - Development Foundation Contract (DFC) Flight Test  
 OT - Operational Test  
 DT - Developmental Test  
 FI - Future Flight Test Capabilities and Investments  
 GTS - Ground Test Simulation and Infrastructure  
 Flight Test assets include DT and OT weapons procurement to support Test and assets needed for flight test instrumentation

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
DT - Developmental Test & Evaluation PAX	WR	NAWCAD: Pax River MD : TBD	-	-		-		17.209	Dec 2021	-		17.209	-	-	-
DT - Developmental Test & Evaluation CLK	WR	NAWCAD: China Lake, CA : TBD	-	-		-		0.820	Dec 2021	-		0.820	-	-	-
DT - Developmental Test & Evaluation EDW	MIPR	Edwards AFB, CA : TBD	-	-		-		15.570	Dec 2021	-		15.570	-	-	-
OT - Operational Test & Evaluation	MIPR	Nellis AFB, NV : TBD	-	-		-		10.378	Dec 2021	-		10.378	-	-	-
FI - Operational Test & Evaluation	MIPR	Nellis AFB, NV : TBD	-	-		-		19.586	Dec 2021	-		19.586	-	-	-





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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673503 / Test and Evaluation (T&E)

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>673503</b>				
Development Foundation Contract Part II	1	2022	1	2022
Development Foundation Contract Part III	1	2022	1	2024
DT Aircraft Viability	1	2022	4	2026
Flight Test Instrumentation	1	2022	4	2026



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2				<b>Project (Number/Name)</b> 673504 / Propulsion (PP)			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
673504: <i>Propulsion (PP)</i>	-	0.000	0.000	33.091	0.000	33.091	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Beginning in FY2022, Propulsion (PP) was established as a separate, distinct project within the Continuous Capability Development and Delivery (C2D2) Program Element, per Congressional direction. Efforts are continued from BPAC 675346, which is still included at the end of the R-2A for Fiscal Years FY2020 & FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request.

**A. Mission Description and Budget Item Justification**

Propulsion F135 Block 4 Integrated Flight Test Support includes efforts such as Engine Flight Test Mechanics, Flight Test Engineers, Replacement Engine Hardware, Test Engine Procurements, and other associated government costs. For C2D2 to be able to continue to test all three aircraft variants, engine propulsion support is required to enable continued flying. Increased flights and flight hours are planned over the next two years to meet additional Block 4 flight test timelines, requiring elevated propulsion support. All of the current Full Flight Release (FFR) engines supporting Flight Test are at or nearing their life limits, requiring the purchase of new Initial Service Release (ISR) engines to replace them. This replacement effort is planned to occur over the next one to two years to enable continued flight capability. There are additional requirements to support the Air Vehicle modernization software capability improvements, assessing bleed air/weight/thrust/performance capabilities, etc.

FY22 funding totals include \$14.725M requested for the Pacific Defense Initiative.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<b>Title:</b> Propulsion (PP)	0.000	0.000	33.091	0.000	33.091
<b>Description:</b> Propulsion F135 Block 4 Integrated Flight Test Support includes efforts such as Engine Flight Test Mechanics, Flight Test Engineers, Replacement Engine Hardware, Test Engine Procurements, and other associated government costs. For C2D2 to be able to continue to test all three aircraft variants, engine propulsion support is required to enable continued flying. Increased flights and flight hours are planned over the next two years to meet additional Block 4 flight test timelines, requiring elevated propulsion support. All of the current Full Flight Release (FFR) engines supporting Flight Test are at or nearing their life limits, requiring the purchase of new Initial Service Release (ISR) engines to replace them. This replacement effort is planned					

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673504 / Propulsion (PP)
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**B. Accomplishments/Planned Programs (\$ in Millions)**

to occur over the next one to two years to enable continued flight capability. There are additional requirements to support the Air Vehicle modernization efforts in agile software capability improvements, assessing bleed air/weight/thrust/performance capabilities, etc.

***FY 2021 Plans:***

N/A

***FY 2022 Base Plans:***

Continued Propulsion F135 Block 4 Integrated Flight Test Support to include efforts such as Engine Flight Test Mechanics, Flight Test Engineers, Replacement Engine Hardware, Test Engine Procurements, and other associated government costs. The Flight Test Fleet is planning to maintain elevated aircraft inventory at twelve aircraft in FY2022 (from 11 in FY2020). This again includes seven at Edwards Air Force Base and five at Patuxent River Naval Air Base. Flights and Engine Flight Hours (EFH) are expected to maintain their FY2021 levels at 960 flights and 1920 flight hours. As the FFR engines have aged past their design life, it is necessary to purchase three ISR engines (two STOVL and one CTOL) to enable continued propulsion support of flight test. Continued incremental funding for two ISR engines, which has been funded with FY2020 and FY2021 dollars. An additional spare engine will be purchased in FY2022.

***FY 2022 OCO Plans:***

N/A

***FY 2021 to FY 2022 Increase/Decrease Statement:***

Increase from FY2021 to FY2022 is due to the continued incremental funding for the procurement of two spare engines in Lot 12-14 with bulk of funding in FY2021 and FY2022, as well as the procurement of an additional spare engine in FY2022. Increased flights and flight hours are planned over the next two years to meet additional Block 4 flight test timelines, requiring elevated propulsion support.

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<b>Accomplishments/Planned Programs Subtotals</b>	0.000	0.000	33.091	0.000	33.091

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673504 / Propulsion (PP)

**D. Acquisition Strategy**

The C2D2 acquisition strategy is to employ both Cost and Fixed Price Incentive contracts for the Block 4 engineering and development efforts. A new modernization contract structure will be established for all post SDD Block 4 efforts. In addition, a separate Basic Ordering Agreement or Indefinite Quantity/Indefinite Delivery contract is planned to provide a long term approach to upgrading and maintaining laboratories and test aircraft and supporting technology maturation for future C2D2 capabilities.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673504 / Propulsion (PP)
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<b>Product Development (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
PP Prime PW C2D2 Propulsion DT Aircraft Procurement Engines	C/CPIF	PW; East Hartford, CT : East Hartford, CT	-	-		-		11.739	Nov 2021	-		11.739	-	-	-
PP Prime PW C2D2 Propulsion Flight Test Support	C/CPIF	PW; East Hartford, CT : East Hartford, CT	-	-		-		16.533	Oct 2021	-		16.533	-	-	-
PP DevSecOps Emulation Lab	C/CPIF	PW; East Hartford, CT : East Hartford, CT	-	-		-		2.458	Oct 2021	-		2.458	-	-	-
PP F135 Engine Growth EEP 22 Bridge	C/CPIF	PW; East Hartford, CT : East Hartford, CT	-	-		-		2.049	Oct 2021	-		2.049	-	-	-
<b>Subtotal</b>			-	-		-		32.779		-		32.779	-	-	N/A

<b>Support (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
PP Program Management Support	Various	Various : TBD	-	-		-		0.312	Nov 2021	-		0.312	-	-	-
<b>Subtotal</b>			-	-		-		0.312		-		0.312	-	-	N/A

<b>Project Cost Totals</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
	-	-	0.000	33.091	-	33.091	-	-	N/A

**Remarks**

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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673504 / Propulsion (PP)
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FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>673504</b>	
P&W Flight Test Support	
2 DT Engine Purchase Inc 3	
1 Spare DT Engine Purchase	
DevSecOps Emulation Lab for FADEC	
F135 Engine Growth EEP 25+ Bridge	
CIP Order #3 Predicted Overspend	
CIP Order #4 Predicted Overspend	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673504 / Propulsion (PP)

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>673504</b>				
P&W Flight Test Support	1	2022	1	2024
2 DT Engine Purchase Inc 3	1	2022	4	2022
1 Spare DT Engine Purchase	1	2022	4	2023
DevSecOps Emulation Lab for FADEC	1	2022	4	2024
F135 Engine Growth EEP 25+ Bridge	1	2022	4	2024
CIP Order #3 Predicted Overspend	1	2022	1	2024
CIP Order #4 Predicted Overspend	1	2022	1	2025

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2				<b>Project (Number/Name)</b> 673505 / Maintenance Systems (MxS)			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
673505: Maintenance Systems (MxS)	-	0.000	0.000	50.409	0.000	50.409	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Beginning in FY2022, Maintenance Systems (MxS) was established as a separate, distinct project within the Continuous Capability Development and Delivery (C2D2) Program Element, per Congressional direction. Efforts are continued from BPAC 675346, which is still included at the end of the R-2A for Fiscal Years FY2020 & FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request.

**A. Mission Description and Budget Item Justification**

Autonomic Logistics Information System (ALIS) is the current F-35 program solution for delivering core maintenance and logistics information solutions to F-35 warfighters. ALIS will continue to deliver the core logistics and maintenance infrastructure requirements for the F-35 enterprise as ALIS evolves into Operational Data Integrated Network (ODIN). ALIS includes features such as aircraft scheduling, training delivery, record keeping, technical data delivery, supply chain management, maintenance management, pilot and maintenance debriefing, and mission planning. Current ALIS development efforts are focused on low cost and high return investments that provide a high confidence return on investment in the short term, significant warfighter impact, and/or offer synergy with ODIN development efforts.

ODIN will incrementally provide a modern, user-friendly integrated information system for the F-35 to deliver core maintenance and logistics information solutions. ODIN will be comprised of multiple elements to include modern hardware, architectures, software development methods, data environments, and platforms. Leveraging agile and modern software development practices, ODIN will serve as the primary logistics tool to support F-35 warfighter operations, health and diagnostics, mission planning, supply chain management, maintenance, and training. ODIN will substantially decrease F-35 administrator and maintainer workload, increase readiness rates for all F-35 variants, and allow software engineers to rapidly develop and deploy updates in response to changing warfighter requirements and improve data management, quality, and integrity. The ALIS to ODIN transition is intended to enable holistic fleet management, improve performance, enhance readiness, and reduce costs to the F-35 program. ODIN is comprised of both hardware and software which support the flow of Unclassified and Classified aircraft and maintenance-related data.

Prognostics and Health Management (PHM) encompasses the Air-System set of software, technical data and capabilities to enable optimal maintenance, and resolution of aircraft failures and impending failures. On-aircraft software identifies failures, enables reporting of status to the pilot, and records data for life cycle management and sustaining engineering. The data processed by ALIS/ODIN supports maintenance debriefs, life cycle management via Assess Material Condition (AMC), and failure resolution via Health Reporting Codes (HRCs) and Anomaly and Failure Resolution System (AFRS). Maintenance performance (inclusive of reliability and maintainability) is enhanced via the collection and reporting of the Failure Reporting and Corrective Action System (FRACAS). Applied advanced analytics on the aggregate PHM is used for airframe lifing and enterprise use, and improves responsiveness to operational needs.

FY22 funding totals include \$22.432M requested for the Pacific Defense Initiative.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673505 / Maintenance Systems (MxS)

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<p><b>Title:</b> Operational Data Integrated Network (ODIN)</p> <p><b>Description:</b> ODIN efforts will focus on building a modern architecture and the data platform/environment(s), conducting cybersecurity and user-focused testing, and developing user training.</p> <p><b>FY 2021 Plans:</b> N/A</p> <p><b>FY 2022 Base Plans:</b> Program will continue to modernize and reduce sustainment costs of the F-35 logistics information system by delivering incremental capabilities to transition aircraft, data, and operations from ALIS to ODIN. Program will continue maturing the ODIN infrastructure (hardware/cloud based development and production infrastructure). ODIN efforts will focus on building a modern architecture and the data platform/environment(s), conducting cybersecurity and user-focused testing, and developing user training. Program will execute initiatives that support enabling the ODIN requirements by modernizing ALIS applications where applicable; leveraging commercial and government off the shelf; and maximizing re-use from existing US Services logistics modernization efforts.</p> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increases from FY2021 to FY2022 as program focuses on ALIS to ODIN transition priorities such as evolving to a modern architecture, developing enhancements to reduce sustainment costs, and enabling infrastructure and data environments in FY2022.</p>	-	0.000	47.131	0.000	47.131
<p><b>Title:</b> Prognostics and Health Management (PHM)</p> <p><b>Description:</b> Develop PHM failure resolution improvements by analyzing Anomaly and Failure Resolution System (AFRS) technical data and increasing Assess Material Condition algorithm development and implementation.</p> <p><b>FY 2021 Plans:</b> N/A</p> <p><b>FY 2022 Base Plans:</b> Develop PHM failure resolution improvements by analyzing Anomaly and Failure Resolution System (AFRS) technical data, as identified by the associated affordability war room initiatives and Performance-to-Plan metrics,</p>	-	0.000	3.278	0.000	3.278



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673505 / Maintenance Systems (MxS)
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
and increasing Assess Material Condition algorithm development and implementation. Develop government-hosted PHM data storage and analytics infrastructure. Begin Systems Engineering and architecture development of PHM Downlink capability.  <b>FY 2022 OCO Plans:</b> N/A  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increases from FY2021 to FY2022 as priority AMC algorithm development and implementation continues and program initiates PHM downlink capability effort in FY2022.					
<b>Accomplishments/Planned Programs Subtotals</b>	-	0.000	50.409	0.000	50.409

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

N/A



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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date: May 2021**

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673505 / Maintenance Systems (MxS)
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FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026							
<b>673505</b>																																
Operational Data Integrated Network (ODIN): Hardware Development																																
Operational Data Integrated Network (ODIN): Hardware Improvement Studies																																
Operational Data Integrated Network (ODIN): Architecture Development																																
Operational Data Integrated Network (ODIN): Business Process Reengineering																																
Operational Data Integrated Network (ODIN): Platform Development																																
Operational Data Integrated Network (ODIN): Integrated Data Environment Development																																
Operational Data Integrated Network (ODIN): Data Transformation																																
Operational Data Integrated Network (ODIN): Software Prototyping																																
Operational Data Integrated Network (ODIN): Legacy Modernization and Migration																																
Operational Data Integrated Network (ODIN): COTS/GOTS Application Configuration, Software Development, and Integration																																
Prognostics and Health Management (PHM): PHM Algorithm Development																																

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673505 / Maintenance Systems (MxS)
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>673505</b>				
Operational Data Integrated Network (ODIN): Hardware Development	1	2022	4	2023
Operational Data Integrated Network (ODIN): Hardware Improvement Studies	1	2022	4	2026
Operational Data Integrated Network (ODIN): Architecture Development	1	2022	3	2023
Operational Data Integrated Network (ODIN): Business Process Reengineering	1	2022	3	2022
Operational Data Integrated Network (ODIN): Platform Development	1	2022	3	2024
Operational Data Integrated Network (ODIN): Integrated Data Environment Development	1	2022	4	2024
Operational Data Integrated Network (ODIN): Data Transformation	1	2022	1	2025
Operational Data Integrated Network (ODIN): Software Prototyping	1	2022	3	2022
Operational Data Integrated Network (ODIN): Legacy Modernization and Migration	1	2022	1	2023
Operational Data Integrated Network (ODIN): COTS/GOTS Application Configuration, Software Development, and Integration	4	2022	4	2026
Prognostics and Health Management (PHM): PHM Algorithm Development	3	2022	4	2026

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2				<b>Project (Number/Name)</b> 673506 / Combat Data Systems (CDS)			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
673506: <i>Combat Data Systems (CDS)</i>	-	0.000	0.000	60.039	0.000	60.039	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Beginning in FY2022, Combat Data Systems (CDS) was established as a separate, distinct project within the Continuous Capability Development & Delivery (C2D2) Program Element, per Congressional direction. Efforts are continued from BPAC 675346, which is still included at the end of the R-2A for Fiscal Years FY2020 and FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request.

**A. Mission Description and Budget Item Justification**

Investment and modernization activities required for Block 4 development, integration, test and evaluation of Mission Data Tools, Verification & Validation Systems, and Mission Planning Software/Hardware. Funding related to key deliveries to Electronic Warfare Squadrons and F-35 Operational Squadrons and enables government and contractor labor for mission planning support environment and joint reprogramming enterprise. Other costs support Technology Investment for key Modernization / Innovation activities and Cloud based DevSecOps infrastructure.

FY22 funding totals include \$26.717M requested for the Pacific Defense Initiative.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p><b>Title:</b> Joint Reprogramming Environment (JRE)</p> <p><b>Description:</b> AGILE development of Common Reprogramming Tools (CRT) to provide Electronic Warfare Squadrons with essential software tools that reduce Mission Data File (MDF) development time and human error and increase combat effectiveness.</p> <p><b>FY 2021 Plans:</b> N/A</p> <p><b>FY 2022 Base Plans:</b> Continue efforts for the AGILE development of Common Reprogramming Tools (CRT) to provide Electronic Warfare Squadrons with essential software tools that reduce Mission Data File (MDF) development time and human error and increase combat effectiveness. The CRT effort will continue in decomposition of requirements and begin software coding to support development of the software tool. Continue effort to upgrade Reprogramming Verification &amp; Validation Systems (RVVS) to meet the Block 4 capability requirements and meet next generation threats. RVVS plans to conduct</p>	0.000	0.000	39.550	0.000	39.550

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673506 / Combat Data Systems (CDS)

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<p>critical System Engineering Technical Review events to move forward in the design and delivery including acquiring equipment. Continue activities on the Capability Upgrade/Refresh Contract (CURC) to accomplish three main objectives including upgrading the Radar Stimulator Interface (RSI), provide Win10 compliance, and redesign the IT infrastructure. In addition, the refresh effort upgrades multiple United States Reprogramming Laboratory (USRL) computer systems for security compliance, and removes obsolete parts and deficient technology to form the new backbone of the USRL IT infrastructure for all future mission data production, test, and fielding. Continue ongoing efforts to support aircraft in relation to Technology Refresh-3 (TR-3), Continuous Capability Development and Delivery (C2D2), Capability Upgrade and Refresh, and Network Boundary Consolidation. Continue development support for defining, managing and acquiring the F-35 Reprogramming capability enhancements identified in approved requirements documents for Block 4 and modernization efforts and support efforts for joint reprogramming enterprise activities.</p> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase due to planned increase to upgrade the RVVS to meet Block 4 capability requirements. Additionally, planned ramp-up in activities on the CURC to upgrade the RSI, provide Win10 compliance, and redesign the IT infrastructure. Finally, previously planned innovation projects (e.g., Software in the Loop) were partially delayed in FY2021 and requirements in FY2022.</p>					
<p><b>Title:</b> Mission Planning Support Environment (MPSE)</p> <p><b>Description:</b> Development support for defining, managing and acquiring the F-35 Mission Planning capability enhancements identified in approved requirements documents for Block 4 and modernization efforts.</p> <p><b>FY 2021 Plans:</b> N/A</p> <p><b>FY 2022 Base Plans:</b> Continue development support for defining, managing and acquiring the F-35 Mission Planning capability enhancements identified in approved requirements documents for Block 4 and modernization efforts within the mission planning support hardware and software boundary. Continue development support of the Mission Planning System Environment (MPSE) software suite that is customized for each and every air vehicle Operational Flight Program (OFP) / Software Data Load (SDL) release to support the features and enhancements of that release. Continue development of the F-35 Next Generation Mission Planning (formerly</p>	0.000	0.000	20.489	0.000	20.489

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673506 / Combat Data Systems (CDS)
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>OSCAR) to: a) Replace the Joint Mission Planning Software (JMPS) framework that is facing end-of-life, increasing cost, decreasing performance, and limited capability growth, and b) Replace the Ground Data Receptacle (GDR) cross-domain solution and encryption/decryption device that has been assessed by the NSA to have high cyber security risks and not able to meet NSA Raise-the-Bar requirements without a complete redesign. Continue ongoing efforts to transition F-35 mission planning software development to AGILE and DevSecOps methodologies to reduce costs and increase speed of delivering capabilities to the warfighter. Continue ongoing efforts to transition F-35 mission planning software development workload from contractor to the Government, securing organic software development capability and reducing costs.</p> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase due to Joint Mission Planning Software framework end of life and transition to the Next Generation Open Mission System (NOMS). Increase due to NSA requirement to transition from GDR to a separate cross domain solution and inline field encryption device, as well as planned ramp-up in activities that will deliver the next-generation mission planning architecture to support current and future capabilities, address current and future cyber security risks, avoid the high costs of sustaining an obsolete architecture, and enable the Government to own portions of the F-35 software development / testing capabilities and reduce reliance on the prime contractor.</p>					
<b>Accomplishments/Planned Programs Subtotals</b>	0.000	0.000	60.039	0.000	60.039

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673506 / Combat Data Systems (CDS)
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CDS Prime JRE Development - CRT Increment 1	C/CPFF	LM; Ft Worth Tx : TBD	-	-		-		6.900	Oct 2021	-		6.900	-	-	-
CDS Prime JRE Development - RVVS	C/CPIF	LM; Ft Worth Tx : TBD	-	-		-		5.700	Jul 2022	-		5.700	-	-	-
CDS Prime JRE Development - CURC	C/CPFF	LM; Ft Worth Tx : TBD	-	-		-		12.750	Oct 2021	-		12.750	-	-	-
CDS Prime JRE Development - TR-3	C/CPAF	LM; Ft Worth Tx : TBD	-	-		-		2.987	Apr 2022	-		2.987	-	-	-
CDS Prime JRE Development - Capability Development	C/CPFF	LM; Ft Worth Tx : TBD	-	-		-		2.100	Dec 2021	-		2.100	-	-	-
CDS Prime MPSE Development F-35 Next Generation Mission Planning	Various	Various : TBD	-	-		-		15.750	Jul 2022	-		15.750	-	-	-
<b>Subtotal</b>			-	-		-		46.187		-		46.187	-	-	N/A

<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CDS JRE Development Support	Various	Various : TBD	-	-		-		9.113	Dec 2021	-		9.113	-	-	-
CDS MPSE Development Support	Various	Various : TBD	-	-		-		4.739	Dec 2021	-		4.739	-	-	-
<b>Subtotal</b>			-	-		-		13.852		-		13.852	-	-	N/A

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>		-	-	0.000	60.039	-	-	60.039	N/A

**Remarks**



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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673506 / Combat Data Systems (CDS)
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FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>673506</b>	
Joint Reprogramming Environment (JRE): Technology Refresh 3 (TR3) Reprogramming LabUpgrade	████████████████████
Joint Reprogramming Environment (JRE): Reprogramming Verification & Validation Systems(RVVS): Stimulator Upgrades SLDO 3	██
Joint Reprogramming Environment (JRE): Reprogramming Verification & Validation Systems(RVVS): Stimulator Upgrades Main	██
Joint Reprogramming Environment (JRE): Reprogramming Verification & Validation Systems(RVVS): Long Lead Procurement	██
Joint Reprogramming Environment (JRE): Phase 2.3 - 30P05/30P07 Mission Data Tools -Contract	████████████████████
Joint Reprogramming Environment (JRE): CRT INC 1 - CRT LOE	████
Joint Reprogramming Environment (JRE): CRT INC 1 - Long Lead Procurement	████████
Joint Reprogramming Environment (JRE): CRT INC 1 - CRT INC 1 - Development	██
Mission Planning Support Environment (MPSE): TR-3/Enablers for TR-3 - Contract	██
Mission Planning Support Environment (MPSE): TR-3/Enablers for TR-3 - MPSE TR2Configuration	██

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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673506 / Combat Data Systems (CDS)
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Mission Planning Support Environment (MPSE): F-35 Next Gen Mission Planning - PrototypeSLDO									■																			
Mission Planning Support Environment (MPSE): F-35 Next Gen Mission Planning - Increment1									■	■	■	■																
Mission Planning Support Environment (MPSE): F-35 Next Gen Mission Planning - Increment2													■	■	■	■	■	■	■	■	■	■	■	■				
Mission Planning Support Environment (MPSE): DevSecOps - Hill AFB, China Lake, Pt Mugu									■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Mission Planning Support Environment (MPSE): DevSecOps - NOMS Cloud Development(Multiple)									■	■	■	■																
Mission Planning Support Environment (MPSE): OGCs - Contracts									■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673506 / Combat Data Systems (CDS)

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>673506</b>				
Joint Reprogramming Environment (JRE): Technology Refresh 3 (TR3) Reprogramming LabUpgrade	1	2022	2	2023
Joint Reprogramming Environment (JRE): Reprogramming Verification & Validation Systems(RVVS): Stimulator Upgrades SLDO 3	1	2022	4	2024
Joint Reprogramming Environment (JRE): Reprogramming Verification & Validation Systems(RVVS): Stimulator Upgrades Main	4	2022	4	2024
Joint Reprogramming Environment (JRE): Reprogramming Verification & Validation Systems(RVVS): Long Lead Procurement	1	2022	3	2023
Joint Reprogramming Environment (JRE): Phase 2.3 - 30P05/30P07 Mission Data Tools -Contract	1	2022	4	2022
Joint Reprogramming Environment (JRE): CRT INC 1 - CRT LOE	2	2022	2	2022
Joint Reprogramming Environment (JRE): CRT INC 1 - Long Lead Procurement	1	2022	2	2022
Joint Reprogramming Environment (JRE): CRT INC 1 - CRT INC 1 - Development	1	2022	2	2024
Mission Planning Support Environment (MPSE): TR-3/Enablers for TR-3 - Contract	1	2022	2	2023
Mission Planning Support Environment (MPSE): TR-3/Enablers for TR-3 - MPSE TR2Configuration	1	2022	4	2026
Mission Planning Support Environment (MPSE): F-35 Next Gen Mission Planning - PrototypeSLDO	1	2022	1	2022
Mission Planning Support Environment (MPSE): F-35 Next Gen Mission Planning - Increment1	1	2022	2	2023
Mission Planning Support Environment (MPSE): F-35 Next Gen Mission Planning - Increment2	4	2022	3	2026
Mission Planning Support Environment (MPSE): DevSecOps - Hill AFB, China Lake, Pt Mugu	1	2022	4	2026

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673506 / <i>Combat Data Systems (CDS)</i>
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Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Mission Planning Support Environment (MPSE): DevSecOps - NOMS Cloud Development(Multiple)	1	2022	4	2022
Mission Planning Support Environment (MPSE): OGCs - Contracts	1	2022	4	2026

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2				<b>Project (Number/Name)</b> 673507 / Training Systems & Simulation			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
673507: Training Systems & Simulation	-	0.000	0.000	72.712	0.000	72.712	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Beginning in FY2022, Training Systems and Simulation (TSS) was established as a separate, distinct project within the Continuous Capability Development and Delivery (C2D2) Program Element, per Congressional direction. Efforts are continued from BPAC 675346, which is still included at the end of the R-2A for Fiscal Years FY2020 and FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request.

**A. Mission Description and Budget Item Justification**

The F-35 Training Systems & Simulation Program Management Office (TSS PMO) development portfolio is aligned with the program's Continuous Capability Development and Delivery (C2D2) efforts and is organized in three primary lines of effort; Training System Capability Development (TSCD), Training Systems Investments (TSI) Roadmap, and Joint Simulation Environment (JSE) Development. As a function of the F-35 organizational pivot, this is the first budget cycle in which TSS PMO budget requirements have been comprehensively and discretely defined within a dedicated BPAC.

Training System Capability Development (TSCD): Efforts will continue with a primary focus on alignment of Training System capabilities with other elements of the Air System. Specific efforts will include development of Block 4 capabilities to equivalent maturity of those in the Air Vehicle enabling release of one capability upgrade per year to the fleet, continued development of the Production Runtime Server (PRTS) - Pilot Training Device TR-3 equivalent - to enable Block 4 capabilities, continued development of Live-Virtual-Constructive (LVC) capabilities including Distributed Mission Training (DMT), and appropriate lab infrastructure to enable Training System development.

Training Systems Investments (TSI) Roadmap: Efforts will continue with a focus on implementation of the modernization activities outlined in the TSS PMO roadmaps that will target the requirement for higher fidelity training to the warfighter. Specific efforts will include software architecture modernization, hardware architecture modernization and Synthetic Threat Enhancement.

Joint Simulation Environment (JSE) Development: Efforts will continue with a focus on completion of F-35 IOT&E events at the NAS Patuxent River facility while upgrading JSE capabilities at NAS Patuxent River to enable effective verification of Block 4 capabilities. Additionally, efforts will continue toward development of Effects Based Simulation (EBS) capabilities as well as Virtual Warfare Center (VWC) events.

FY22 funding totals include \$32.356M requested for the Pacific Defense Initiative.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<b>Title:</b> Training Systems Capability Development (TSCD)	0.000	0.000	35.810	0.000	35.810

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673507 / Training Systems & Simulation

**B. Accomplishments/Planned Programs (\$ in Millions)**

**Description:** Efforts will continue with a primary focus on alignment of Training System capabilities with other elements of the Air System. Specific efforts will include development of capabilities (Capability Increments (CI) 1-3) to equivalent maturity of those in the Air Vehicle enabling release of one capability upgrade per year to the fleet, continued development of the Production Runtime Server (PRTS) - Pilot Training Device TR-3 equivalent - to enable CI1-3 capabilities, continued development of Live-Virtual-Constructive (LVC) capabilities including Distributed Mission Training (DMT), and appropriate lab infrastructure to enable Training System development.

**FY 2021 Plans:**  
N/A

**FY 2022 Base Plans:**  
Efforts will continue to support development, integration and test of Block 4 capabilities in the Training System with a focus on equivalent capability maturity between the Training System and other elements of the Air System and preparing a relevant capability upgrade (Pilot Training, Maintainer Training, Instructional Products) for release to the fleet in FY2022. Additionally, PRTS will continue critical development, integration and test activities required to enable Block 4 training capabilities. The DMT program will continue with development activities to ensure DMT capability remains fully integrated with CI1-3 capabilities and in-line with overall Air System capability to include certified and exportable Cross Domain Solutions (CDS) to enable fully integrated DMT across the F-35 Enterprise. Within the LVC portfolio, requirements derivation and planning activities for Enhanced Embedded Training and TCTS II integration will continue to evolve. Training System lab infrastructure assets will be configured to enable current and future Training System development activities across the portfolio.

**FY 2022 OCO Plans:**  
N/A

**FY 2021 to FY 2022 Increase/Decrease Statement:**  
The increase in funding from FY2021 to FY2022 is a direct function of the continued maturation of the F-35 organization pivot. Prior to FY2021, Training System capability development costs were factor-based and embedded in higher-level capability development budgets. FY2021 was the first budget cycle where Training System costs were broken out and identified discretely, but the FY2021 effort was based on limited/incomplete data and did not fully capture the true cost of Training System capability development. In concert with the maturation of the TSS PMO, higher fidelity cost estimating models have evolved to comprehensively inform FY2022 (and beyond) budget requirements for Training System capability development. More specifically, the FY2022 budget increase accurately captures

FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673507 / Training Systems & Simulation

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
the cost of Training System development lab infrastructure, development of Block 4 capabilities in the Training System, PRTS development and DMT development. These development requirements were unfunded/underfunded in FY2021 and are critical to ensure Training Systems are operationally relevant and aligned with other elements of the Air System.					
<p><b>Title:</b> Training Systems Investments (TSI) Roadmap</p> <p><b>Description:</b> Efforts will continue with a focus on implementation of the modernization activities outlined in the TSS PMO roadmaps that will target the requirement for higher fidelity training to the warfighter. Specific efforts will include software architecture modernization, hardware architecture modernization and Synthetic Threat Enhancement.</p> <p><b>FY 2021 Plans:</b> N/A</p> <p><b>FY 2022 Base Plans:</b> Efforts will continue to refine and implement TSS PMO investment roadmaps with the objective to enable operationally relevant and higher fidelity training to the warfighter with focus on training to support the high-end fight. Software architecture modernization efforts (FLITE) will continue with an intent to integrate FLITE into the PTD software baseline in FY2022 (objective) or FY2023 (threshold). Hardware architecture modernization efforts will continue with an intent to conduct tradeoff analyses of smaller footprint Pilot Training Device (PTD) rapid prototype activities to support eventual Program of Record production cut-in. Synthetic Threat Enhancement efforts will continue to improve the quantity, density and fidelity of relevant synthetic threat integration in the family of PTDs with intent to incrementally integrate synthetic threat improvement in each annual PTD capability upgrade to the fleet. Opportunities to leverage JSE synthetic threat investment toward a common threat environment across Training Systems and JSE architectures will continue to mature with an intent to minimize duplicative investment in multiple synthetic threat environments across the F-35 Enterprise.</p> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> The increase in funding from FY2021 to FY2022 is a direct function of the continued maturation of the F-35 organization pivot and the realities of a challenging FY2021 budget year. FY2021 was the first budget cycle where Training System Investments were broken out and identified discretely, but the FY2021 effort did not fully</p>	0.000	0.000	15.717	0.000	15.717

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673507 / Training Systems & Simulation

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
capture details and associated cost of roadmap investments. Additionally, FY2021 budget challenges resulted in deferral of several roadmap investments (Hardware architecture modernization, Synthetic Threat Enhancement) to FY2022 and beyond. In concert with the maturation of the TSS PMO, roadmaps have been refined to more accurately inform FY2022 (and beyond) budget requirements for Training System roadmap investments. More specifically, the FY2022 budget increase accurately captures the cost of smaller footprint PTD prototype activities and enables synthetic threat enhancements that were deferred from FY2021. These roadmap investments are critical enablers to ensure that Training Systems remain affordable, operationally relevant, and aligned with other elements of the Air System across the FYDP and beyond.					
<p><b>Title:</b> Joint Simulation Environment (JSE) Development</p> <p><b>Description:</b> Efforts will continue with a focus on completion of F-35 IOT&amp;E events at the NAS Patuxent River facility while upgrading JSE capabilities at NAS Patuxent River to enable effective verification of C11-3 capabilities. Additionally, efforts will continue toward development of Effects Based Simulation (EBS) capabilities as well as Virtual Warfare Center (VWC) capabilities.</p> <p><b>FY 2021 Plans:</b> N/A</p> <p><b>FY 2022 Base Plans:</b> Efforts will continue with a focus on completion of Verification, Validation and Accreditation (VV&amp;A) activities enabling successful IOT&amp;E Run-for-Score events. Concurrently, upgrading JSE capability will enable effective verification of Block 4 capabilities (sensor model fidelity, complex threat models and F-35 In-a-Box (FIAB) upgrades) (objective). Efforts will continue toward expansion of JSE capability to Wright Patterson AFB, Edwards AFB and Nellis AFB in FY2023 (objective). Effects Based Simulation (EBS) will continue design, development and integration activities to support requirements analysis and pilot training tasks. Efforts will continue to support F-35 participation in events at the Virtual Warfare Center (VWC), including Nimble Lightning.</p> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> The increase in funding from FY2021 to FY2022 is a direct function of the continued maturation of the F-35 organization pivot. Prior to FY2021, JSE development costs were immature and embedded in higher-level capability verification budgets. FY2021 was the first budget cycle where JSE costs were broken out and allocated to the TSS PMO, but the FY2021 effort was based on incomplete data and did not fully capture the true</p>	0.000	0.000	21.185	0.000	21.185



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673507 / Training Systems & Simulation

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
cost of JSE development. In concert with the maturation of the TSS PMO, higher fidelity cost estimating models have evolved to comprehensively inform FY2022 (and beyond) budget requirements for JSE development. More specifically, the FY2022 budget increase is required to support increased personnel and resources, Government and Contractor, to enable successful completion of F-35 IOT&E events while also supporting continued development of EBS and F-35 software at VWC to implement Block 4 capabilities.					
<b>Accomplishments/Planned Programs Subtotals</b>	0.000	0.000	72.712	0.000	72.712

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

For FY2021 and FY2022, the majority of Training System capability development requirements (CI1-3 development, PRTS development, Lab Infrastructure) will be executed via training specific CLINs in Enterprise-level development contracts (Block 4 - Phase 2.3, Development Foundation). Training System Investment requirements will be executed via a combination of training specific CLINs in Enterprise-level contracts, TSS PMO specific contract actions and Other Transaction Authority (OTA) contracts. JSE development requirements will be executed via a combination of Enterprise-level contract actions and MIPR transactions to support OGC activities.

In concert with continued maturation of the F-35 organizational pivot, the TSS PMO acquisition strategy will transition toward TSS PMO controlled contract actions that will enable more effective oversight of PMO cost-schedule-performance execution.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673507 / Training Systems & Simulation
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
TSS Prime LM Training System Alignment (TSCD)	C/CPAF	Lockheed Martin : Ft. Worth, TX	-	-		-		14.330	Nov 2021	-		14.330	-	-	157.972
TSS Prime LM PTD TR-3 Development (TSCD)	C/CPAF	Lockheed Martin : Ft. Worth, TX	-	-		-		11.448	Nov 2021	-		11.448	-	-	84.564
TSS Prime LM Training Lab Infrastructure (TSCD)	C/CPFF	Lockheed Martin : Ft. Worth, TX	-	-		-		8.780	Nov 2021	-		8.780	-	-	76.127
TSS Live-Virtual-Constructive (LVC) - DMT (TSCD)	C/CPFF	Lockheed Martin : Ft. Worth, TX	-	-		-		1.252	Nov 2021	-		1.252	-	-	35.717
TSS Hardware Rearchitecture (TSI)	Various	Not specified : TBD	-	-		-		7.261	Nov 2021	-		7.261	-	-	15.166
TSS Software Rearchitecture (TSI)	C/CPAF	Lockheed Martin : Ft. Worth, TX	-	-		-		5.955	Nov 2021	-		5.955	-	-	45.545
TSS Synthetic Threat Enhancement (TSI)	C/CPFF	Lockheed Martin : Ft. Worth, TX	-	-		-		2.501	Nov 2021	-		2.501	-	-	15.227
TSS JSE Prime LM FIAB Development	C/CPIF	Lockheed Martin : Ft. Worth, TX	-	-		-		9.105	Nov 2021	-		9.105	-	-	54.073
TSS JSE VWC Development	Various	Various : TBD	-	-		-		0.995	Nov 2021	-		0.995	-	-	7.696
<b>Subtotal</b>			-	-		-		61.627		-		61.627	-	-	N/A

<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
TSS JSE Pax Development Support	Various	NAWCAD : NAS Patuxent River, MD	-	-		-		8.725	Nov 2021	-		8.725	-	-	51.671
TSS JSE Other Development Support	Various	Various : TBD	-	-		-		0.821	Nov 2021	-		0.821	-	-	16.383
TSS JSE EBS Development Support	Various	Various : TBD	-	-		-		1.539	Nov 2021	-		1.539	-	-	5.826
<b>Subtotal</b>			-	-		-		11.085		-		11.085	-	-	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date: May 2021**

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673507 / Training Systems & Simulation
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	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	-	-	0.000	72.712	-	72.712	-	-	N/A

**Remarks**

**UNCLASSIFIED**

**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date: May 2021**

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673507 / Training Systems & Simulation
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FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>673507</b>	
Capability Development & Air System Alignment	
Ownship Software Modernization (FLITE)	
Environment Software Re-architecture & Integration of JSE Components	
Hardware Re-architecture (Small Footprint Sim OTA)	
Pilot Training Devices (PTD) TR-3 Development	
Training System Lab Infrastructure	
Distributed Mission Training (DMT)	
Development/Integration of models in JSE	
Development/Integration of F-35 In-a-Box	
Development of Effects Based Simulation (EBS)	
Execution of Virtual Warfare Center (VWC) Development Support	

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673507 / Training Systems & Simulation
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>673507</b>				
Capability Development & Air System Alignment	1	2022	4	2026
Ownship Software Modernization (FLITE)	1	2022	3	2023
Environment Software Re-architecture & Integration of JSE Components	2	2022	3	2025
Hardware Re-architecture (Small Footprint Sim OTA)	1	2022	1	2024
Pilot Training Devices (PTD) TR-3 Development	1	2022	4	2026
Training System Lab Infrastructure	1	2022	4	2026
Distributed Mission Training (DMT)	1	2022	4	2026
Development/Integration of models in JSE	1	2022	4	2023
Development/Integration of F-35 In-a-Box	1	2022	4	2023
Development of Effects Based Simulation (EBS)	1	2021	4	2026
Execution of Virtual Warfare Center (VWC) Development Support	1	2022	4	2026

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673508 / Infrastructure & Support Costs
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
673508: Infrastructure & Support Costs	-	0.000	0.000	67.860	0.000	67.860	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Beginning in FY2022, Infrastructure and Support Costs was established as a separate, distinct project within the Continuous Capability Development and Delivery (C2D2) Program Element, per Congressional direction. Efforts are continued from BPAC 675346, which is still included at the end of the R-2A for Fiscal Years FY2020 and FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request.

**A. Mission Description and Budget Item Justification**

The F-35 Joint Program Office equips U.S. and allied forces with operational F-35 weapon systems in support of military and national security operations. The acquisition and product support workforce provides cutting edge weapon systems, sustainment capabilities, and is charged with providing management, tools, and technical and business capabilities needed to oversee acquisition programs throughout their life cycle. The acquisition workforce funded in this program element will support all phases of acquisition programs to include material solution analysis, technology development, engineering and manufacturing development, production and deployment, and operations and support. This funding does not include costs for base operating support civilian personnel. This program element supports both civilian pay and non-pay support requirements. Additional infrastructure and program management support costs include travel, supplies, contractor support, off-base leases, program office IT, cybersecurity, model-based systems engineering, and risk reduction studies.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

FY22 funding totals include \$30.197M requested for the Pacific Defense Initiative.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<b>Title:</b> Core Program Support/CSS Support	-	0.000	67.860	0.000	67.860
<b>Description:</b> Includes off-base leases, Advisory and Assistance Services (A&AS), travel, supplies, Navy Working Capital fund subject matter expert support, program office IT, cybersecurity, model-based systems engineering, and risk reduction studies.					
<b>FY 2021 Plans:</b> N/A					
<b>FY 2022 Base Plans:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673508 / Infrastructure & Support Costs
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Support program office efforts, including Arlington, VA program unique off-base lease costs, CSS support, travel, supplies, Navy working capital technical SME labor, program office IT, cybersecurity, model-based systems engineering, and risk reduction studies.  <b>FY 2022 OCO Plans:</b> N/A  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase from FY2021 to FY2022 by \$2.492M is due to a new BPAC established for Infrastructure & Support Costs. The original BPAC where this effort was originally funded was 675346.					
<b>Accomplishments/Planned Programs Subtotals</b>	-	0.000	67.860	0.000	67.860

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673508 / Infrastructure & Support Costs
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<b>Support (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Core Program Support Cyber Risk Reduction	Various	Various : TBD	-	-		-		1.000	Dec 2021	-		1.000	-	-	-
Core Program Support Model-Based Systems Engineering	Various	Various : TBD	-	-		-		0.200	Dec 2021	-		0.200	-	-	-
<b>Subtotal</b>			-	-		-		1.200		-		1.200	-	-	N/A

<b>Management Services (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
F-35 JPO AFLCMC Civilian Pay	MIPR	Wright Patterson AFB, OH : TBD	-	-		-		46.862	Oct 2021	-		46.862	-	-	-
CSS Support/Civ Support	Various	Various : TBD	-	-		-		7.070	Dec 2021	-		7.070	-	-	-
Core Program Support Off-Base Leases	MIPR	WHS: NCR : TBD	-	-		-		12.228	Oct 2021	-		12.228	-	-	-
Core Program Support Travel	Various	Various : TBD	-	-		-		0.500	Oct 2021	-		0.500	-	-	-
<b>Subtotal</b>			-	-		-		66.660		-		66.660	-	-	N/A

<b>Project Cost Totals</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
	-	-	0.000	67.860	-	67.860	-	-	N/A

**Remarks**



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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673508 / Infrastructure & Support Costs
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FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>673508</b>	
Continued JPO Infrastructure and Support Costs	[REDACTED]

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673508 / Infrastructure & Support Costs

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>673508</b>				
Continued JPO Infrastructure and Support Costs	1	2022	4	2026

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2				<b>Project (Number/Name)</b> 673509 / DevSecOps			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
673509: DevSecOps	-	0.000	0.000	28.000	0.000	28.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Beginning in FY2022, DevSecOps was established as a separate, distinct project within the Continuous Capability Development and Delivery (C2D2) Program Element, per Congressional direction. Efforts are continued from BPAC 675346, which is still included at the end of the R-2A for Fiscal Years FY2020 and FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request.

**A. Mission Description and Budget Item Justification**

The F-35 Software Development, Security & Operations (DevSecOps) Cloud platform environment allows for US Government and contracted software development teams to produce, test and deploy capabilities for F-35 supported Project Management Offices (PMO). This includes providing support to the Combat Data Systems (CDS), Air Vehicle (AV), Maintenance Systems (MxS), Propulsion (PP), and Training Systems and Simulation (TSS) PMOs. The mission of DevSecOps is to provide a centralized and consolidated F-35 software development environment, allowing for rapid release cycles to keep the F-35 ahead of its adversaries. Investment and modernization of DevSecOps include efforts to support F-35 Software Modernization efforts, develop organic government software and testing capabilities, enhance the security posture of the development pipeline, and support goals of reducing long-term on-premise infrastructure environments cost ultimately resulting in reducing fleet delivery timelines.

FY22 funding totals include \$12.460M requested for the Pacific Defense Initiative.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<b>Title:</b> DevSecOps Support	-	0.000	28.000	0.000	28.000
<b>Description:</b> Reference Mission Description and Budget Item Justification.					
<b>FY 2021 Plans:</b> N/A					
<b>FY 2022 Base Plans:</b> Continue development and support for DevSecOps infrastructure, platform, software development pipeline, and joint F-35 organizational connections. Establish initial capabilities and expand existing software development efforts with the goal of transitioning dispersed and separated software development environments into model based systems engineering and a fully collaborative requirements to development environment. Additional goals of delivering flight worthy rapid prototyping of capability, virtual test capability, and transitioning workloads to lower cost software sustainment efforts. New requirements from PMOs are expected. Prepare environment					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673509 / DevSecOps

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<p>for on-boarding, as well as transitioning the PMOs from separate pillars to a centralized JPO-managed cloud environment. Includes software licensing for PMO tool sets and associated applications. Major cost drivers include requirements tool, and collaboration tools, authentication tools - supporting Single Sign On and Multi-Factor Authentication and Compiler tools. For software tooling efforts, working towards an eventual consolidation of tools across the PMOs (i.e. application rationalization) with an end goal of a standardized compiler tool sets and Cybersecurity compliance. Accordingly, talent/consumption (hardware and software to run the environment) contracts must be renewed and expanded. Cybersecurity requirements must also be met, meaning additional resources for security processes, monitoring, scanning, vulnerability identification plus mitigation, and meeting all requirements for DoD compliance to obtain ongoing/continuous Authority to Operate (ATO).</p> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase from FY2021 to FY2022 is due to a new BPAC established for DevSecOps. The original BPAC where this effort was originally funded was 675346.</p>					
<b>Accomplishments/Planned Programs Subtotals</b>	-	0.000	28.000	0.000	28.000

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

The DevSecOps Acquisition Strategy is based on the CSAF 180-day delivery sprint. Phase 1 demonstrates prototype designs, integration of Defense Industry Base partners and PMOs, appropriate set of technology stacks to be integrated, identifying ROI and buying down technical risk. Technology maturation; putting in place the necessary contracts for talent, licenses and Cloud consumption to support software pipeline delivery for F-35. Production and Development; building, testing and deploying Cloud ecosystems Impact Level (IL) 2 - 6+ and software development pipeline utilizing contracted and government support. Operation and Support; maintain Cloud ecosystem utilizing industry research, resources, talent and technology modernization methodologies with the focus on reducing long-term costs for the program.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673509 / DevSecOps
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<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Dev Ops Development Support - Talent	MIPR	Various : TBD	-	-		-		16.000	Dec 2021	-		16.000	-	-	-
Dev Ops Development Support - Licenses	C/FFP	Various : TBD	-	-		-		7.000	Oct 2021	-		7.000	-	-	-
Dev Ops Development Support - Cloud Support	C/FFP	Various : TBD	-	-		-		5.000	Oct 2021	-		5.000	-	-	-
<b>Subtotal</b>			-	-		-		28.000		-		28.000	-	-	N/A

**Remarks**  
DevSecOps Ecosystem Standup used for centralized software development in JPO-managed cloud.

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	-	-	0.000	28.000	-	28.000	-	-	N/A

**Remarks**  
DevSecOps Ecosystem Standup used for centralized software development in JPO-managed cloud

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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date: May 2021**

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673509 / DevSecOps
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FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>673509</b>	
AWS Impact Level 5 Buildout	██████████
AWS Impact Level 6 Buildout	████████████████████
AWS Impact Level 6 Sustainment/ Modernization	██████████
AWS Impact Level 6+ (SAP) Buildout	████████████████████
AWS Impact Level 6+ (SAP) Sustainment/ Modernization	██████████
Data Transfer as a Service	██████████
Cloud Gateway (Collateral) LM Connection	████████████████████
Cloud Gateway (Collateral) Sustainment/ Modernization	██████████
Cloud Gateway (SAP) LM Connection	██████████
Cloud Gateway (SAP) Sustainment/ Modernization	██████████
AzureStack Impact Level 6+ (SAP) Buildout	████████████████████
AzureStack Impact Level 6+ (SAP) Sustainment/Modernization	██████████

**UNCLASSIFIED**

**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 673509 / DevSecOps
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>673509</b>				
AWS Impact Level 5 Buildout	1	2022	1	2022
AWS Impact Level 6 Buildout	1	2022	4	2022
AWS Impact Level 6 Sustainment/Modernization	4	2022	4	2022
AWS Impact Level 6+ (SAP) Buildout	1	2022	4	2022
AWS Impact Level 6+ (SAP) Sustainment/Modernization	4	2022	4	2022
Data Transfer as a Service	1	2022	1	2022
Cloud Gateway (Collateral) LM Connection	2	2022	4	2022
Cloud Gateway (Collateral) Sustainment/Modernization	1	2023	1	2023
Cloud Gateway (SAP) LM Connection	1	2022	1	2022
Cloud Gateway (SAP) Sustainment/Modernization	2	2022	2	2022
AzureStack Impact Level 6+ (SAP) Buildout	1	2022	3	2022
AzureStack Impact Level 6+ (SAP) Sustainment/Modernization	3	2022	3	2022

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2				<b>Project (Number/Name)</b> 675346 / F-35			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
675346: F-35	-	624.973	695.869	0.000	0.000	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Total cost, including International partner contributions, USN, USMC, and USAF funding: FY2020:1,623.467, FY2021:1,938.386M, FY2022:2,367.088M.

R-2A table shown above reflects service funding only.

R-2A (section B)/R-3 displays combined program for JSF Continuous Capability Development and Delivery (C2D2).

JSF C2D2 Includes:

USAF PE 0207142F BPAC 675346

USAF PE 0604840F BPAC 675346

USN PE 0604840N/ Project Unit 2936

USMC PE 0604840M Project Unit 3410

USN PE 0604810N/ Project Unit 2936

USMC PE 0604810M Project Unit 2935

USN PE 0604800N Project Unit 9999 (FY14): 1.500M

USMC PE 0604800M Project Unit 9999 (FY14): 1.500M

International Partner Contributions

**A. Mission Description and Budget Item Justification**

F-35 C2D2 provides continuing incremental upgrades of the three F-35 variants and associated ground equipment. Upgrades are essential capabilities for Air Interdiction and Strategic Attack, Close Air Support, Suppression and Destruction of Enemy Air Defenses, Offensive and Defensive Counter Air and expanded Surface Warfare. The C2D2 acquisition strategy is based upon incremental deliveries of capabilities. The strategy includes periodic deliveries with a focus on hardware, tech refresh and software. C2D2 capability planning includes an efficient transition from F-35 SDD to C2D2. As SDD development activities ramp down C2D2 will assume responsibility for improvements and modernization efforts.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<b>Title:</b> Product Development - Air Vehicle (AV) / Block 4 Planning and Systems Engineering	232.868	204.120	0.000	0.000	0.000
<b>Description:</b> Block 4 Planning and Systems Engineering from preliminary design and requirements decomposition					



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
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**B. Accomplishments/Planned Programs (\$ in Millions)**

through completion of Developmental Flight Test for all variants of the F-35 aircraft. Modernization efforts include Requirements Decomposition and continuous development and release of capabilities identified as Block 4 upgrades. This is a continuation of the previous Block 4 developmental contracts, which will include activities leading to successful completion of Developmental Flight Test, to include select facility upgrades required for Block 4 research, development, test and evaluation. Included in Block 4 are upgraded capabilities and continuous improvements to maintain Air System viability against evolving threats indicated in the Electronic Warfare Initial Capabilities Document (ICD), the Fifth Generation Fighter Modernization ICD, and the Block 4 Capability Development Document (CDD), reduce life cycle cost, and improve operational suitability. Continuous risk reduction activities to include Air System Integration, preplanning for subsequent Block 4 Modernization events, and investments to deliver the full Block 4 Air System capabilities as needed. Efforts also included are AARGM-ER, NRE for obsolescence, and 6 In The Bay early systems engineering. C2D2 capability planning includes an efficient transition from F-35 SDD to C2D2. As SDD development activities ramp down C2D2 will assume responsibility for improvements and modernization efforts.

Beginning in FY2022, Air Vehicle - Block 4 Planning & Sys Eng was established as a separate, distinct project within the Continuous Capability Development & Delivery (C2D2) Program Element, per Congressional direction. Efforts are continued from BPAC 675346, which is still included at the end of the R-2A for Fiscal Years FY2020 and FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request.

***FY 2021 Plans:***

Continue Post-PDR risk reduction activities to include Air Ship Integration and planning. Continue with Agile development of capabilities through Flight Test. Continue development and maturity of key long lead capabilities and service unique weapons. Continue C2D2 capability development of software drops 30P6 (Q3 2021) and 30P7 (Q1 2022) to be available for fielding to meet warfighter need. C2D2 capability planning which includes an efficient transition from F-35 SDD to C2D2.

***FY 2022 Base Plans:***

Efforts continued in BPAC 673502.

***FY 2022 OCO Plans:***

N/A

***FY 2021 to FY 2022 Increase/Decrease Statement:***

FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

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**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
FY2021 to FY2022 increase is due to the continued effort with C2D2 DM90 Capability Development.					
<p><b>Title:</b> AV Product Development - Technology Refresh 3 (TR-3)</p> <p><b>Description:</b> Technology Refresh 3 (TR-3) conducts post Critical Design Review (CDR) design activities. This effort will develop and deliver a TR-3 system through full flight-worthy certification and production readiness review for Lot 15. The design of TR-3 subsystems Integrated Core Processor (ICP), Aircraft Memory System (AMS), and Panoramic Cockpit Display Electronics Unit and Display Unit (PCD-EU, PCD-DU) configurations will contain new backplane technology, commercial operating systems, and modified middleware necessary to support Block 3F functionality and incorporation of all Block 4 capabilities. This work includes nonrecurring engineering for the developing, test, and certification of the ICP, AMS, PCD-EU, and PCD-DU, and includes processing capacity to ensure long term viability for future capabilities.</p> <p>Beginning in FY2022, Air Vehicle - Technology Refresh 3 (TR-3) was established as a separate, distinct project within the Continuous Capability Development and Delivery (C2D2) Program Element, per Congressional direction. Efforts are continued from BPAC 675346, which is still included at the end of the R-2A for Fiscal Years FY2020 and FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request.</p> <p><b>FY 2021 Plans:</b> The TR-3 program will continue robust software development of the Core Processing Software (CPSW) and Pilot Systems Software (PSSW) to ensure and validate compatibility with current F-35 sensors and weapon loads, and will continue software development to integrate with the new Embedded Training and Next Generation Distributed Aperture System (NG DAS). In addition, the program will complete Safety of Flight (SoF) qualification on the ICP, AMS, PCD-EU, and PCDDU. Furthermore, the final hardware configurations will continue software development, as well as system integration and test activities. Finally, TR-3 will commence modifying developmental test aircraft, complete ground test, and start flight test.</p> <p><b>FY 2022 Base Plans:</b> Efforts continued in BPAC 673501.</p> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b></p>	121.150	161.290	0.000	0.000	0.000

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 675346 / F-35
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>The reduction in funding from FY2021 to FY2022 is due to development efforts with sub-tier suppliers which will curtail in FY22, with the focus being on the completion of qualification and flight test activities. The significant technical development up through FY21 will not continue at the same rate in FY22</p> <p><b>Title:</b> Infrastructure and Support Costs</p> <p><b>Description:</b> Funding will support infrastructure investment planning and other test planning activities required for Block 4 development, integration, test and evaluation. Funding related to the Integrated Test Force, government, and contractor labor. Support efforts for airframe, air vehicle systems, air ship integration, mission systems, weapons integration, offboard mission support, autonomic logistics development, joint reprogramming enterprise and modeling and joint simulation environment activities, including Nimble Lightning efforts. Other costs in support of ranges, chase planes and DT site operations. USAF only will fund additional PMA to transition to a final hybrid product support integrator (HPSI) which will support sustainment analysis with product support managers, focused on long term strategic planning and transition to a final integrated support plan. Other costs support Technology Investment for Modernization, Cloud based DevSecOps infrastructure, and COCOM Requirements for Coalition Mission Data Files (CMDx) to reduce fratricide in coalition environments.</p> <p>Beginning in FY2022, Infrastructure and Support Costs was established as a separate, distinct project within the Continuous Capability Development and Delivery (C2D2) Program Element, per Congressional direction. Efforts are continued from BPAC 675346, which is still included at the end of the R-2A for Fiscal Years FY2020 and FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request.</p> <p><b>FY 2021 Plans:</b> Continue development support for defining, managing and acquiring the F-35 capability enhancements identified in approved requirements documents. Support efforts for airframe, air vehicle systems, air ship integration, mission systems, weapons integration, offboard mission support, autonomic logistics development, modeling and simulation, training investments, and joint simulation environment activities to include Nimble Lightening. Continue integrated test focus on Block 4. Upgraded capabilities and improvements to include continuous upgrade of joint reprogramming enterprise labs, lab tooling, Mission Data File (MDF) development, and replacement of Ground Data Receptacle and Mission Planning system.</p> <p><b>FY 2022 Base Plans:</b> Efforts continued in BPAC 673508.</p> <p><b>FY 2022 OCO Plans:</b></p>	55.680	42.690	0.000	0.000	0.000

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
N/A					
<b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> FY2021 to FY2022 increase is due to the increase of the requirements based on the revised cost estimate, which includes the addition of DevSecOps efforts.					
<b><i>Title:</i></b> Test and Evaluation (TE)	103.960	141.760	0.000	0.000	0.000
<b><i>Description:</i></b> Integrated Test activities in support of Block 4, to include Lockheed Martin and Pratt & Whitney support at all test sites. Non-recurring engineering required to plan for the service life extension of existing DT aircraft and modification necessary to bring DT aircraft fleet to a more production representative and sustainable configuration, and to develop flight test instrumentation and release test software to meet Block 4 requirements. Additional upgrades required to support development and evaluation of improvements driven by changes in the threat environment and as identified in the Electronic Warfare ICD, the Fifth Generation Fighter Modernization ICD, and the Block 4 Capability Development Document (CDD). Efforts include non-recurring engineering and procurement of a test article to evaluate service life of F-35B STOVL Aircraft.					
Beginning in FY2022, Test and Evaluation (T&E) was established as a separate, distinct project within the Continuous Capability Development and Delivery (C2D2) Program Element, per Congressional direction. Efforts are continued from BPAC 675346, which is still included at the end of the R-2A for Fiscal Years FY2020 and FY2021. This project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request.					
<b><i>FY 2021 Plans:</i></b> Funding will support Integrated Test capacity and flight test execution (manpower, weapons, flight hours, range time, and chase, target & tanker support assets) to develop and verify Block 4 and other capabilities as directed by the F-35 JPO. Funding also supports investment planning and prioritization required for future development capabilities. This includes continuing work on instrumenting new test aircraft, delivery and installation of upgraded hardware (including production engines) as part of the DT aircraft viability effort. Additionally, this funding supports laboratory upgrades required to support development and verification of capabilities in a relevant environment, as well as meeting cyber security and testing requirements of Block 4 capabilities. Efforts also include non-recurring engineering and development of a test article to evaluate service life of F-35B Aircraft, which will then be used in flight test.					
<b><i>FY 2022 Base Plans:</i></b>					

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Efforts continued in BPAC 673503. <b>FY 2022 OCO Plans:</b> N/A <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY2021 to FY2022 increase is due to ramping up test capacity to accommodate testing of Block 4 warfighter capabilities.					
<b>Title:</b> Maintenance Systems (MxS) Operational Data Integrated Network (ODIN) / Autonomic Logistics Information System (ALIS) Development <b>Description:</b> The F-35 Operational Data Integrated Network (ODIN) is the F-35 program solution for delivering core maintenance and logistics information system solutions to F-35 warfighters. Leveraging agile and modern software development practices, ODIN will replace ALIS to serve as the primary logistics tool to support F-35 warfighter operations, health and diagnostics, mission planning, supply chain management, maintenance, and training. ODIN will substantially decrease F-35 administrator and maintainer workload, increase readiness rates for all F-35 variants, and allow software engineers to rapidly develop and deploy updates in response to changing warfighter requirements and improve data management, quality and integrity. ODIN is intended to provide the data to enable holistic fleet management, improve performance, enhance readiness, and reduce costs to the F-35 program. It comprises both hardware and software, and supports the flow of Unclassified and Classified aircraft and maintenance-related data.  Autonomic Logistics Information System (ALIS) will continue to deliver the core logistics and maintenance infrastructure requirements for the F-35 enterprise until ODIN is fielded at all sites. ALIS includes features such as aircraft scheduling, training delivery, record keeping, technical data delivery, supply chain management, maintenance management, pilot and maintenance debriefing, and mission planning. ALIS development is only focused on low cost and high return investments that provide a high confidence return on investment in the short term, significant warfighter impact, and/or offer synergy with ODIN development efforts.  Beginning in FY2022, Maintenance Systems (MxS) was established as a separate, distinct project within the Continuous Capability Development & Delivery (C2D2) Program Element, per Congressional direction. Efforts are continued from BPAC 675346, which is still included at the end of the R-2A for Fiscal Years FY2020 and FY2021. This project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request.	38.644	20.772	0.000	0.000	0.000

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<p><b><i>FY 2021 Plans:</i></b> Continue to mature initial ODIN infrastructure (hardware and cloud based development and production infrastructure), software, and data products with the goal of transitioning initial F-35 squadrons from ALIS to ODIN by the end of FY21. ODIN will develop initial unscheduled maintenance and disconnected operations capabilities and other capabilities detailed in the ODIN Capability Needs Statement (CNS), integrating government and contractor developed applications into a cohesive product. Product teams that delivered minimum viable products in FY20 will continue to develop software to fulfill user needs as defined in the ODIN CNS. ODIN will also deliver initial implementation of the Integrated Data Environment, conduct cybersecurity and user-focused testing, and develop user training.</p> <p>ALIS developmental efforts will be focused on low cost, high return on investment capabilities (e.g. Portable Maintenance Aid autoloader capability that will decrease the need for on-site administrators and provide immediate cost savings), and on maintaining alignment with the F-35 Air Vehicle Block 4 development. Support ALIS development environment at prime contractor site. ALIS cybersecurity improvements will be made if required.</p> <p>Develop and execute plans to transition aircraft, data, and operations from ALIS to ODIN.</p> <p>Develop improvements to Prognostic Health Management (PHM) and fault isolation and resolution with Anomaly and Failure Resolution System (AFRS) in addition to maintainer troubleshooting guides/instructions and sustainment tech data updates (e.g. Nuisance Filter Lists) as well as additional Assess Material Condition (AMC) algorithm development and implementation.</p> <p><b><i>FY 2022 Base Plans:</i></b> Efforts continued in BPAC 673505.</p> <p><b><i>FY 2022 OCO Plans:</i></b> N/A</p> <p><b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> FY2021 to FY2022 cost decrease due to lower ODIN requirements in FY 2022 per approved Cost Estimate.</p>					
<p><b><i>Title:</i></b> Combat Data Systems (CDS)</p> <p><b><i>Description:</i></b> Investment and modernization activities required for Block 4 development, integration, test and evaluation of Mission Data Tools, Verification &amp; Validation Systems, and Mission Planning Software/Hardware.</p>	19.649	36.612	0.000	0.000	0.000

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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**B. Accomplishments/Planned Programs (\$ in Millions)**

Funding related to key deliveries to Electronic Warfare Squadrons and F-35 Operational Squadrons and enables government and contractor labor for mission planning and joint reprogramming enterprise.

Beginning in FY2022, Combat Data Systems (CDS) was established as a separate, distinct project within the Continuous Capability Development & Delivery (C2D2) Program Element, per Congressional direction. Efforts are continued from BPAC 675346, which is still included at the end of the R-2A for Fiscal Years FY2020 and FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request.

***FY 2021 Plans:***

Continue development support for defining, managing and acquiring the F-35 Reprogramming and Mission Planning capability enhancements identified in approved requirements documents for Block 4 and modernization efforts. Support efforts for mission planning support and joint reprogramming enterprise activities. Initiate vital Mission Planning re-architecture efforts to support F-35 Operational Squadrons and replace Joint Mission Planning Software (JMPS) end of life and Ground Data Receptacle (GDR) replacement due to high cyber security risks. These updates are mandated to meet NSA Raise-the-bar requirements. Continue and expand efforts for the Agile development of Common Reprogramming Tools (CRT) to provide Electronic Warfare Squadrons with essential software tools that reduce Mission Data File (MDF) development time and human error and increase combat effectiveness. Continue and expand effort to upgrade Reprogramming Verification & Validation Systems (RVVS) to meet the Block 4 capability requirements and meet next generation threats. Continue ongoing efforts to support aircraft in relation to TR-3, Continuous Capability Development and Delivery (C2D2), Capability Upgrade and Refresh, and Network Boundary Consolidation.

***FY 2022 Base Plans:***

Efforts continued in BPAC 673506.

***FY 2022 OCO Plans:***

N/A

***FY 2021 to FY 2022 Increase/Decrease Statement:***

FY2021 to FY2022 cost increase is due to a steady increase in the development of the overall Block 4 Hardware upgrades required to support the F-35 Joint Reprogramming Enterprise. In addition, the increase is associated with the ramp-up in development work associated with the F-35 Ground Data Receptacle architecture upgrade, and the planned transition of the F-35 platform to the Next Gen Open Mission System (NOMS) software

FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
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architecture in support of the F-35 Mission Planning Enterprise - both the GDR and NOMS development efforts make up the aircraft's Open Secure Collaboration Architecture (OSCAR) program.					
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<b>Title:</b> Propulsion (PP)	23.843	18.975	0.000	0.000	0.000
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**Description:** Propulsion F135 Block 4 Integrated Flight Test Support includes efforts such as Engine Flight Test, Test Engine Procurements, and other associated government costs. For C2D2 to be able to continue to test all three aircraft variants, propulsion support is required to enable continued flying. Increased flights and flight hours are planned over the next 2 years, requiring elevated propulsion support. All of the current Full Flight Release (FFR) engines supporting Flight Test are at or nearing their life limits, requiring the purchase of new Initial Service Release (ISR) engines to replace them. This replacement effort is planned to occur over the next few years to enable continued flight capability.

Beginning in FY2022, Propulsion (PP) was established as a separate, distinct project within the Continuous Capability Development and Delivery (C2D2) Program Element, per Congressional direction. Efforts are continued from BPAC 675346, which is still included at the end of the R-2A for Fiscal Years FY2020 and FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request.

**FY 2021 Plans:**  
The Flight Test Fleet is planned to grow to 12 aircraft in CY21 (from 11 in CY20). This includes 7 at Edwards Air Force Base and 5 at Patuxent River Naval Air Station. Flights are expected to grow from 880 in CY20 to 960 in CY21. This includes an expected increase in EFH from 1760 to 1920 hours.

**FY 2022 Base Plans:**  
Efforts continued in BPAC 673504.

**FY 2022 OCO Plans:**  
N/A

**FY 2021 to FY 2022 Increase/Decrease Statement:**  
Increased from FY2021 to FY2022 is due to the procurement of five spare engines in Lot 12-14 with bulk of incremental funding in FY21 and FY22.

<b>Title:</b> Training Systems (TSS)	6.513	45.230	0.000	0.000	0.000
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**Description:** Training System efforts include continuous development and release of capabilities identified as Block 4 upgrades integral to an aligned Air System. This is a continuation of previous Block 4 developmental



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**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>efforts, which will include: capability development, architecture upgrades to support capability delivery, enhanced synthetic threat integration, opportunities to leverage JSE investments toward Training System requirements, and facility/lab upgrades required for research, development, test, and evaluation. Included in Block 4 are upgraded capabilities and continuous improvements to maintain Air System viability and alignment against evolving threats indicated in the Electronic Warfare Initial Capabilities Document (ICD), Fifth Generation Fighter Modernization ICD, Block 4 Capability Development Document (CDD), and TSS PMO Roadmap.</p> <p>Distributed Mission Training (DMT) Development and Test from preliminary design through completion of development, testing and fielding of the initial DMT capability for the United States Air Force, United States Navy, and United States Marine Corps. The DMT effort is developing the Joint Interoperability Interface (JII) as the filter for the F-35 simulator to interface with the various network standards. The DMT hardware and software components will be added to the Pilot Training Device (PTD) configuration baseline, yielding a fielded training capability for all F-35 services and customers with distributed training network capability. This is a continuation of previous DMT efforts. Included in DMT are upgraded capabilities and continuous improvements to maintain Air System viability against evolving threats, reduce life cycle cost, and improve operational suitability. Funding will support hardware purchase and planning for installation and test activities required for DMT development, integration, test, and evaluation. Funding related to contractor labor. Support efforts for Full Mission Simulator, Deployable Mission Rehearsal Trainer, and Tactical Environment Simulator capability developments.</p> <p>The Joint Simulation Environment (JSE) will continue efforts to allow for completion of F-35 IOT&amp;E events at the Patuxent River NAS facility. Efforts to upgrade JSE capabilities at Patuxent River NAS to support future F-35 Block 4 needs will continue and efforts to bring future JSE facilities at Wright Patterson AFB, Edwards AFB, and Nellis AFB online in FY23. Efforts to determine feasibility of integrating the JSE, F-35 In-a-Box (FIAB) and the F-35 Effects Based Simulator(EBS) with F-35 Training software to move towards a common software architecture will begin. F-35 EBS will continue development of unclassified and classified capabilities, and deliver formal software releases to current and new domestic and international partners and stakeholders. Continuation of efforts to support events involving the F-35, including Nimble Lightning, at the Virtual Warfare Center (VWC).</p> <p>Beginning in FY2022, Training Systems and Simulation (TSS) was established as a separate, distinct project within the Continuous Capability Development and Delivery (C2D2) Program Element, per Congressional direction. Efforts are continued from BPAC 675346, which is still included at the end of the R-2A for Fiscal Years</p>					

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**B. Accomplishments/Planned Programs (\$ in Millions)**

FY2020 and FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request.

***FY 2021 Plans:***

Continue Training System design and development activities enabling delivery of an aligned Air System in accordance with Block 4/C2D2 planning strategy. Leverage Mission Systems agile development activities as a risk-reducing measure to enable development of a relevant and robust training capability across the Block 4 capability spectrum. Continue design / development of Blade Server replacement focused on Pilot Training Device architecture upgrades that will enable and support future Block 4 modernization activities. Complete development of planned C2D2 capability updates planned for fielding in FY21.

The DMT program will continue interface development for USN and USMC networks to ensure and validate compatibility with their network standards and other aviation platforms. Continued lab test and verification will ensure timely capability delivery to customers by their requested timelines. Key milestone events are Configured for Use (CFU) declarations for the USN at NAS Lemoore, and the USMC at MCAS Miramar. Continued capability and entity development and integration activities will advance the DMT training capability for all users.

JSE will continue integration of initial FIAB software to allow for completion of IOT&E testing at Patuxent River NAS facility. JSE will begin development and receive delivery of updated FIAB software. JSE will continue efforts to upgrade capabilities to allow JSE to support future F-35 Block 4 needs, including beginning development of Communication, Navigation and Identification (CNI) Hardware-in-the-Loop (HITL) systems, development and integration of increased fidelity sensor models, and development and integration of Block 4 threat models. EBS will continue its design and development to support software releases and delivery to domestic and international partners and stakeholders. EBS will be used to support current and future initiatives including alignment with F-35 Training Community, rapid prototyping and requirements analysis, and other F-35 JPO high priority tasks. Support of events at the VWC involving the F-35, including upgrading of F-35 software at the VWC to include Block 4 capabilities.

***FY 2022 Base Plans:***

Efforts continued in BPAC 673507.

***FY 2022 OCO Plans:***

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>FY2020 and FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request.</p> <p><b><i>FY 2021 Plans:</i></b></p> <p>Continue Training System design and development activities enabling delivery of an aligned Air System in accordance with Block 4/C2D2 planning strategy. Leverage Mission Systems agile development activities as a risk-reducing measure to enable development of a relevant and robust training capability across the Block 4 capability spectrum. Continue design / development of Blade Server replacement focused on Pilot Training Device architecture upgrades that will enable and support future Block 4 modernization activities. Complete development of planned C2D2 capability updates planned for fielding in FY21.</p> <p>The DMT program will continue interface development for USN and USMC networks to ensure and validate compatibility with their network standards and other aviation platforms. Continued lab test and verification will ensure timely capability delivery to customers by their requested timelines. Key milestone events are Configured for Use (CFU) declarations for the USN at NAS Lemoore, and the USMC at MCAS Miramar. Continued capability and entity development and integration activities will advance the DMT training capability for all users.</p> <p>JSE will continue integration of initial FIAB software to allow for completion of IOT&amp;E testing at Patuxent River NAS facility. JSE will begin development and receive delivery of updated FIAB software. JSE will continue efforts to upgrade capabilities to allow JSE to support future F-35 Block 4 needs, including beginning development of Communication, Navigation and Identification (CNI) Hardware-in-the-Loop (HITL) systems, development and integration of increased fidelity sensor models, and development and integration of Block 4 threat models. EBS will continue its design and development to support software releases and delivery to domestic and international partners and stakeholders. EBS will be used to support current and future initiatives including alignment with F-35 Training Community, rapid prototyping and requirements analysis, and other F-35 JPO high priority tasks. Support of events at the VWC involving the F-35, including upgrading of F-35 software at the VWC to include Block 4 capabilities.</p> <p><b><i>FY 2022 Base Plans:</i></b></p> <p>Efforts continued in BPAC 673507.</p> <p><b><i>FY 2022 OCO Plans:</i></b></p>					

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
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N/A  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> The increase in funding from FY2021 to FY2022 is due to increased investments in TSS Roadmap initiatives including, Synthetic Threat improvements, integration of JSE investments in the Training System, design/development of small footprint Pilot Training Devices and hardware/software architecture improvements to enable effective delivery of future capabilities.					
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<b>Title:</b> DevSecOps  <b>Description:</b> Beginning in FY2022, DevSecOps was established as a separate, distinct project within the Continuous Capability Development and Delivery (C2D2) Program Element, per Congressional direction. Efforts are continued from BPAC 675346, which is still included at the end of the R-2A for Fiscal Years FY2020 and FY2021. This Project has also been updated to reflect the directed project categories to provide traceability between current execution and the FY2022 request.	22.666	14.420	0.000	0.000	0.000
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<b>FY 2021 Plans:</b> N/A					
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<b>FY 2022 Base Plans:</b> Efforts continued in BPAC 673509.					
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<b>FY 2022 OCO Plans:</b> N/A					
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<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> N/A					
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<b>Accomplishments/Planned Programs Subtotals</b>	624.973	685.869	0.000	0.000	0.000
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	<b>FY 2020</b>	<b>FY 2021</b>			
<b>Congressional Add:</b> JASSM  <b>FY 2020 Accomplishments:</b> N/A  <b>FY 2021 Plans:</b> F-35 Air System Integration Assessment (ASIA) study completed to determine feasibility of full integration of JASSM-ER on the F-35A. JASSM integration conducts preliminary integration analysis, risk reduction activities, and long lead test asset procurement for the JASSM family of weapons on F-35A/B/C	0.000	10.000			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 675346 / F-35

	<b>FY 2020</b>	<b>FY 2021</b>
variants. JASSM integration provides F-35 with a highly survivable long range precision strike capability against high value, well defended, fixed, and relocatable targets.		
<b>Congressional Adds Subtotals</b>	0.000	10.000

**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• RDTE 07 0604840N: <i>BLI 2936: F-35C C2D2</i>	342.860	370.235	-	-	-	-	-	-	-	-	-
• RDTE 07 0604840M: <i>BLI 3410: F-35B C2D2</i>	380.232	341.179	-	-	-	-	-	-	-	-	-
• RDTE 07 International: <i>International Continuous Capability Development and Delivery</i>	258.004	359.626	-	-	-	-	-	-	-	-	-

**Remarks**

This is a joint program with no executive service. Service Acquisition Executive (SAE) authority alternates between the Department of the Navy and the Department of the Air Force and currently resides with the Navy. Program Element 0604800N/0604800M continues USN development efforts budgeted in 0603800N prior to FY2002. The United Kingdom, Italy, Netherlands, Canada, Australia, Denmark, and Norway are participants in the SDD phase of JSF.

**D. Acquisition Strategy**

The C2D2 acquisition strategy is to employ both Cost and Fixed Price Incentive contracts for the Block 4 engineering and development efforts. A new modernization contract structure will be established for all post SDD Block 4 efforts. In addition, a separate Basic Ordering Agreement or Indefinite Quantity/Indefinite Delivery contract is planned to provide a long term approach to upgrading and maintaining laboratories and test aircraft and supporting technology maturation for future C2D2 capabilities.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date: May 2021**

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 675346 / F-35
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<b>Product Development (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
AV Prime LM Phase II Development	C/CPIF	Lockheed Martin : Ft Worth, TX	-	199.900	Nov 2019	187.144	Nov 2020	0.000		-		0.000	-	-	-
AV Prime LM TR-3 Development	C/CPIF	Lockheed Martin : Ft Worth, TX	-	121.150	Nov 2019	166.843	Nov 2020	0.000		-		0.000	-	-	-
TSS VWC Nimble Lightening	C/CPFF	Various : Various	-	0.050	Jan 2020	0.410	Jan 2021	0.000		-		0.000	-	-	-
TE Flight Test Assets	Various	Lockheed Martin : Ft Worth, TX	-	20.950	Dec 2019	9.760	Dec 2020	0.000		-		0.000	-	-	-
TE Prime LM TBD DT AC Viability	C/CPFF	Lockheed Martin : Ft Worth, TX	-	6.840	Dec 2019	6.000	Dec 2020	0.000		-		0.000	-	-	-
PP Prime PW Propulsion	SS/CPFF	Pratt Whitney : East Hartford, CT	-	23.840	Nov 2019	18.970	Nov 2020	0.000		-		0.000	-	-	-
TE Prime LM Developmental Foundation Contract	C/CPIF	Lockheed Martin : Ft Worth, TX	-	40.550	Nov 2019	79.250	Nov 2020	0.000		-		0.000	-	-	-
CDS Prime LM JRE Dev.	C/CPFF	Lockheed Martin : Ft Worth, TX	-	11.880	Dec 2019	25.010	Nov 2020	0.000		-		0.000	-	-	-
MxS Prime LM ALIS	C/CPFF	Lockheed Martin : Ft Worth, TX	-	3.940	Dec 2019	0.000	Dec 2020	0.000		-		0.000	-	-	-
MxS Prime LM ODIN	C/CPIF	Lockheed Martin : Ft Worth, TX	-	4.160	Dec 2019	6.710	Nov 2020	0.000		-		0.000	-	-	-
AV Prime LM Air Vehicle Integration	C/CPIF	Lockheed Martin : Ft Worth, TX	-	10.000	Nov 2019	0.000	Nov 2020	0.000		-		0.000	-	-	-
TE Prime LM F-35B Fatigue Test Article	C/CPIF	Lockheed Martin : Ft Worth, TX	-	0.000	Jan 2020	0.000	Dec 2020	0.000		-		0.000	-	-	-
TSS Prime LM Training Investments	C/CPIF	Lockheed Martin : Ft Worth, TX	-	5.060	Dec 2019	8.000	Dec 2020	0.000		-		0.000	-	-	-
AV Systems Engineering	Various	Various : Various	-	17.160	Jan 2020	7.120	Jan 2021	0.000		-		0.000	-	-	-
TSS Prime LM - JSE	C/CPIF	Lockheed Martin : Ft Worth, TX	-	0.500	Dec 2020	6.920	Dec 2020	0.000		-		0.000	-	-	-
CDS Prime LM Mission Planning Software Environment (MPSE)	C/CPIF	Lockheed Martin : Ft Worth, TX	-	0.250		3.250	Dec 2020	0.000		-		0.000	-	-	-

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2022 Air Force</b>											<b>Date: May 2021</b>				
<b>Appropriation/Budget Activity</b> 3600 / 7						<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2					<b>Project (Number/Name)</b> 675346 / F-35				

<b>Product Development (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
JASSM LM Integration	TBD	TBD : TBD	-	0.000		10.000	Jun 2021	-		-		-	-	-	-
<b>Subtotal</b>			-	466.230		535.387		0.000		-		0.000	-	-	N/A

**Remarks**  
 Changed Prime LM Nimble Lightening to TSS VWC Nimble Lightening, added PMO identifiers to Cost Category Item Name description, added TSS Prime LM - JSE, CDS Prime LM Mission Planning Software Environment (MPSE).  
 R-2A Categories include:  
 Air Vehicle / Block 4 Planning & Systems Engineering: AV Prime LM Phase II Development, Prime LM Air Vehicle Integration, AV Systems Engineering.  
 Technology Refresh 3 (TR-3): Prime LM TR-3 Development  
 Test and Evaluation (TE): Flight Test Asset, Prime LM DT AC Viability, Prime Development Foundation Contract, Prime LM F-35B Fatigue Test Article  
 Maintenance Systems (MxS): Prime LM ALIS, Prime LM ODIN  
 Combat Data Systems (CDS): Prime TBD JRE Dev, Prime LM MPSE  
 Propulsion (PP): Prime PW Propulsion  
 Training Systems (TSS): Prime LM Training Investments, Prime LM - JSE, VWC Nimble Lightening  
 Prime LM Phase II Development Contract is a hybrid CPIF/CPAF contract.  
 Prime LM F-35B Fatigue Test Article is a hybrid CPIF/CPFF contract.  
 Per USD(A&S) announcement, changing ALIS Next to ALIS / ODIN.  
 Prime LM ALIS / ODIN Contract is a hybrid CPFF/CPIF contract.  
 Flight Test assets include weapons procurement to support Test and assets needed for flight test instrumentation

<b>Support (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
TSS Development Support - JSE	WR	Various : Various	-	0.900	Dec 2019	8.300	Dec 2020	0.000		-		0.000	-	-	-
AV Mission Systems Support	Various	Various : Various	-	2.440	Dec 2019	4.140	Dec 2020	0.000		-		0.000	-	-	-
AV Vehilce Systems Support	Various	Various : Various	-	0.000	Dec 2019	0.000	Dec 2020	0.000		-		0.000	-	-	-
TSS Development Support - Training Systems	Various	Various : Various	-	0.000	Dec 2019	4.090	Dec 2020	0.000		-		0.000	-	-	-
AV CSO Development support	Various	Various : Various	-	8.370	Dec 2019	1.270	Dec 2020	0.000		-		0.000	-	-	-

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2022 Air Force</b>											<b>Date: May 2021</b>				
<b>Appropriation/Budget Activity</b> 3600 / 7						<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2					<b>Project (Number/Name)</b> 675346 / F-35				

<b>Support (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
CDS JRE IPT Development Support	Various	Various : Various	-	6.250	Dec 2019	25.010	Dec 2020	0.000		-		0.000	-	-	-
MxS Dev Ops Development Support	Various	Various : Various	-	23.720	Dec 2019	2.500	Dec 2020	0.000		-		0.000	-	-	-
MxS ALIS / ODIN Development Support	Various	Various : Various	-	6.070	Dec 2019	1.730	Dec 2020	0.000		-		0.000	-	-	-
CDS MPSE Re-Arch Development Support	Various	Various : Various	-	1.270	Dec 2019	3.580	Dec 2020	0.000		-		0.000	-	-	-
PP Propulsion Development Support	Various	Various : Various	-	0.000	Dec 2019	0.000	Dec 2020	0.000		-		0.000	-	-	-
<b>Subtotal</b>			-	49.020		50.620		0.000		-		0.000	-	-	N/A

**Remarks**  
 Changed JSE/IPT Development Support to TSS Support Cost - JSE and to various, changed ALIS DevOps Development Support to MxS Dev Ops Development Support, changed JRE Development Support to CDS JRE IPT Development Support, changed IPT Development Support to AV Mission Systems Support and changed to various, changed IPT Development Support to AV Vehicle Systems Support and changed to various, changed ALIS/ODIN Development support to MxS ALIS/ODIN Development Support, added CDS MPSE Re-Arch Development Support, added PP Propulsion Development Support, and changed IPT Support to TSS Development Support - Training Systems.  
 R-2A Categories include:  
 Air Vehicle (AV) / Block 4 Planning & Systems Engineering: Missions Systems Support, Vehicle Systems Support, IPT Development Support, Tech Planning Maintenance Systems (MxS)Dev Ops Development Support, Maintenance Systems Development Support, ALIS/ODIN Development Support  
 Combat Data Systems (CDS) : MPSE Re-Arch Development Support, JRE IPT Development Support  
 Propulsion (PP): Propulsion Development Support  
 Training Systems (TSS): Development Support - JSE, Development Support - Training Systems  
 Per USD(A&S) announcement, changing ALIS Next to ALIS / ODIN.

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
TE Developmental Test & Evaluation - PAX	WR	NAWCAD : Patuxent River, MD	-	9.415	Dec 2019	6.523	Dec 2020	0.000		-		0.000	-	-	-

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2022 Air Force</b>											<b>Date: May 2021</b>				
<b>Appropriation/Budget Activity</b> 3600 / 7						<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2					<b>Project (Number/Name)</b> 675346 / F-35				

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
TE Developmental Test & Evaluation - CL	WR	NAWCWD : China Lake, CA	-	9.415	Dec 2019	6.523	Dec 2020	0.000		-		0.000	-	-	-
TE Developmental Test & Evaluation - Edwards AFB	MIPR	Edwards AFB : Edwards AFB, CA	-	9.415	Dec 2019	6.523	Dec 2020	0.000		-		0.000	-	-	-
TE Developmental Test & Evaluation - Various	Various	Various : Various	-	9.415	Dec 2019	6.523	Dec 2020	0.000		-		0.000	-	-	-
TE Operational Test & Evaluation - UOTT	MIPR	Nellis AFB : Nellis AFB, NV	-	16.780	Dec 2019	20.670	Dec 2020	0.000		-		0.000	-	-	-
TE USMC Operational Test & Evaluation - VMX-1	WR	Yuma Air Station : Yuma Air Station, NV	-	0.000	Nov 2019	0.000	Dec 2020	0.000		-		0.000	-	-	-
TE USN Operational Test & Evaluation - VX-9	WR	Various : Various	-	0.000	Nov 2019	0.000	Nov 2020	0.000		-		0.000	-	-	-
TE Ground Test	Various	Various : Various	-	0.000	Jul 2020	0.000		0.000		-		0.000	-	-	-
<b>Subtotal</b>			-	54.440		46.762		0.000		-		0.000	-	-	N/A

**Remarks**  
 Added TE Ground Test line and added PMO Specific identifier in front of Cost Category Item Name description.  
 All lines total to Test and Evaluation (TE) R-2A.  
 Added USMC Operational Test & Evaluation line, USMC added funding for service unique Operational Test support, broken out from Operational Test & Evaluation line.  
 Added USN Operational Test & Evaluation line, USN added funding for service unique Operational Test support, broken out from Operational Test & Evaluation line.

<b>Management Services (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
AFLCMC Civilian Pay	C/CPAF	AFLCMC Civ Pay : Wright Patterson AFB, OH	-	40.260	Oct 2019	34.730	Oct 2020	0.000		-		0.000	-	-	-
Financial Mgmt Database Support IDS	C/CPAF	Various : Various	-	0.500	Dec 2019	0.250	Dec 2020	0.000		-		0.000	-	-	-
Earned Value/Finance/ Cost ACT-I	C/CPAF	Various : Various	-	0.505	Dec 2019	0.500	Dec 2020	0.000		-		0.000	-	-	-
Operating Core Support	C/FP	Various : Various	-	8.820	Dec 2019	1.910	Dec 2020	0.000		-		0.000	-	-	-



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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 675346 / F-35
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<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Other Core Contractor Support	C/CPAF	NAWCAD/WD : Vatious	-	0.000		0.000		0.000		-		0.000	-	-	-
Travel	Various	Not specified. : TBD	-	0.880	Dec 2019	0.020	Dec 2020	0.000		-		0.000	-	-	-
DevSecOps	Various	Not specified. : TBD	-	4.318	Oct 2019	25.690	Oct 2020	0.000		-		0.000	-	-	-
<b>Subtotal</b>			-	55.283		63.100		0.000		-		0.000	-	-	N/A

**Remarks**  
 All lines total to Infrastructure and Support.  
 Beginning in FY20 HPSI will be in a separate BPAC and no longer included in USAF C2D2 budget docs.

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	-	624.973	695.869	0.000	-	0.000	-	-	N/A

**Remarks**  
 Subtotals and totals may not add due to rounding.  
 Prior Year reflects only PE 0604840M/N due to PE 0604810M/N ending in FY18 and being replaced by PE 0604840M/N in FY19 as budget moves from BA05 to BA07.  
 Prior Years reflects \$414.998M USAF/\$215.366M USN/\$222.644 USMC/\$209.763M International/Total \$1,062.771M  
 FY 2020 reflects \$642.371M USAF/\$342.8600M USN/\$380.232M USMC/\$258.004M International/Total \$1,623.467M  
 FY 2021 reflects \$785.336M USAF/\$413.875M USN/\$379.549M USMC/\$359.626M International/Total \$1,938.386M  
 FY 2022 reflects \$549.279M USAF/\$328.999M USN/\$349.197M USMC/\$224.501M International/Total \$1,451.976M  
 R-2A (section B)/R-3 displays total combined program (i.e. not Service-specific), including International partners.  
 JSF Continuous Capability Development and Delivery (C2D2) Includes:  
 USAF PE 0207142F BPAC 675346  
 USAF PE 0604840F BPAC 675346  
 USN PE 0604810N Project Unit 2936 - ends FY18  
 USMC PE 0604810M Project Unit 2935 - ends FY18

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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date: May 2021**

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 675346 / F-35
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FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>675346 / F-35</b>	
Systems Engineering & Development: Phase II Development	
Systems Engineering & Development: Modernization Contract	
Systems Engineering & Development: Development Foundation	
Systems Engineering & Development: Development & Maturation IDIQ Contract	
Agile Process & Capability Development: Agile Process & Capability Development	
Verification & Validation: DT Aircraft Upgrades	
Verification and Validation: Integrated Test	
Verification and Validation: TR-3 Operational Test	
Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LOT 14 Full Funding / Delivery	
Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LOT 15 Full Funding / Delivery	
Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LOT 16 Full Funding / Delivery	
Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LOT 17 Full Funding / Delivery	

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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 675346 / F-35
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LOT 18 Full Funding / Delivery																																
Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LOT 19 Full Funding / Delivery																																
Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LOT 20 Full Funding / Production / Delivery																																

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0604840F / F-35 C2D2	<b>Project (Number/Name)</b> 675346 / F-35
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>675346 / F-35</b>				
Systems Engineering & Development: Phase II Development	1	2020	4	2024
Systems Engineering & Development: Modernization Contract	4	2021	4	2024
Systems Engineering & Development: Development Foundation	1	2020	1	2023
Systems Engineering & Development: Development & Maturation IDIQ Contract	3	2023	4	2025
Agile Process & Capability Development: Agile Process & Capability Development	1	2020	4	2025
Verification & Validation: DT Aircraft Upgrades	1	2020	1	2020
Verification and Validation: Integrated Test	1	2020	1	2020
Verification and Validation: TR-3 Operational Test	2	2022	1	2023
Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LOT 14 Full Funding / Delivery	1	2020	1	2021
Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LOT 15 Full Funding / Delivery	1	2021	4	2022
Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LOT 16 Full Funding / Delivery	1	2022	4	2023
Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LOT 17 Full Funding / Delivery	1	2023	4	2024
Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LOT 18 Full Funding / Delivery	1	2024	4	2025
Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LOT 19 Full Funding / Delivery	1	2025	4	2025
Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LOT 20 Full Funding / Production / Delivery	1	2026	4	2026

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0605018F / <i>AF Integrated Personnel and Pay System (AF-IPPS)</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	0.000	39.275	26.986	22.010	0.000	22.010	-	-	-	-	-	-
676003: <i>HRM Structural Development</i>	0.000	39.275	26.986	22.010	0.000	22.010	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Program MDAP/MAIS Code:** N86

**A. Mission Description and Budget Item Justification**

The Air Force Integrated Personnel and Pay System (AFIPPS) will be a web-enabled, Enterprise Resource Planning (ERP) solution that will integrate existing personnel and pay processes into one self-service system. AFIPPS supports how the Air Force owns and operates the Human Resource Management domain and is a component of the AF/A1 digital transformation journey, currently underway. AFIPPS continues the transformation by providing an accurate and single authoritative source of personnel data to ensure timely delivery of pay, entitlements, allowances, and benefits to all Active Duty Air and Space Force, National Guard (ANG), and Reserve (AFRes) components. AFIPPS represents the DAF's commitment to modernize business practices and provide enhanced support to service members and their families by integrating personnel and pay systems. AFIPPS will eliminate DAF reliance on the unsustainable Defense Finance and Accounting System (DFAS) and the Defense Joint Military Pay System (DJMS) for payroll processing and will ensure improved auditability of service member pay.

The AFIPPS program will directly increase readiness for the total force service members, human resources and financial management specialists and DAF Commanders. AFIPPS will improve the DAF community's experience by allowing members to update via self-initiate pay/personnel actions, commencing automated transmission of verified personnel data, decreasing pay errors and providing accurate personnel/pay data for leadership decision making.

AFIPPS modernizes the existing Military Personnel Data System (MilPDS) and adds pay and leave capability. In Jan 2021, the DAF leveraged a MilPDS self-service capability deployment to verify the baseline system had the infrastructure for the new pay and leave capability in place. The self-service capability allowed DAF Airmen and Guardians to initiate self-registration, validate member data and verify operational performance. AFIPPS will subsume MilPDS and launch its pay and leave capabilities achieving initial operating capability (IOC) in June 2022.

This program element may include necessary emergent or unanticipated civilian pay expenses required to manage, execute, and deliver AFIPPS capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0.000M was expended for civilian pay expenses in this program element, and in FY21 \$0.000M is forecasted for civilian pay expenses in this program element.

This requirement supports performance of a full financial audit as required by title 10 U.S.C Chapter 9A, Sec 240-D.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development	<b>R-1 Program Element (Number/Name)</b> PE 0605018F I AF Integrated Personnel and Pay System (AF-IPPS)
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	40.567	27.035	12.737	0.000	12.737
Current President's Budget	39.275	26.986	22.010	0.000	22.010
Total Adjustments	-1.292	-0.049	9.273	0.000	9.273
• Congressional General Reductions	0.000	-0.049			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-1.292	0.000			
• Other Adjustments	0.000	0.000	9.273	0.000	9.273

**Change Summary Explanation**

Program funding was restored in FY22 corresponding to the latest cost estimate which accounted for new USSF requirements.

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<b>Title:</b> Air Force Integrated Personnel and Pay System (AFIPPS) - Product Development	37.988	25.752	21.267	0.000	21.267
<b>Description:</b> Acquire and develop the activities that support the acquisition of a personnel/pay capability for USAF personnel across all components (i.e., Active Duty Air and Space Force, ANG, and AFRes).					
<b>FY 2021 Plans:</b>					
- Develop and incorporate new United States Space Force (USSF)-specific requirements into AFIPPS system					
- Finalize system interface modifications required to deploy pay capability in AFIPPS					
- Update acquisition documentation to support AFIPPS Full Deployment Authority to Proceed (ATP)					
- Continue acquisition reporting and execution of AFIPPS					
- Continue AF information technology efforts (e.g., Common Computing Environment, FIAR/FISCAM audit support, etc) to ensure AFIPPS is fully integrated into the AF & DoD enterprise networks, databases, and information systems upon deployment					
- Maintain the required AFIPPS computing environments (e.g. development, test and production) with DISA					
- Deploy enterprise architecture for pay in support of 500K total force members					
- Deploy Initial Capability release					
- Continue to perform change management activities in support of deployment					

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0605018F / <i>AF Integrated Personnel and Pay System (AF-IPPS)</i>
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<ul style="list-style-type: none"> <li>- Initiate training of personnel in support of deployment</li> <li>- Continue Oracle Subject Matter Expertise contract to advise program office on COTS product deployment</li> </ul> <p><b>FY 2022 Base Plans:</b> Will conduct development activities to support testing and system delivery. Activities will include but not be limited to the following:</p> <ul style="list-style-type: none"> <li>- Will update and finalize contract and acquisition documentation to support AFIPPS strategy and Full Deployment Authority to Proceed (ATP) approval.</li> <li>- Will deploy AFIPPS initial capability release to support payroll operations for Total Air Force</li> <li>- Will finalize system interface modifications</li> <li>- Will continue Oracle Subject Matter Expertise contract to ensure quality development support</li> <li>- Will continue AF information technology efforts (e.g., Common Computing Environment, FIAR/FISCAM audit support, etc) to ensure AFIPPS is fully integrated into AF &amp; DoD enterprise networks, databases, and information systems upon deployment</li> <li>- Will maintain the required AFIPPS computing environments (e.g. development, test and production) with DISA</li> <li>- Will continue to perform change management activities in support of initial capability release deployment</li> <li>- Will complete training of personnel in support of deployment</li> </ul> <p><b>FY 2022 OCO Plans:</b> - None</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreased due to completion of primary development activities, the transition to developmental test, and final preparation for IOC.</p>					
<p><b>Title:</b> AFIPPS - Test and Evaluation</p> <p><b>Description:</b> Government integrated test and evaluation activities.</p> <p><b>FY 2021 Plans:</b></p> <ul style="list-style-type: none"> <li>- Initiate Pay/Leave integrated development Test</li> <li>- Initiate and conduct Payroll reconciliation testing</li> <li>- Conduct Test Readiness Review - IOT&amp;E</li> <li>- Initiate Operational Test and Evaluation (IOT&amp;E)</li> </ul> <p><b>FY 2022 Base Plans:</b></p>	1.287	1.234	0.743	0.000	0.743

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0605018F / <i>AF Integrated Personnel and Pay System (AF-IPPS)</i>
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
- Will validate AFIPPS payroll with payroll runs with legacy DJMS (reconciliation testing) - Will complete Phase 1 Initial Operational Test and Evaluation (IOT&E) - Will initiate Phase 2 IOT&E - Will continue Cyber Vulnerability Assessments to evaluate current/future AFIPPS system environments  <b>FY 2022 OCO Plans:</b> - None  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding is necessary due to the addition of USSF requirements and the subsequent re-phasing of Initial Operational Test and Evaluation into FY22.					
<b>Accomplishments/Planned Programs Subtotals</b>	39.275	26.986	22.010	0.000	22.010

<b>D. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• OPAF 03 834410: <i>INTEGRATED PERSONNEL AND PAY SYSTEM</i>	0.000	0.000	15.240	-	15.240	-	-	-	-	-	-

**Remarks**

**E. Acquisition Strategy**

E. Acquisition Strategy  
 AFIPPS acquisition strategy focuses on expanding the fielded AF Military Personnel Data System (MilPDS) by integrating pay and leave capabilities. MilPDS is implemented using the commercial Oracle ERP E-Business Suite (EBS). The AFIPPS program will configure/develop the pay module of EBS and ensure the system is fully integrated and deployed. The Government awarded a contract for the pay system development, test, and deployment. The development activities are fully coordinated and integrated with the on-going operation and sustainment of MilPDS.

AFIPPS is implementing agile principles to the maximum extent practical during the software development effort. The AFIPPS program includes two major releases. First, the program leveraged a MilPDS self-service capability deployment to ensure infrastructure for pay and leave capability is in place. The self-service capability deployed in Jan 2021, allowing the AF community to initiate self-registration, validate member data and verify operational performance.



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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Air Force Date: May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0605018F / <i>AF Integrated Personnel and Pay System (AF-IPPS)</i>
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Next, the pay/leave capability was broken into stories then incorporated into work packages to be developed in three week sprints. Each work package has been developed and tested by the integrated user/developer team on multiple pre-production environments. Once functionality and associated business processes from current payroll and leave systems are integrated and validated against the existing MilPDS baseline, the pay/leave capability will be delivered in a single release.

While agile development procedures are practiced, AFIPPS will conduct one pay/leave capability release. The legacy systems within the existing pay/leave process have a significant interdependency such that incrementally decommissioning systems is not feasible.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0605018F / AF Integrated Personnel and Pay System (AF-IPPS)	<b>Project (Number/Name)</b> 676003 / HRM Structural Development
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<b>Product Development (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Prime Software Developmental Efforts	C/CPAF	ACCENTURE FEDERAL SVCS : ARLINGTON, VA	0.000	25.186	Dec 2019	8.000	Feb 2021	11.291	Jan 2022	-		11.291	-	-	44.477
Application Hosting Environment	MIPR	DISA EIS : Pensacola, FL	0.000	1.266	Mar 2020	4.100	Nov 2020	1.983	Jan 2022	-		1.983	-	-	7.349
Systems Integration/ Interfaces	TBD	TBD : TBD	0.000	-		1.231	Dec 2020	0.000		-		0.000	-	-	1.231
COTs Licenses	Various	Various : Various	0.000	1.610	Apr 2020	4.815	Apr 2021	0.838	Apr 2022	-		0.838	-	-	7.263
Oracle EBS Subject Matter Experts	C/T&M	DLT SOLUTIONS, LLC : HERNDON, VA	0.000	0.497	May 2020	0.300	Apr 2021	0.000		-		0.000	-	-	0.797
Financial Improvement and Audit Readiness(FIAR)	C/FP	Various : Various	0.000	0.246	Aug 2020	0.062	Aug 2021	-		-		-	-	-	0.308
Government Training	TBD	TBD : TBD, TN	0.000	-		0.100	Jan 2021	0.000		-		0.000	-	-	0.100
Direct Mission Support (Other)	Various	Various : Various	0.000	3.108	Jan 2020	2.937	Mar 2021	1.950	Jan 2022	-		1.950	-	-	8.402
Cloud One Migration/ Integration	C/TBD	TBD : TBD	0.000	-		-		-		-		-	-	-	5.144
<b>Subtotal</b>			0.000	31.913		21.545		16.062		-		16.062	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Gov't Integrated Test & Evaluation Activities	MIPR	Various : Various	0.000	0.289	Apr 2020	0.634	Feb 2021	0.143	Nov 2021	-		0.143	-	-	1.066
Development and Test Infrastructure	C/CIPIF	DTSI : San Antonio, TX	0.000	0.998	Jul 2020	0.600	May 2021	0.600	Jan 2022	-		0.600	-	-	2.198
<b>Subtotal</b>			0.000	1.287		1.234		0.743		-		0.743	-	-	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0605018F / AF Integrated Personnel and Pay System (AF-IPPS)	<b>Project (Number/Name)</b> 676003 / HRM Structural Development
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<b>Management Services (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Engineering, Professional, and Administrative Support Services (EPASS)	C/CPAF	Oasis Systems, LLC : Lexington, MA	0.000	5.336	Mar 2020	3.989	Mar 2021	4.935	Dec 2021	-		4.935	-	-	14.260
Other Program Support Cost	Various	Various : Various	0.000	0.499	Jan 2020	0.218	Jan 2021	0.270	Nov 2021	-		0.270	-	-	0.987
Specialized Cost Services (SCS): EPASS	C/CPAF	BusinessTechnologies & Solutions : Beavercreek, OH	0.000	0.240	Apr 2020	-		-		-		-	-	-	0.240
<b>Subtotal</b>			0.000	6.075		4.207		5.205		-		5.205	-	-	N/A
<b>Project Cost Totals</b>			0.000	39.275		26.986		22.010		-		22.010	-	-	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0605018F / AF Integrated Personnel and Pay System (AF-IPPS)	<b>Project (Number/Name)</b> 676003 / HRM Structural Development

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b><i>Integrated Personnel and Pay System</i></b>	
AFIPPS Development and Test Environments	
Enterprise Architecture Design/Implement	
Prime Development, Integration, and Deployment	
AF Information Technology Efforts	
Government Integrated Test and Evaluation Activities	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0605018F / <i>AF Integrated Personnel and Pay System (AF-IPPS)</i>	<b>Project (Number/Name)</b> 676003 / <i>HRM Structural Development</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Integrated Personnel and Pay System</i></b>				
AFIPPS Development and Test Environments	1	2020	2	2022
Enterprise Architecture Design/Implement	1	2020	4	2020
Prime Development, Integration, and Deployment	1	2020	3	2021
AF Information Technology Efforts	1	2020	4	2022
Government Integrated Test and Evaluation Activities	1	2020	2	2022

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0605024F / <i>Anti-Tamper Technology Executive Agency</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	46.934	47.107	51.492	0.000	51.492	-	-	-	-	-	-
675066: <i>Anti-Tamper Technology Executive Agent</i>	-	46.934	47.107	51.492	0.000	51.492	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Program MDAP/MAIS Code:**  
**Project MDAP/MAIS Code(s):** N42

**A. Mission Description and Budget Item Justification**

The Anti-Tamper (AT) Technology Executive Agency budget funds activities related to the DoD Executive Agent for AT (ATEA) responsibilities required by DoD Directive 5200.47E, "Anti-Tamper (AT)." These responsibilities are unique to the DoD ATEA and the Air Force Component Office of Primary Responsibility (OPR) for AT. The DoD ATEA is responsible for developing and enforcing AT policy and guidance, assessing AT technologies (hardware and software), maintaining and developing new AT technology assessment capabilities, maintaining and maturing AT laboratory equipment and infrastructure, establishing and maintaining a library of AT technologies, providing security guidance and support mechanisms, providing outreach and education to the DoD AT community, providing intelligence support, and evaluating AT implementations across all DoD acquisition programs, foreign military sales (FMS), and direct commercial sales (DCS). The AF OPR for AT evaluates AT on applicable AF acquisition programs, FMS, and DCS as well as manages AF AT technology development.

AT protects critical program information (CPI) in U.S. weapon systems that are no longer under U.S. control (e.g., lost/left on the battlefield or sold to a foreign government) from hands-on, reverse engineering (RE) attacks. AT protections enable the U.S. to preserve its technological advantage and the combat capabilities of critical weapons systems while supporting the warfighters' mission requirements. Furthermore, AT adds longevity to DoD weapon systems by deterring or delaying RE attacks, and thus reducing an adversaries' ability to obtain the CPI and/or develop weapon countermeasures against the system. All DoD acquisition programs, FMS, and DCS with CPI require a validated AT Plan.

The AT program includes resources required for subject matter experts (SMEs) to evaluate AT Plans and conduct AT validation on all DoD Weapon Systems. Additionally, the AT program provides resources for SMEs to perform AT assessments of both commercial off the shelf (COTS) and government off the shelf (GOTS) products. As the COTS and GOTS technologies advance, the AT program includes the resources required to mature AT hardware/software assessment capabilities. These capabilities include the acquisition of specialized equipment, maintenance and/or renovations to support the integration of this equipment, and modifications to new and/or existing laboratory facilities to meet equipment and security requirements.

The DoD ATEA coordinates technology development among the DoD Services/Agencies, National Laboratories, and Industry. These technology development efforts fund development of new AT technology, as well as enhance existing AT technology efforts to increase the technology readiness level (TRL) and facilitate transition for programs to implement. The AT technology development and enhancement efforts include: advanced AT sensor hardware, secure processing, crypto-analysis, tamper penalties, modifying and developing technology to address vulnerability and susceptibility of fielded parts, and other AT enablers.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0605024F / <i>Anti-Tamper Technology Executive Agency</i>
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The Air Force AT OPR conducts AT technology development to meet Air Force service needs to mature promising AT technologies to transition to Air Force weapons systems. Technology development priorities are given to those technologies that most benefit AF acquisition programs while aligning to the overall DoD ATEA technology development strategy. These activities are coordinated through the ATEA as a part of the ATEA technology development roadmap and to coordinate with Navy and Army AT technology development efforts.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0 was expended for civilian pay expenses in this program element, and in FY21 \$0 is forecasted for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	47.193	50.508	52.241	0.000	52.241
Current President's Budget	46.934	47.107	51.492	0.000	51.492
Total Adjustments	-0.259	-3.401	-0.749	0.000	-0.749
• Congressional General Reductions	0.000	-0.086			
• Congressional Directed Reductions	0.000	-3.315			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.259	0.000			
• Other Adjustments	0.000	0.000	-0.749	0.000	-0.749

**Change Summary Explanation**

\$3.315M Congressional Directed Reduction for "lack of prior year execution data"  
 \$0.086M Congressional General Reduction for share of DAF RDT&E AF Undistributed Mark

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> DoD Anti-Tamper Technology Executive Agent (DoDATEA)	35.961	34.921	38.652
<b>Description:</b> AT technology coordination and evaluations, hardware/software vulnerability assessments, capability development, laboratory equipment and infrastructure improvements; outreach and education to the AT Community, AT implementation validation and evaluation as well as AT policy development.			



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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0605024F / <i>Anti-Tamper Technology Executive Agency</i>		
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>FY 2021 Plans:</b> - Validate and evaluate AT implementations on all DoD Acquisition programs; conduct vulnerability assessments, develop advanced assessment capabilities, improve laboratory equipment and infrastructure, and provide intelligence support. Develop AT policy and continue to train the acquisition workforce on AT policy and technology.</p> <p><b>FY 2022 Plans:</b> - Validate and evaluate AT implementations on all DoD Acquisition programs; conduct vulnerability assessments, develop advanced assessment capabilities, improve laboratory equipment and infrastructure, and provide intelligence support. Develop AT policy and continue to train the acquisition workforce on AT policy and technology.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increased due to inflation.</p>				
<p><b>Title:</b> DoDATEA Program Management Support</p> <p><b>Description:</b> Includes civilian pay, A&amp;AS, outreach and education, travel, supplies, and AFLCMC/XA-AT support.</p> <p><b>FY 2021 Plans:</b> Support program office efforts, including civilian pay, A&amp;AS, intelligence support, outreach and education, travel, and supplies.</p> <p><b>FY 2022 Plans:</b> Support program office efforts, including civilian pay, A&amp;AS, intelligence support, outreach and education, travel, and supplies.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increased due to inflation.</p>		5.873	6.580	6.744
<p><b>Title:</b> Air Force Anti-Tamper Office Technology Development</p> <p><b>Description:</b> The Air Force AT office conducts Anti-Tamper technology development to meet AF service needs to mature promising AT technologies to transition to AF weapon systems. The AF AT office will fund and manage new technology efforts to protect AF CPI. These new AT technology requirements will be obtained from AF programs and these new AT technologies will then transition to Air Force and DoD programs.</p> <p>The AT technology development and enhancement efforts include: advanced AT sensor hardware, secure processing, crypto-analysis, tamper penalties, and other AT enablers.</p> <p><b>FY 2021 Plans:</b></p>		5.100	5.606	6.096

**UNCLASSIFIED**

<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0605024F / <i>Anti-Tamper Technology Executive Agency</i>
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022
<p>The Air Force AT office conducts Anti-Tamper technology development to meet Air Force service needs to mature promising AT technologies to transition to Air Force weapons systems.</p> <p><b>FY 2022 Plans:</b> The Air Force AT office conducts Anti-Tamper technology development to meet Air Force service needs to mature promising AT technologies to transition to Air Force weapons systems.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increased due to inflation.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	46.934	47.107	51.492

**D. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

**E. Acquisition Strategy**

The DoD ATEA acquisition strategy is to coordinate DoD AT technology developments across the Services which fund development and assessments of new AT technology, as well as enhance existing AT technology efforts by increasing TRL. The ATEA will coordinate the Technology Roadmap with major Prime vendors. Evaluating their AT CRADA projects is of major importance. The ATEA will also coordinate with the Service AT personnel to foster communication and understand what programs Services are developing for their AT implementation. Emerging research areas such as materials, cryptography and electronic circuits have the potential to bring new AT capabilities with increased processing power, reduced power draw, and smaller form factor. The goal of the research is to mature promising technologies to the point they can be transitioned to a program office or industry for implementation in DoD weapon systems. Priorities will be given to those technologies that most benefit the DoD AT community.

The Air Force AT Office will fund and manage new technology efforts to protect Air Force critical program information. These new AT technology requirements will be obtained from AF programs and these new AT technologies will then transition to Air Force programs and be made available for use in other DoD weapon systems.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0605024F / <i>Anti-Tamper Technology Executive Agency</i>	<b>Project (Number/Name)</b> 675066 / <i>Anti-Tamper Technology Executive Agent</i>
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Air Force Anti-Tamper Office Technology Development	Various	Not specified. : NV	-	5.100	Oct 2019	5.606	Oct 2020	6.096	Oct 2021	-		6.096	-	-	-
<b>Subtotal</b>			-	5.100		5.606		6.096		-		6.096	-	-	N/A

<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
DoD Anti-Tamper Technology Executive Agent (DoDATEA)	Various	Not specified. : NV	-	35.961	Oct 2019	34.545	Oct 2020	38.270	Oct 2021	-		38.270	-	-	-
<b>Subtotal</b>			-	35.961		34.545		38.270		-		38.270	-	-	N/A

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
DoDATEA Program Management Support	Various	Not specified. : NV	-	5.503	Oct 2019	6.580	Oct 2020	6.744	Oct 2021	-		6.744	-	-	-
Air Force Tech Development Management Support	Various	Not specified. : NV	-	0.370	Oct 2019	0.376	Oct 2020	0.382	Oct 2021	-		0.382	-	-	-
<b>Subtotal</b>			-	5.873		6.956		7.126		-		7.126	-	-	N/A

			Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>			-	46.934	47.107	51.492	-	51.492	-	-	N/A

**Remarks**  
Additional funding breakout and award dates are classified per the Anti-Tamper Security Classification Guide. Please contact the ATEA if additional information is required.

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Air Force</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0605024F / <i>Anti-Tamper Technology Executive Agency</i>	<b>Project (Number/Name)</b> 675066 / <i>Anti-Tamper Technology Executive Agent</i>

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>ATEA</b>																												
ATEA Program Office																												
AT RDT&E																												
AT Technology Development																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0605024F / <i>Anti-Tamper Technology Executive Agency</i>	<b>Project (Number/Name)</b> 675066 / <i>Anti-Tamper Technology Executive Agent</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>ATEA</b>				
ATEA Program Office	1	2020	4	2026
AT RDT&E	1	2020	4	2026
AT Technology Development	1	2020	4	2026

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0605117F / <i>Foreign Materiel Acquisition and Exploitation</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	68.397	71.099	71.391	0.000	71.391	-	-	-	-	-	-
675897: <i>Foreign Materiel Acquisition and Exploitation</i>	-	68.397	71.099	71.391	0.000	71.391	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Foreign Materiel Acquisition and Exploitation (FMA&E) program element supports the military services' and defense agencies' Foreign Material Program activities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0305019F. In FY20 \$0.386M and in FY21 \$0.285M was expended for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	70.083	71.229	72.463	0.000	72.463
Current President's Budget	68.397	71.099	71.391	0.000	71.391
Total Adjustments	-1.686	-0.130	-1.072	0.000	-1.072
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-0.130			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-1.686	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-1.072	0.000	-1.072

**Change Summary Explanation**

FY 2021 to FY 2022 funding increased due to inflation.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0605117F / <i>Foreign Materiel Acquisition and Exploitation</i>
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<b>Title:</b> Foreign Materiel Acquisition and Exploitation  <b>Description:</b> Classified details can be found in OSD Comptroller's classified Defense Wide Justification Book Volume 6.  <b>FY 2021 Plans:</b> Classified  <b>FY 2022 Base Plans:</b> Classified  <b>FY 2022 OCO Plans:</b> N/A  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increase is due to inflation.	68.397	71.099	71.391	0.000	71.391
<b>Accomplishments/Planned Programs Subtotals</b>	68.397	71.099	71.391	0.000	71.391

**D. Other Program Funding Summary (\$ in Millions)**  
N/A

**Remarks**  
N/A

**E. Acquisition Strategy**  
Classified details can be found in OSD Comptroller's classified Defense-Wide Justification Book Volume 6.



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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0605117F / <i>Foreign Materiel Acquisition and Exploitation</i>	<b>Project (Number/Name)</b> 675897 / <i>Foreign Materiel Acquisition and Exploitation</i>
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Classified details can be found in OSD Comptroller's classified Defense-Wide Justification Book Volume 6.	Various	Various : TBD	-	67.925	Apr 2020	70.627	Apr 2021	70.919	Apr 2022	-		70.919	-	-	-
<b>Subtotal</b>			-	67.925		70.627		70.919		-		70.919	-	-	N/A

<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
SAF/CDM Salary and Travel	Allot	SAF/CDMA : Fairfax, VA	-	0.472	Oct 2019	0.472	Oct 2020	0.472	Oct 2021	-		0.472	-	-	-
<b>Subtotal</b>			-	0.472		0.472		0.472		-		0.472	-	-	N/A

			Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>			-	68.397	71.099	71.391	-	71.391	-	-	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0605117F / <i>Foreign Materiel Acquisition and Exploitation</i>	<b>Project (Number/Name)</b> 675897 / <i>Foreign Materiel Acquisition and Exploitation</i>

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026															
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4												
<b><i>Foreign Materiel Acquisition &amp; Exploitation</i></b>																																								
FY20 Plan executed and updated as required	██████████																																							
Additional acquisition opportunities reviewed quarterly; FY20 execution reprioritized	██████████																																							
Additional exploitation opportunities reviewed quarterly; FY20 execution reprioritized	██████████																																							
FY21 requirements and funding requests submitted by Services/Agencies			██████████																																					
FY21 requirements and funding requests validated and prioritized			██████																																					
FY21 FMP Plan approved and published			██████																																					
FY21 Plan executed and updated as required					████████████████████																																			
Additional acquisition opportunities reviewed quarterly; FY21 execution reprioritized					████████████████████																																			
Additional exploitation opportunities reviewed quarterly; FY21 execution reprioritized					████████████████████																																			
FY22 requirements and funding requests submitted by Services/Agencies					██████████																																			
FY22 requirements and funding requests validated and prioritized							██████																																	
FY22 FMP Plan approved and published							██████																																	
FY22 FMP Plan executed and updated as required									████████████████████																															
Additional acquisition opportunities reviewed quarterly; FY22 execution reprioritized									████████████████████																															
Additional exploitation opportunities reviewed quarterly; FY22 execution reprioritized									████████████████████																															

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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0605117F / Foreign Materiel Acquisition and Exploitation	<b>Project (Number/Name)</b> 675897 / Foreign Materiel Acquisition and Exploitation
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
FY23 requirements and funding requests submitted by Services/Agencies																												
FY23 requirements and funding requests validated and prioritized																												
FY23 FMP Plan approved and published																												
FY23 FMP Plan executed and updated as required																												
Additional acquisition opportunities reviewed quarterly; FY23 execution reprioritized																												
Additional exploitation opportunities reviewed quarterly; FY23 execution reprioritized																												
FY24 requirements and funding requests submitted by Services/Agencies																												
FY24 requirements and funding requests validated and prioritized																												
FY24 FMP Plan approved and published																												
FY24 FMP Plan executed and updated as required																												
Additional acquisition opportunities reviewed quarterly; FY24 execution reprioritized																												
Additional exploitation opportunities reviewed quarterly; FY24 execution reprioritized																												
FY25 requirements and funding requests submitted by Services/Agencies																												
FY25 requirements and funding requests validated and prioritized																												
FY25 FMP Plan approved and published																												

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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0605117F / <i>Foreign Materiel Acquisition and Exploitation</i>	<b>Project (Number/Name)</b> 675897 / <i>Foreign Materiel Acquisition and Exploitation</i>
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
FY25 FMP Plan executed and updated as required																												
Additional acquisition opportunities reviewed quarterly; FY25 execution reprioritized																												
Additional exploitation opportunities reviewed quarterly; FY25 execution reprioritized																												
FY26 requirements and funding requests submitted by Services/Agencies																												
FY26 requirements and funding requests validated and prioritized																												
FY26 FMP Plan approved and published																												
FY26 FMP Plan executed and updated as required																												
Additional acquisition opportunities reviewed quarterly; FY26 execution reprioritized																												
Additional exploitation opportunities reviewed quarterly; FY26 execution reprioritized																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details: PB 2022 Air Force</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0605117F / <i>Foreign Materiel Acquisition and Exploitation</i>	<b>Project (Number/Name)</b> 675897 / <i>Foreign Materiel Acquisition and Exploitation</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Foreign Materiel Acquisition &amp; Exploitation</i></b>				
FY20 Plan executed and updated as required	1	2020	1	2021
Additional acquisition opportunities reviewed quarterly; FY20 execution reprioritized	1	2020	1	2021
Additional exploitation opportunities reviewed quarterly; FY20 execution reprioritized	1	2020	1	2021
FY21 requirements and funding requests submitted by Services/Agencies	3	2020	4	2020
FY21 requirements and funding requests validated and prioritized	4	2020	4	2020
FY21 FMP Plan approved and published	4	2020	4	2020
FY21 Plan executed and updated as required	1	2021	1	2022
Additional acquisition opportunities reviewed quarterly; FY21 execution reprioritized	1	2021	1	2022
Additional exploitation opportunities reviewed quarterly; FY21 execution reprioritized	1	2021	1	2022
FY22 requirements and funding requests submitted by Services/Agencies	3	2021	4	2021
FY22 requirements and funding requests validated and prioritized	4	2021	4	2021
FY22 FMP Plan approved and published	4	2021	4	2021
FY22 FMP Plan executed and updated as required	1	2022	1	2023
Additional acquisition opportunities reviewed quarterly; FY22 execution reprioritized	1	2022	1	2023
Additional exploitation opportunities reviewed quarterly; FY22 execution reprioritized	1	2022	1	2023
FY23 requirements and funding requests submitted by Services/Agencies	3	2022	4	2022
FY23 requirements and funding requests validated and prioritized	4	2022	4	2022
FY23 FMP Plan approved and published	4	2022	4	2022
FY23 FMP Plan executed and updated as required	1	2023	1	2024
Additional acquisition opportunities reviewed quarterly; FY23 execution reprioritized	1	2023	1	2024
Additional exploitation opportunities reviewed quarterly; FY23 execution reprioritized	1	2023	1	2024

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0605117F / <i>Foreign Materiel Acquisition and Exploitation</i>	<b>Project (Number/Name)</b> 675897 / <i>Foreign Materiel Acquisition and Exploitation</i>
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Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
FY24 requirements and funding requests submitted by Services/Agencies	3	2023	4	2023
FY24 requirements and funding requests validated and prioritized	4	2023	4	2023
FY24 FMP Plan approved and published	4	2023	4	2023
FY24 FMP Plan executed and updated as required	1	2024	1	2025
Additional acquisition opportunities reviewed quarterly; FY24 execution reprioritized	1	2024	1	2025
Additional exploitation opportunities reviewed quarterly; FY24 execution reprioritized	1	2024	1	2025
FY25 requirements and funding requests submitted by Services/Agencies	3	2024	4	2024
FY25 requirements and funding requests validated and prioritized	4	2024	4	2024
FY25 FMP Plan approved and published	4	2024	4	2024
FY25 FMP Plan executed and updated as required	1	2025	4	2025
Additional acquisition opportunities reviewed quarterly; FY25 execution reprioritized	1	2025	4	2025
Additional exploitation opportunities reviewed quarterly; FY25 execution reprioritized	1	2025	4	2025
FY26 requirements and funding requests submitted by Services/Agencies	3	2025	4	2025
FY26 requirements and funding requests validated and prioritized	4	2025	4	2025
FY26 FMP Plan approved and published	4	2025	4	2025
FY26 FMP Plan executed and updated as required	1	2026	4	2026
Additional acquisition opportunities reviewed quarterly; FY26 execution reprioritized	1	2026	4	2026
Additional exploitation opportunities reviewed quarterly; FY26 execution reprioritized	1	2026	4	2026

**Note**

The schedule on the previous page, representing the Foreign Material Program acquisition and exploitation processes, repeats for each fiscal year. Out of cycle Ad-Hoc foreign material acquisition and exploitation reviews are held when required throughout each fiscal year.

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0605278F / HC/MC-130 Recap RDT&E
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	0.000	16.523	19.491	46.796	0.000	46.796	-	-	-	-	-	-
675006: <i>HC/MC-130 Recap</i>	0.000	16.523	5.739	0.660	0.000	0.660	-	-	-	-	-	-
675910: <i>Block 8.X</i>	0.000	0.000	13.752	46.136	0.000	46.136	-	-	-	-	-	-

**Program MDAP/MAIS Code:** 257

**Note**

This program, BA 7, PE 0605278F, project 675910, Communications Modernization Phase II, is a new start.

In FY 2022, PE 0605278F, (HC/MC-130J Recap RDT&E), Project 675006, (HC/MC-130 Recap) efforts were transferred to, Project 675910, (Block 8.X), in order to combine the Communication Modernization funding to execute a single Communications Modernization program for AC/HC/MC-130J. The HC-130J 7.0/8.1 program and the AC/MC-130J 7.0/8.X program include critical upgrades needed as a baseline requirement for the Communications Modernization radio/software architecture.

**A. Mission Description and Budget Item Justification**

HC/MC-130 Recapitalization provides a Medium lift tanker aircraft to replace and augment the aging USAF fleet of combat rescue HC-130P/N and special operations MC-130E/H/P/W aircraft for the Combat Search and Rescue (CSAR) forces, and Air Force Special Operation Forces, which are experiencing airworthiness, maintainability, and operations limitations. The HC/MC-130 Recap incorporates production line modifications to the C-130J common/baseline configuration to convert them to the HC/MC model. The program also funds post-production modifications to add special mission systems required for behind-enemy-line operations required of CSAR and Special Operations aircraft.

The Research, Development, Testing and Evaluation (RDT&E) portion of the Recap program funds engineering support and studies to conduct rapid development activities, and develops major "block" upgrades to deliver specific increments of capability in common configurations across the fielded fleet, which includes AC/HC/MC-130J and potentially EC-130Js for future mods. The RDT&E activities in PE 0605278F currently include but are not limited to Block 7.0/8.1 and Communications Modernization. Block 7.0/8.1 leverages the baseline C-130J (PE0401132F) Block 7.0/8.1 upgrade, but funds unique AC/HC/MC-130J integration requirements. The Block 7.0/8.1 project will deliver Communication, Navigation and Surveillance/Air Traffic Management (CNS/ATM) capabilities required for compliance with evolving international airspace standards. It also incorporates a new Flight Management System (FMS) that allows AC/HC/MC-130J aircraft to maintain hardware and software commonality with the C-130J Enterprise. The remaining capabilities 7.0/8.1 provides are Link-16, Civil GPS Navigation and Data Link, Identification Friend or Foe (IFF) Transponder Mode-5, and Automatic Dependent Surveillance-Broadcast Out (ADS-B Out) The USAF has also initiated the Communications Modernization program to comply with Mobile User Objective System (MUOS) and VINSON/ANDVT Cryptographic Modernization (VACM) mandates, as well as deliver Second-generation Anti-jam Tactical UHF Radio for NATO (SATURN), Single Channel Ground and Airborne Radio System (SINCGARS), and HF Modernization capabilities to resolve DMS issues.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0605278F / HC/MC-130 Recap RDT&E
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The Air Force decoupled IFF Mode 5 and ADS-B from the 7.0/8.1 program to accelerate fielding and address 2020 mandates. Additionally, The Air Force recently separated the HC-130J and MC-130J 7.0/8.1 programs to address MC-130J availability for other modifications. Due to technical inter-dependencies of the Communications Modernization program on some sub-systems delivered in the Block 7.0/8.1 program, AC/MC-130J 7.0/8.1 requirements will be addressed through both the Communications Modernization program and a future AC/MC-130J 7.0/8.x program. That is, some 7.0/8.1 requirements/subsystems must be accelerated for the new communications systems to function properly; those will now be executed under the Communications Modernization program. The later AC/MC Block 8.x program will then address the remaining requirements.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver the HC/MC-130 Recap weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0.334M was expended for civilian pay expenses in this program element, and in FY21 \$0.374M is forecasted for civilian pay expenses in this program element.

The program may also include any Contractor Manpower Equivalent (CME)/A&AS support deemed necessary to support the program objectives. The HC/MC-130 Recap RDT&E permits the initiation and employment of rapid acquisition authorities to respond to emerging threats and requirements as needed.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	17.218	24.705	52.502	0.000	52.502
Current President's Budget	16.523	19.491	46.796	0.000	46.796
Total Adjustments	-0.695	-5.214	-5.706	0.000	-5.706
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-5.214			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-0.090	0.000			
• SBIR/STTR Transfer	-0.605	0.000			
• Other Adjustments	0.000	0.000	-5.706	0.000	-5.706

**Change Summary Explanation**

FY 2021 funding was reduced by \$5.214 million for Congressional Direction Reductions for Block 8.X Acquisition Strategy (\$3.066 million) and Forward Financing (\$2.112 million).

FY 2022 funding was reduced by \$5.706 million to account for the availability of prior year execution balances.



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0605278F / HC/MC-130 Recap RDT&E				<b>Project (Number/Name)</b> 675006 / HC/MC-130 Recap			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
675006: HC/MC-130 Recap	0.000	16.523	5.739	0.660	0.000	0.660	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Note**

In FY 2022, PE 0605278F, (HC/MC-130J Recap RDT&E), Project 675006, (HC/MC-130 Recap) efforts were transferred to, Project 675910, (Block 8.X), in order to combine the Communication Modernization funding to execute a single Communications Modernization program for AC/HC/MC-130J. The HC-130J 7.0/8.1 program and the AC/MC-130J 7.0/8.X program include critical upgrades needed as a baseline requirement for the Communications Modernization radio/software architecture.

**A. Mission Description and Budget Item Justification**

HC/MC-130 Recapitalization will replace and augment the aging USAF fleets of combat rescue HC-130P/N and special operations MC-130E/P/H aircraft which are experiencing airworthiness, maintainability and operational limitations.

The RDT&E portion of the Recap program funds three major thrusts to include but not limited to Continuous Improvement Program, HC Block 7.0/8.1, and Governmental Test.

The HC-130J Recap RDT&E activity integrates Block 7.0/8.1 into a HC-130J, provides program capability updates, studies, and integration with other HC-130J unique modifications. The HC-130J Block 7.0/8.1 program follows the same "Block Upgrade" strategy being used in the C-130J program (PE 0401132F).

The USAF will be fielding the IFF Mode 5, ADS-B Out and Link-16 portions of Block 7.0/8.1 ahead of the remaining 36 capabilities in order to comply with the 2020 mandates.

The USAF has also initiated the Communications Modernization program to comply with Mobile User Objective System (MUOS) and VINSON/ANDVT Cryptographic Modernization (VACM) mandates, as well as deliver Second-generation Anti-jam Tactical UHF Radio for NATO (SATURN), Single Channel Ground and Airborne Radio System (SINCGARS), and HF Modernization capabilities to resolve DMS issues.

The HC Block 7.0/8.1 Recap program is scheduled to complete development in 2021.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver the HC/MC-130 Recap weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0.334M was expended for civilian pay expenses in this program element, and in FY21 \$0.374M is forecasted for civilian pay expenses in this program element.

RDT&E permits the initiation and employment of rapid acquisition authorities to respond to emerging threats and requirements as needed.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0605278F / HC/MC-130 Recap RDT&E	<b>Project (Number/Name)</b> 675006 / HC/MC-130 Recap		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>Title:</b> HC/MC-130 Recap Continuous Improvement Program (CIP)</p> <p><b>Description:</b> Recurring Software and hardware enhancements to address evolving requirements for Special Operations Forces and Personnel Recovery missions. These enhancements will be incorporated in both production and fielded aircraft. These enhancements will include, but are not limited to, parallel operational flight program (OFP) updates.</p> <p><b>FY 2021 Plans:</b> Supports continuous improvement cycle of both hardware and software of multiple onboard systems</p> <p><b>FY 2022 Plans:</b> Supports continuous improvement cycle of both hardware and software of multiple onboard systems</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> N/A</p>		0.000	0.001	0.001
<p><b>Title:</b> HC-130 Block 7.0/8.1</p> <p><b>Description:</b> Combined software/hardware upgrade for Block 7.0/8.1. Block 7.0/8.1 includes, but is not limited to: Link 16, a new Flight Management System (FMS), Civil Global Positioning System (GPS) Navigation, a Special Mission Processor Interface (SMP-I), Identification Friend or Foe (IFF) Mode 5, Civil Data Link, Automatic Dependent Surveillance-Broadcast Out (ADS-B-Out) and the CSO 2.5.</p> <p><b>FY 2021 Plans:</b> Operational testing and technical data package.</p> <p><b>FY 2022 Plans:</b> HC Block 7.0/8.1 Recap program is scheduled to complete development in 2021.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreased due to the HC Block 7.0/8.1 Recap program being scheduled to complete NRE in FY21 and finish development in early FY22.</p>		16.133	5.625	0.113
<p><b>Title:</b> Government Test Support</p> <p><b>Description:</b> Test and evaluation planning, conduct, and support to include MITRE for developmental and operational testing.</p> <p><b>FY 2021 Plans:</b> Development and operational testing for HC-130J Block 7.0/8.1 DT&amp;E as well as communication modernization testing.</p> <p><b>FY 2022 Plans:</b></p>		0.390	0.113	0.546

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0605278F / HC/MC-130 Recap RDT&E	<b>Project (Number/Name)</b> 675006 / HC/MC-130 Recap
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Development and operational testing for communications modernization. DT&E as well as communication modernization testing.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increased due to JTIC testing and completion of the test program.			
<b>Accomplishments/Planned Programs Subtotals</b>	16.523	5.739	0.660

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b> <b>Base</b>	<b>FY 2022</b> <b>OCO</b>	<b>FY 2022</b> <b>Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• APAF 05 Line Item HCMC00: <i>HC/MC-130 Modifications</i>	41.820	76.573	147.826	-	147.826	-	-	-	-	-	-
• APAF 02 Line Item C-130JM: MC-130J	796.544	385.107	220.049	-	220.049	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

Lockheed Martin is the primary contractor for Research and Development work in support of the HC/MC-130J Recap program. Block 7.0/8.1 strategy takes the common core Block 7.0/8.1 developed in the C-130J program and integrates it into the HC-130J. Block 7.0/8.1 will also integrate with HC- unique mods. The C-130J ADS-B Out program includes all C-130J variants.

Development work done to date on the HC-130J Recap program has been on Cost Plus Award Fee (CPAF) and Cost Plus Incentive Fee (CPIF) type contracts.

The Continuous Improvement Program (CIP) acquisition strategy is developed on an as needed basis.

See Communications Modernization Acquisition strategy under the Block 8.X BPAC 675910.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0605278F / HC/MC-130 Recap RDT&E	<b>Project (Number/Name)</b> 675006 / HC/MC-130 Recap
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
HC/MC-130 Recap Continuous Improvement Program (CIP)	SS/CPHF	Lockheed Martin : Marietta, GA	0.000	0.000		0.001	Sep 2021	0.001	Mar 2022	-		0.001	-	-	1.198
HC-130 Recap Block 7.0/8.1	SS/CPHF	Lockheed Martin : Marietta, GA	0.000	15.799	Nov 2019	5.251	Nov 2020	0.113	Nov 2021	-		0.113	-	-	81.441
<b>Subtotal</b>			0.000	15.799		5.252		0.114		-		0.114	-	-	N/A

<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Direct Site Civilian Pay	C/CPAF	Not specified. : TBD	0.000	0.334		0.374		-		-		-	-	-	-
<b>Subtotal</b>			0.000	0.334		0.374		-		-		-	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Government Support Test	RO	46th Test Wing: EAFB, FL : TBD	0.000	0.390	Mar 2020	0.113	Apr 2021	0.546	Nov 2021	-		0.546	-	-	-
<b>Subtotal</b>			0.000	0.390		0.113		0.546		-		0.546	-	-	N/A

			Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>			0.000	16.523	5.739	0.660	-	0.660	-	-	N/A

**Remarks**

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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date: May 2021**

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0605278F / HC/MC-130 Recap RDT&E	<b>Project (Number/Name)</b> 675006 / HC/MC-130 Recap
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>HC/MC-130 Recap Development</b>	
HC-130J Government Testing	
HC-130 RECAP Block 7.0/8.1 Development	
Continuous Improvement Program (CIP)	

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0605278F / HC/MC-130 Recap RDT&E	<b>Project (Number/Name)</b> 675006 / HC/MC-130 Recap
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>HC/MC-130 Recap Development</i></b>				
HC-130J Government Testing	1	2020	2	2022
HC-130 RECAP Block 7.0/8.1 Development	3	2020	1	2022
Continuous Improvement Program (CIP)	2	2020	4	2022

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0605278F / HC/MC-130 Recap RDT&E				<b>Project (Number/Name)</b> 675910 / Block 8.X			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
675910: <i>Block 8.X</i>	0.000	0.000	13.752	46.136	0.000	46.136	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

This program, BA 7, PE 0605278F, project 675910, Communications Modernization Phase II, is a new start.

In FY 2022, PE 0605278F, (HC/MC-130J Recap RDT&E), Project 675006, (HC/MC-130 Recap) efforts were transferred to, Project 675910, (Block 8.X), in order to combine the Communication Modernization funding to execute a single Communications Modernization program for AC/HC/MC-130J. The HC-130J 7.0/8.1 program and the AC/MC-130J 7.0/8.X program include critical upgrades needed as a baseline requirement for the Communications Modernization radio/software architecture.

**A. Mission Description and Budget Item Justification**

This project funding is intended to execute system upgrades for AC/HC/MC-130J aircraft (with plans to include EC-130J upgrades in the future). The upgrades currently include but are not limited to AC/MC-130J 7.0/8.1 (i.e., Block 8.X) and Communications Modernization as well as studies and integration activities required for special mission 130J aircraft.

The USAF has also initiated the Communications Modernization program to comply with Mobile User Objective System (MUOS) and VINSON/ANDVT Cryptographic Modernization (VACM) mandates, as well as deliver Second-generation Anti-jam Tactical UHF Radio for NATO (SATURN), Single Channel Ground and Airborne Radio System (SINCGARS), and HF Modernization capabilities to resolve DMS issues.

Near-term, the Air Force intends to execute critical portions of AC/MC-130J 7.0/8.1 program as part of the Communications Modernization program. The remaining AC/MC-130J 7.0/8.1 capabilities (i.e., those not needed to execute Communications Modernization) will be installed on the AC and MC-130J under a future RDT&E program within this project, projected to begin in FY25, as well as the potential EC-130J requirement in the future.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver the HC/MC-130 Recap weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 0.334M was expended for civilian pay expenses in this program element, and in FY21 0.374M is forecasted for civilian pay expenses in this program element.

RDT&E permits the initiation and employment of rapid acquisition authorities to respond to emerging threats and requirements as needed.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Communications Modernization Phase I	0.000	13.752	28.456

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0605278F / HC/MC-130 Recap RDT&E	<b>Project (Number/Name)</b> 675910 / Block 8.X
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>Description:</b> Complies with Mobile User Objective System (MUOS) and VINSON/ANDVT Cryptographic Modernization (VACM) mandates, which will allow for continuous secure voice, data, video, network-centric, and satellite communications in real-time as the satellite constellation transitions and cryptographic algorithms are modernized.</p> <p><b>FY 2021 Plans:</b> Begin NRE EMD activities.</p> <p><b>FY 2022 Plans:</b> Continue NRE EMD activates.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increased due to Communications Modernization requirements/subsystems must be accelerated for the new communications systems to function properly.</p>			
<p><b>Title:</b> Communications Modernization Phase II</p> <p><b>Description:</b> Addresses Second-generation Anti-jam Tactical UHF Radio for NATO (SATURN), Single Channel Ground and Airborne Radio System (SINCGARS), and HF Modernization capabilities to resolve DMS issues, which will allow for continuous UHF, VHF, and HF communications in real-time.</p> <p>Due to technical inter-dependencies of the Communications Modernization program on some sub-systems delivered in the Block 7.0/8.1 program, AC/MC-130J 7.0/8.1 requirements will be addressed through both the Communications Modernization program and a future AC/MC-130J 7.0/8.x program. REMOVE: That is, some 7.0/8.1 requirements/subsystems must be accelerated for the new communications systems to function properly; those will now be executed under the Communications Modernization program.</p> <p><b>FY 2021 Plans:</b> N/A</p> <p><b>FY 2022 Plans:</b> Phase II EMD scheduled to begin in FY22</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increased due to the start of COMMs MOD Phase II activities.</p>	-	0.000	17.315
<p><b>Title:</b> Government Test Support</p> <p><b>Description:</b> Test and evaluation planning, conduct and support to included MITRE for developmental and operational testing for Phase I and Phase II activities</p>	-	0.000	0.364



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0605278F / HC/MC-130 Recap RDT&E	<b>Project (Number/Name)</b> 675910 / Block 8.X

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>FY 2021 Plans:</b> N/A			
<b>FY 2022 Plans:</b> Development and operational testing in support of Communications modernization.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increased due to the COMMs MOD test program.			
<b>Title:</b> Continuous Improvement (CIP)	-	0.000	0.001
<b>Description:</b> Continuous Improvement projects to include by not limited to studies and other research projects.			
<b>FY 2021 Plans:</b> N/A			
<b>FY 2022 Plans:</b> Supports continuous improvement cycle of both hardware and software of multiple onboard systems			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increased to support CIP efforts.			
<b>Accomplishments/Planned Programs Subtotals</b>	0.000	13.752	46.136

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• APAF 05 HCMC00: HC/ MC-130 Modifications	0.000	0.000	2.437	-	2.437	-	-	-	-	-	-
<b>Remarks</b>											

**D. Acquisition Strategy**  
Block 8.X strategy takes the common core Block 7.0/8.1 developed in the C-130J program and integrates it into the AC/MC-130J configurations as well as the potential EC-130J requirement in the future.

The Air Force intends to acquire critical portions of AC/MC-130J 7.0/8.1 program as part of the Communications Modernization program in order to address critical Second-generation Anti-jam Tactical UHF Radio for NATO (SATURN), Single Channel Ground and Airborne Radio System (SINCGARS), and HF Modernization capabilities to resolve DMS issues, which will allow for continuous UHF, VHF, and HF communications in real-time.

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b>	<b>R-1 Program Element (Number/Name)</b>	<b>Project (Number/Name)</b>
3600 / 7	PE 0605278F / <i>HC/MC-130 Recap RDT&amp;E</i>	675910 / <i>Block 8.X</i>

The remaining AC/MC-130J 7.0/8.1 capabilities (i.e., those not needed to execute Communications Modernization) will be integrated on to the AC/MC-130J under a future RDT&E program, projected to begin in FY25, as well as the potential EC-130J requirement in the future.



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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0605278F / HC/MC-130 Recap RDT&E	<b>Project (Number/Name)</b> 675910 / Block 8.X
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FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>Block 8.X</b>	
Communications Modernization Phase I	[REDACTED]
Communications Modernization Phase II	[REDACTED]
Government Test Support	[REDACTED]

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0605278F / HC/MC-130 Recap RDT&E	<b>Project (Number/Name)</b> 675910 / Block 8.X
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>Block 8.X</b>				
Communications Modernization Phase I	4	2021	3	2023
Communications Modernization Phase II	3	2022	2	2024
Government Test Support	4	2021	4	2026

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0606018F / <i>NC3 Integration</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	25.414	26.308	26.532	0.000	26.532	-	-	-	-	-	-
674877: <i>NC3 Integration, Assessment, and Improvement</i>	-	25.414	26.308	26.532	0.000	26.532	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

Nuclear Command, Control, and Communications (NC3) is critical to our Nation's nuclear deterrence. Nuclear Deterrence Operations (NDO) is an Air Force Core Function. Within this core function, Nuclear Command and Control (NC2) is the exercise of authority and direction by the President, as Commander in Chief, through established command lines, over nuclear weapon operations of military forces. The President's authority and direction are exercised through the Nuclear Command and Control System (NCCS). The NCCS is the designated combination of flexible and enduring elements including facilities, equipment, communications, procedures, personnel, and the structure in which these elements are integrated, all of which are essential for planning, directing, and controlling nuclear weapon operations. These functions are accomplished through the NC3 system of systems.

The NC3 system of systems provides connectivity from the President or Secretary of Defense through the National Military Command System (NMCS) to nuclear execution forces worldwide. To enhance NC3 mission success, the AF formalized AF NC3 elements as a specified AF Weapon System (WS), AN/USQ-225. Activities funded in this Program integrate legacy systems, ongoing NC3 programs, and future capabilities for the overall AF NC3 WS.

The AF Nuclear Weapon Center NC3 Integration Directorate (AFNWC/NC) will ensure current, new, and future NC3 capabilities are fully integrated as part of the Air Force's overall effort to sustain, modernize, and recapitalize the nuclear enterprise. AFNWC/NC will be responsible for integrating NC3 materiel management across Air Force Materiel Command (AFMC) to include authority and responsibility for weapon system architecture, weapon system configuration management, weapon system state-of-health reporting, risk management, supply chain management, overall integration, system test, verification, and certification. AFNWC/NC is responsible for defining, building, and sustaining current and future AF NC3 WS system of systems configuration baselines, and marshaling necessary Supporting Centers in AFMC and other units/agencies in the Air Force and the Department of Defense (DoD) to support and/or accomplish these tasks. AFNWC/NC will collaborate with AFMC Supporting Centers to champion the full spectrum of doctrine, organization, training, materiel, leadership and education, personnel, facilities, and policy (DOTMLPF-P) efforts, in support of U.S. Strategic Command as the Enterprise Lead for NC3, the Under Secretary of Defense for Acquisition and Sustainment as the NC3 Enterprise Capability Portfolio Manager, and Air Force Global Strike Command as the Lead Command championing NDO requirements for all Combatant Commands.

This program funds activities for integrating AF NC3 WS materiel, authority, and responsibility for the AF NC3 WS architecture, modeling & simulation, digital engineering, configuration management, risk management, weapon system state-of-health reporting, supply chain supportability and risk management, and overall AF NC3 WS integration, development, system test, verification, fielding, and certification. This program also supports modernization and integration activities associated with Joint All Domain Command and Control (JADC2) and Advanced Battle Management System (ABMS) initiatives.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0606018F / NC3 Integration
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This program element may include necessary emergent or unanticipated civilian pay expenses required to manage, execute, and deliver NC3 Integration, Assessment, and Improvement for emergent or unanticipated weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F and 0605833F. In FY2020 \$1.484M and in FY2021 \$2.550M was expended for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	25.917	26.356	26.932	0.000	26.932
Current President's Budget	25.414	26.308	26.532	0.000	26.532
Total Adjustments	-0.503	-0.048	-0.400	0.000	-0.400
• Congressional General Reductions	0.000	-0.048			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.503	0.000			
• Other Adjustments	0.000	0.000	-0.400	0.000	-0.400

**Change Summary Explanation**

No significant changes

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> NC3 Integration, Assessment, and Improvement	25.414	26.308	26.532
<b>Description:</b> To include but not limited to:			
- Modeling and simulation of the AF NC3 WS current and future capabilities			
- Conducting capability gap analysis			
- Establishing NC3 capability recapitalization and modernization plans			
- Developing and conducting the AF NC3 WS test and certification program as well as expanding existing High Frequency (HF) and other frequency testbeds utilizing a phased approach			
- Conducting NC3 system component verification			
- Implementing and employing program and material management controls for the AF NC3 WS including configuration management, risk management, supply chain supportability and risk management, maintenance data collection and reporting capabilities and AF NC3 WS health monitoring solutions			



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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0606018F / <i>NC3 Integration</i>		
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<ul style="list-style-type: none"> <li>- Issue tracking and resolution, assessments and analysis, and governance</li> <li>- Providing data-driven system of system solutions, and shaping NC3 component program acquisition strategies for AF NC3 WS sustainment and performance capability improvements</li> <li>- Initiating and implementing new capability programs/systems and changes to existing programs to align with AF NC3 WS requirements, test and certification, and future capabilities</li> <li>- Interfacing with JADC2 &amp; ABMS leadership to ensure NC3 Modernization efforts are synchronized with larger AF modernization efforts &amp; identifying risk areas where advanced tech demos may be required</li> </ul> <p><b>FY 2021 Plans:</b> NC3 weapon system integration efforts including, but not limited to:</p> <ul style="list-style-type: none"> <li>- Continue to implement test and evaluation certification program for NC3 WS</li> <li>- Continue to expand existing communication spectrum and cyber assessment test bed utilizing a phased approach</li> <li>- Continue to perform NC3 physics, communication and networking analysis</li> <li>- Continue to develop and evolve technical framework of the NC3 WS to meet mission threats of 2030 and beyond</li> <li>- Continue to conduct WS analysis, develop WS capability model, plan WS updates, and implement WS updates</li> <li>- Continue to evaluate options for system-of-system performance improvements within constraints of NC3 WS strategic vision and roadmap</li> <li>- Continue to analyze, model, and prototype emerging NC3 technologies</li> <li>- Continue to develop and implement AF NC3 WS program and materiel management control processes including risk management, configuration management, supply chain management, maintenance data collection and reporting and NC3 WS health assessment application, integrated scheduling, change management, budgeting and cost controls, etc.</li> <li>- Continue to conduct NC3 WS health assessments, reporting, and issue resolution</li> <li>- Continue to map out the NC3 WS supply chain and develop supply chain monitoring capability, supply chain supportability and supply chain risk management</li> <li>- Continue to develop layered architecture to measure and report capability impacts</li> <li>- Continue to develop and coordinate Operational Performance Criteria Document (OPCD) to support weapon system configuration element specs, test and evaluation, and assessment of weapon capabilities and limitations</li> <li>- Continue to establish authoritative intelligence community analysis for high-altitude electromagnetic pulse (HEMP)</li> <li>- Continue to improve integration and interoperability of the NC3 WS</li> <li>- Continue to conduct WS risk, issue, and opportunity analysis, and mitigation/corrective action/pursuit plan development</li> <li>- Continue to enhance digital transformation of NC3 WS</li> </ul>				

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0606018F / <i>NC3 Integration</i>		
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>- Continue evolving approach to discover, collaboratively develop, consume and manage Modeling Based Systems Engineering (MBSE) data, models, visualizations and simulations required for NC3 Weapon System evolution decisions</p> <p><b>FY 2022 Plans:</b>                      NC3 weapon system integration efforts including, but not limited to:</p> <ul style="list-style-type: none"> <li>- Continue to implement test and evaluation certification program for NC3 WS</li> <li>- Continue to expand existing communication spectrum and cyber assessment test bed utilizing a phased approach</li> <li>- Continue to perform NC3 physics, communication and networking analysis</li> <li>- Continue to develop and evolve technical framework of the NC3 WS to meet mission threats of 2030 and beyond</li> <li>- Continue to conduct WS analysis, develop WS capability model, plan WS updates, and implement WS updates</li> <li>- Continue to evaluate options for system-of-system performance improvements within constraints of NC3 WS strategic vision and roadmap</li> <li>- Continue to analyze, model, and prototype emerging NC3 technologies</li> <li>- Continue to develop and implement AF NC3 WS program and materiel management control processes including risk management, configuration management, supply chain management, maintenance data collection and reporting and NC3 WS health assessment application, integrated scheduling, change management, budgeting and cost controls, etc.</li> <li>- Continue to conduct NC3 WS health assessments, reporting, and issue resolution</li> <li>- Continue to map out the NC3 WS supply chain and develop supply chain monitoring capability, supply chain supportability and supply chain risk management</li> <li>- Continue to develop layered architecture to measure and report capability impacts</li> <li>- Continue to develop and coordinate Operational Performance Criteria Document (OPCD) to support weapon system configuration element specs, test and evaluation, and assessment of weapon capabilities and limitations</li> <li>- Continue to establish authoritative intelligence community analysis for high-altitude electromagnetic pulse (HEMP)</li> <li>- Continue to improve integration and interoperability of the NC3 WS</li> <li>- Continue to conduct WS risk, issue, and opportunity analysis, and mitigation/corrective action/pursuit plan development</li> </ul> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b>                      Increase from FY21 to FY22 includes inflation.</p>				
<b>Accomplishments/Planned Programs Subtotals</b>		25.414	26.308	26.532
<b>D. Other Program Funding Summary (\$ in Millions)</b>				
N/A				
<b>Remarks</b>				

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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Air Force Date: May 2021

**Appropriation/Budget Activity**  
3600: *Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development*

**R-1 Program Element (Number/Name)**  
PE 0606018F / *NC3 Integration*

**E. Acquisition Strategy**

The NC3 Integration acquisition strategy applies WS acquisition lifecycle principles across the system of systems AF NC3 WS. Key elements include configuration management, supply chain supportability and risk management, maintenance data collection and reporting, risk management, integration, test, verification, and certification, as well as modeling, simulation, gap analysis, and architecture development for capabilities in sustainment, development, and for future capabilities. To conduct these essential activities a combination of competitively awarded contracts, classified contracts, as well as sole source contracts, will be used to augment AF organic capabilities with technical skill sets from Federally Funded Research and Development Centers (FFRDCs), research laboratories, University Affiliated Research Centers (UARCs), and industry Advisory and Assistance Services (A&AS) providers.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0606018F / NC3 Integration	<b>Project (Number/Name)</b> 674877 / NC3 Integration, Assessment, and Improvement
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
DMS FFRDC/UARC/A&AS	Various	Various : Various	-	23.260	Oct 2019	23.632	Oct 2020	23.997	Oct 2021	-		23.997	-	-	-
<b>Subtotal</b>			-	23.260		23.632		23.997		-		23.997	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Integration Studies /Test Support	Various	Various : Various	-	0.019	Feb 2020	0.021	Oct 2020	0.023	Oct 2021	-		0.023	-	-	-
<b>Subtotal</b>			-	0.019		0.021		0.023		-		0.023	-	-	N/A

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PMA (Eng/Acq Spt/Travel/Supplies)	Various	Various : Various	-	2.135	Oct 2019	2.655	Oct 2020	2.512	Oct 2021	-		2.512	-	-	-
<b>Subtotal</b>			-	2.135		2.655		2.512		-		2.512	-	-	N/A

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>		-	25.414	26.308	26.532	-	-	26.532	N/A

**Remarks**  
FY22 Management Services includes Direct Cite Authority (DCA) for 12 civilian positions; \$1.97M.

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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0606018F / NC3 Integration	<b>Project (Number/Name)</b> 674877 / NC3 Integration, Assessment, and Improvement

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>NC3 WS Integration</b>																											
AF NC3 WS Test and Certification Program																											
NC3 Health Assessment and Analysis																											
Enhance Target Architecture through Development of NC3 Technologies																											
Implement AF NC3 WS Program and Materiel Management Control Process																											
AF NC3 WS Risk Management Program, Monthly Working Group, and Quarterly Board																											
AF NC3 Maintenance Data Reporting																											
NC3 Supply Chain Risk Analysis																											
NC3 Supply Chain Normalization and Supply Health Reporting																											
AF NC3 WS NC3 Configuration Boards Bi-monthly																											
Implement NC3 Enterprise Comm Tech Analysis Repository																											
NC3 Capability Improvement Program (NCIP) Biannually																											
AF NC3 WS Review Biannually																											

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0606018F / <i>NC3 Integration</i>	<b>Project (Number/Name)</b> 674877 / <i>NC3 Integration, Assessment, and Improvement</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>NC3 WS Integration</i></b>				
AF NC3 WS Test and Certification Program	1	2020	4	2023
NC3 Health Assessment and Analysis	1	2020	4	2023
Enhance Target Architecture through Development of NC3 Technologies	1	2020	4	2023
Implement AF NC3 WS Program and Materiel Management Control Process	1	2020	4	2023
AF NC3 WS Risk Management Program, Monthly Working Group, and Quarterly Board	1	2020	4	2023
AF NC3 Maintenance Data Reporting	1	2020	4	2023
NC3 Supply Chain Risk Analysis	1	2020	4	2023
NC3 Supply Chain Normalization and Supply Health Reporting	1	2020	4	2023
AF NC3 WS NC3 Configuration Boards Bi-monthly	1	2020	4	2023
Implement NC3 Enterprise Comm Tech Analysis Repository	1	2020	4	2023
NC3 Capability Improvement Program (NCIP) Biannually	1	2020	4	2023
AF NC3 WS Review Biannually	1	2020	4	2023

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0606942F / <i>Assessments and Evaluations Cyber Vulnerabilities</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	0.000	3.000	0.000	0.000	0.000	-	-	-	-	-	-
677821: <i>Cyberspace Vulnerability Assessment</i>	-	0.000	3.000	0.000	0.000	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

This program funds cyber vulnerability assessments of Air Force weapons systems and critical infrastructure as well as non-recurring engineering for mitigations. The effort leverages the methodology described in the Air Force Cyber Campaign Plan (CCP) to provide Air Force mission assurance in a cyber-contested environment. Under the Air Force CCP, the Air Force is accomplishing work mandated by Section 1647 of the Fiscal Year (FY) 2016 National Defense Authorization Act (NDAA) and Section 1650 of the FY 2017 NDAA. Section 1647 of the FY 2016 NDAA directs the Secretary of Defense to complete an evaluation of the cyber vulnerabilities of each major weapon system of the Department of Defense. Section 1650 of the FY 2017 NDAA mandates the Secretary of Defense submit a plan for assessing the cyber vulnerability of critical defense infrastructure and begin assessments of this infrastructure. This funding focuses on aspects of the Air Force CCP that develop processes, products, and people to perform the short term goals of conducting system cyber vulnerability assessments, cyber mitigations, and pilot programs and work toward the long term goal of achieving an enduring cyber resilient Air Force. The program builds upon existing efforts regarding the identification and mitigation of cyber vulnerabilities, and does not duplicate similar ongoing efforts or conduct redundant assessments on systems that have already been evaluated.

In addition, this program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. It may also include necessary civilian pay expenses required to perform analysis and developmental activities required in support of the transition of weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0606942F / <i>Assessments and Evaluations Cyber Vulnerabilities</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	0.000	0.000	0.000	0.000	0.000
Current President's Budget	0.000	3.000	0.000	0.000	0.000
Total Adjustments	0.000	3.000	0.000	0.000	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	3.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

**Change Summary Explanation**

FY 2021 increase of \$3.000 due to Congressional Add for Ransomware Response Exercise.

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>Title:</b> Address Weapon System Cyber Vulnerabilities</p> <p><b>Description:</b> Develop processes, products, and people to conduct weapon system cyber vulnerability assessments, cyber mitigations, demonstrations, and pilot programs toward the long term goal of achieving an enduring cyber resilient Air Force.</p> <p><b>FY 2021 Plans:</b> Collaborate and coordinate with multiple Department of Defense organizations and Federal Government Agencies in developing and executing cybersecurity exercises related to ransomware response against weapon systems. These exercises will develop scenarios aimed at testing and developing concept of operations, courses of action, develop and apply TTPs while also documenting the aggressor's ransomware TTPs and methods impacting platform embedded systems. Identify and inform real-time cyber-defense operator training for ransomware attack response and corresponding mitigation efforts.</p> <p><b>FY 2022 Plans:</b> Not Applicable</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Effort Completion</p>	0.000	3.000	0.000
<p><b>Title:</b> Address Infrastructure Cyber Vulnerabilities</p>	0.000	0.000	0.000



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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0606942F / <i>Assessments and Evaluations Cyber Vulnerabilities</i>
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>Description:</b> Develop processes, products, and people to conduct infrastructure/control systems/Operational Technology cyber vulnerability assessments, cyber mitigations, demonstrations, and pilot programs toward the long term goal of achieving an enduring cyber resilient Air Force.</p> <p><b>FY 2021 Plans:</b> Not Applicable</p> <p><b>FY 2022 Plans:</b> Not Applicable.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Not Applicable.</p>			
<p><b>Title:</b> Exercise Participation</p> <p><b>Description:</b> This effort supports exercise participation, Combatant Command support, and assessment team activities to validate candidate weapon system and infrastructure cyber vulnerabilities.</p> <p><b>FY 2021 Plans:</b> Not Applicable</p> <p><b>FY 2022 Plans:</b> Not Applicable.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Not Applicable.</p>	0.000	0.000	0.000
<b>Accomplishments/Planned Programs Subtotals</b>	0.000	3.000	0.000

**D. Other Program Funding Summary (\$ in Millions)**  
N/A

**Remarks**

**E. Acquisition Strategy**  
When possible, activities in this effort will leverage current competitively-awarded contracts. Additional necessary contracts funded in this program element will be awarded using either competitive or sole source procedures, whichever is most appropriate. The government agency responsible for managing the program is the Air Force Life Cycle Management Center, Cyber Resiliency Office for Weapons Systems, Wright-Patterson Air Force Base, Ohio and Hanscom Air Force Base, Massachusetts.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0606942F / Assessments and Evaluations Cyber Vulnerabilities	<b>Project (Number/Name)</b> 677821 / Cyberspace Vulnerability Assessment
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Industry Collaboration for Critical Infrastructure Mitigations (1650)	TBD	Various : TBD	-	0.000		-		-		-		-	-	-	-
More Situational Awareness for Industrial Control Systems (MOSAICS) SANDIA	MIPR	Albuquerque, NM : TBD	-	0.000		-		-		-		-	-	-	-
More Situational Awareness for Industrial Control Systems (MOSAICS)	MIPR	North Charleston, SC : TBD	-	0.000		-		-		-		-	-	-	-
Ransomware Response scenarios, courses of action, associated TTPs, and training requirements	Various	Various : TBD	-	-		3.000		-		-		-	-	-	-
<b>Subtotal</b>			-	0.000		3.000		-		-		-	-	-	N/A

**Remarks**  
In FY 2019, the Office of the Undersecretary of Defense for Acquisition, Technology, and Logistics transitioned the responsibility of funding NDAA 1647 and 1650 activities directly to the Services.

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	-	0.000	3.000	-	-	-	-	-	N/A

**Remarks**  
Ransomware response product development included in response to a FY 2021 Congressional Add

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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0606942F / <i>Assessments and Evaluations Cyber Vulnerabilities</i>	<b>Project (Number/Name)</b> 677821 / <i>Cyberspace Vulnerability Assessment</i>

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b><i>Cyberspace Vulnerability Assessment</i></b>	
Conduct cyber vulnerability assessments for weapon systems	
Develop and assess prototype weapon system cyber mitigations	
Conduct Category 1 cyber vulnerability assessments for infrastructure	
Conduct Category 2 cyber vulnerability assessments for infrastructure	
Develop and assess infrastructure prototype cyber mitigations	
Participate in exercises and red team activities	
<b><i>Ransomware Response</i></b>	
Identify and inform real-time cyber-defense operator training for responding to ransomware attacks	
Develop ransomware scenarios aimed at testing and developing concept of operations, courses of action, develop and apply TTPs	

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0606942F / <i>Assessments and Evaluations Cyber Vulnerabilities</i>	<b>Project (Number/Name)</b> 677821 / <i>Cyberspace Vulnerability Assessment</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Cyberspace Vulnerability Assessment</i></b>				
Conduct cyber vulnerability assessments for weapon systems	1	2020	4	2020
Develop and assess prototype weapon system cyber mitigations	1	2020	4	2020
Conduct Category 1 cyber vulnerability assessments for infrastructure	2	2020	2	2020
Conduct Category 2 cyber vulnerability assessments for infrastructure	4	2020	4	2020
Develop and assess infrastructure prototype cyber mitigations	1	2020	4	2020
Participate in exercises and red team activities	1	2020	4	2020
<b><i>Ransomware Response</i></b>				
Identify and inform real-time cyber-defense operator training for responding to ransomware attacks	3	2021	4	2022
Develop ransomware scenarios aimed at testing and developing concept of operations, courses of action, develop and apply TTPs	3	2021	4	2022

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: Research, Development, Test & Evaluation, Air Force / BA 7: Operational Systems Development	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	308.048	482.741	715.811	0.000	715.811	-	-	-	-	-	-
671803: B-52 AFMC Test Assets	-	4.069	15.654	1.447	0.000	1.447	-	-	-	-	-	-
671805: B-52 VLF/LF Modernization	-	10.000	12.976	9.187	0.000	9.187	-	-	-	-	-	-
671807: Advanced Targeting POD Display Upgrade	-	5.397	0.000	0.000	0.000	0.000	-	-	-	-	-	-
671810: B-52 AEHF Integration	-	0.000	5.024	29.690	0.000	29.690	-	-	-	-	-	-
675039: B-52 System Improvements	-	12.050	11.166	0.150	0.000	0.150	-	-	-	-	-	-
675041: Bomber Tactical Data Link	-	2.878	0.000	0.000	0.000	0.000	-	-	-	-	-	-
675055: GPS-IU	-	1.986	0.000	0.693	0.000	0.693	-	-	-	-	-	-
675056: B-52 Radar Modernization Program (RMP)	-	93.702	157.792	162.862	0.000	162.862	-	-	-	-	-	-
675057: B-52 Low Cost Improvement (LCI)	-	2.607	2.600	0.058	0.000	0.058	-	-	-	-	-	-
675129: B-52 CERP	-	175.359	273.020	484.068	0.000	484.068	-	-	-	-	-	-
675160: B-52 Crypto Modernization	-	0.000	4.509	17.453	0.000	17.453	-	-	-	-	-	-
675165: B-52 Quad Crew	-	0.000	0.000	10.203	0.000	10.203	-	-	-	-	-	-

**Note**

This program, BA 7, PE 0101113F, project 675055, Global Positioning System Interface Unit (GPS-IU), is a new start.

**A. Mission Description and Budget Item Justification**

The B-52H is a long-range bomber capable of delivering the widest variety of nuclear and conventional standoff and direct attack munitions in the Air Force. The Air Force plans to fly the B-52H to 2050.

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / <i>B-52 Squadrons</i>
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The B-52H modernization efforts are needed to perform current and future wartime missions and to ensure relevance, lethality and survivability. Additionally, modernization projects alleviate aircraft obsolescence issues due to Diminishing Manufacturing Sources (DMS) while at the same time providing improved capabilities to the B-52H weapon system that require significant hardware and software development and testing.

B-52 funding also supports innovation activities to include studies, analyses, requirements definition, and quick-reaction capability prototypes/demonstrations to accelerate planning for technology transition, technology insertion, and future acquisition programs.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$14.818M was expended for civilian pay expenses in this program element, and in FY21 \$20.915M is forecasted for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	323.624	520.023	568.349	0.000	568.349
Current President's Budget	308.048	482.741	715.811	0.000	715.811
Total Adjustments	-15.576	-37.282	147.462	0.000	147.462
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-42.282			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	5.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-4.982	0.000			
• SBIR/STTR Transfer	-10.594	0.000			
• Other Adjustments	0.000	0.000	147.462	0.000	147.462

**Congressional Add Details (\$ in Millions, and Includes General Reductions)**

**Project:** 675039: *B-52 System Improvements*  
Congressional Add: *AFGSC Innovation Hub*

	<b>FY 2020</b>	<b>FY 2021</b>
Congressional Add Subtotals for Project: 675039	2.000	5.000
Congressional Add Totals for all Projects	2.000	5.000

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / <i>B-52 Squadrons</i>	
<b><u>Change Summary Explanation</u></b> Change Summary Explanation FY20: = -\$10.594 Small Business Innovative Research (SBIR) and -\$4.982M for reprogramming actions (OMNIBUS; Full Combat Mission Training and LCMC)  FY21: Program increase - global strike innovation hub 5,000; Congressional Marks for ATP display upgrade delay -5,000; RMP MSB slip -10,900; CERP excess to need -25,500; Undistributed Reduction - Excess to Need -882  FY22: Increase \$147.462M - Test Assets (-\$2.816M), CERP (+\$156.550M), RMP (-\$24.590M), Low Cost Improvements (-\$2.598M), VLF/LF (+\$0.220M), AEHF (-\$7.753M), Quad Crew (FY22 New Start) (+\$10.303M), GPS-IU (+\$0.693M), Crypto Mod (+\$17.453M)		

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons				<b>Project (Number/Name)</b> 671803 / B-52 AFMC Test Assets			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
671803: B-52 AFMC Test Assets	-	4.069	15.654	1.447	0.000	1.447	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The B-52 AFMC Test Assets project will provide funding for the test aircraft, manpower, and facilities at the Air Force Test Center located at Edwards AFB, California. This project will support the developmental testing and sustainment needs of the B-52 weapon system as well as the procurement and install of the Bomber Modular Data Acquisition System (BMDAS) of identified B-52 Test Aircraft. Funds include cost of one Test Aircraft #60-036 Programmed Depot Maintenance (PDM) performed at Tinker AFB OK.

Costs include any analysis, documentation, and related expenses necessary to establish a program of record and support the B-52 weapon system. Additionally, other costs include PMA and centralized support and initiatives for anticipated weapon system enhancements (to include efforts to improve weapon system operational capabilities, safety, supportability, maintainability, reliability, and total cost of ownership).

Funds may be used to resolve emerging safety of flight and diminishing manufacturing sources issues, accommodate technology insertion and fulfill Federal Aviation Agency (FAA) or other mandates necessary to ensure continue aircrew safety and mission effectiveness.

Funds may be used to address emerging and short-notice Diminishing manufacturing and material shortage (DMSMS) issues

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<b>Title:</b> B-52 AFMC Test Aircraft Asset Support	4.069	15.654	1.447	0.000	1.447
<b>Description:</b> B-52 Test Support provides funding for the test aircraft, manpower, BMDAS and facilities at the Air Force Test Center, Edwards AFB and Programmed Depot Maintenance (PDM). This will support the developmental testing and sustainment needs of the B-52.					
<b>FY 2021 Plans:</b> FY21 funding reallocated within B-52 to higher Air Force priorities. No induction in FY21 and next induction planned for 2QFY24.					
<b>FY 2022 Base Plans:</b> Provide funding for the test aircraft, manpower and facilities at the Air Force Test Center, Edwards AFB. This will support the developmental testing, facility, BMDAS and sustainment needs of the B-52.					
<b>FY 2022 OCO Plans:</b>					



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / <i>B-52 Squadrons</i>	<b>Project (Number/Name)</b> 671803 / <i>B-52 AFMC Test Assets</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
N/A					
<b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> FY22 funding is higher than FY21 after reallocation to higher Air Force priorities. FY22 funding supports test aircraft manpower, BMDAS and facilities.					
<b>Accomplishments/Planned Programs Subtotals</b>	4.069	15.654	1.447	0.000	1.447

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

Funding sent to Edwards AFB for the test aircraft, manpower, BMDAS and facilities at the Air Force Test Center located at Edwards AFB, California.



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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / <i>B-52 Squadrons</i>	<b>Project (Number/Name)</b> 671803 / <i>B-52 AFMC Test Assets</i>
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b><i>AFMC Test Aircraft Support</i></b>	
Test Support	
PDM Jet Induction	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / <i>B-52 Squadrons</i>	<b>Project (Number/Name)</b> 671803 / <i>B-52 AFMC Test Assets</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>AFMC Test Aircraft Support</i></b>				
Test Support	1	2020	4	2026
PDM Jet Induction	2	2024	3	2025

**Note**  
B-52 Test Aircraft -036 is planned to be inducted to PDM 2QFY24 and out 3QFY25.

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons	<b>Project (Number/Name)</b> 671805 / B-52 VLF/LF Modernization
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
671805: B-52 VLF/LF Modernization	-	10.000	12.976	9.187	0.000	9.187	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The B-52 Very Low Frequency/Low Frequency (VLF/LF) Modernization program integrates a receive-only, low frequency receiver and antenna subsystem to provide a secure, survivable strategic nuclear communication capability for the B-52. This project will consist of integrating an existing VLF/LF terminal into the B-52. Integration includes Group A wiring, rack and antenna, and the Group B terminal Line Replaceable Unit (LRU).

Funds may be used to address emerging and short-notice Diminishing Manufacturing and Material Shortage (DMSMS) issue, to resolve emerging safety of flight, accommodate technology insertion and fulfill FAA or other mandates necessary to ensure continued aircrew safety and mission effectiveness.

As the VLF/LF provides future communication growth to the B-52, emerging security/certification requirements (nuclear certification, cyber security, program protection, crypto modernization, etc.) as well as other aircraft upgrades may require studies and/or support for potential impact to VLF/LF. Funds may be used to procure, test, and field terminals.

DMS efforts to include removal of end-of-life software/hardware within simulators systems and move to a modular, common open system architecture that is sustainable and cyber-resilient. Implement requirements and standards defined under the Simulator Common Architecture Requirements and Standards (SCARS) initiative.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<b>Title:</b> B-52 Very Low Frequency/Low Frequency (VLF/LF)	10.000	12.976	9.187	0.000	9.187
<b>Description:</b> Provides secure, survivable, receive-only strategic nuclear communication for the B-52					
<b>FY 2021 Plans:</b> Continue EMD phase to support fielding decision. Accomplish Preliminary Design Review (PDR) 2QFY21 and Critical Design Review (CDR) 3QFY21.					
<b>FY 2022 Base Plans:</b> Continue EMD phase to support fielding decision. Accomplish kit #1 delivery (3QFY22) and A/C mod (4QFY22) for test.					
<b>FY 2022 OCO Plans:</b>					

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons	<b>Project (Number/Name)</b> 671805 / B-52 VLF/LF Modernization
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Continue EMD phase to support fielding decision. Accomplish DT/OT (1QFY23), A/C 2 Mod (3QFY23, and Milestone C (3QFY23).					
<b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> Funding decreased from FY21 to FY22. No change to programmatic approach as funding is sufficient to support EMD efforts in FY22.					
<b>Accomplishments/Planned Programs Subtotals</b>	10.000	12.976	9.187	0.000	9.187

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• APAF 05 B05200: BP11 Production	0.000	0.000	20.137	-	20.137	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

The Milestone Decision Authority (MDA) approved the 25 January 2019 decision of the B-52 VLF/LF Acquisition Strategy Panel (ASP), which authorized the program to enter into the EMD phase with the Original Equipment Manufacturer (OEM). The program office received a proposal from the OEM on 16 August 2019. The EMD Contract was awarded 22 January 2020. The Acquisition Program Baseline (APB) was signed April 2020.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons	<b>Project (Number/Name)</b> 671805 / B-52 VLF/LF Modernization
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Risk Reduction	TBD	Not specified. : TBD	-	0.091		0.320	Mar 2021	0.290	Mar 2022	-		0.290	-	-	-
VLF/LF EMD	SS/CPFF	Various : Oklahoma, OK	-	7.324		10.419	Jan 2021	3.808	Jan 2022	-		3.808	-	-	-
<b>Subtotal</b>			-	7.415		10.739		4.098		-		4.098	-	-	N/A

<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
VLF/LF Program Office Support	Various	Various : TBD	-	1.896	Jul 2020	1.154	Jul 2021	1.285	Jul 2022	-		1.285	-	-	-
VLF/LF Trainers	Allot	Not specified. : TBD	-	-		-		2.760		-		2.760	-	-	-
VLF/LF ECO	C/CPAF	Not specified. : TBD	-	0.663		0.650		0.605		-		0.605	-	-	-
<b>Subtotal</b>			-	2.559		1.804		4.650		-		4.650	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
VLF/LF Test	PO	Not specified. : TBD	-	0.026	Mar 2020	0.033	Feb 2021	0.039	Feb 2022	-		0.039	-	-	-
VLF/LF Certifications	TBD	Not specified. : TBD	-	-		0.400	May 2021	0.400	May 2022	-		0.400	-	-	-
<b>Subtotal</b>			-	0.026		0.433		0.439		-		0.439	-	-	N/A

			Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>			-	10.000	12.976	9.187	-	9.187	-	-	N/A

**Remarks**

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force Date: May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons	<b>Project (Number/Name)</b> 671805 / B-52 VLF/LF Modernization
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>B-52 VLF/LF Modernization</b>																												
EMD																												
MS C																												
IOC																												
Procurement																												



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / <i>B-52 Squadrons</i>	<b>Project (Number/Name)</b> 671805 / <i>B-52 VLF/LF Modernization</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>B-52 VLF/LF Modernization</i></b>				
EMD	2	2020	3	2023
MS C	3	2023	3	2023
IOC	4	2024	4	2024
Procurement	4	2023	4	2026

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons				<b>Project (Number/Name)</b> 671807 / Advanced Targeting POD Display Upgrade			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
671807: <i>Advanced Targeting POD Display Upgrade</i>	-	5.397	0.000	0.000	0.000	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The B-52 Advanced Targeting Pod (ATP) Display Upgrade project consists of a separate display and processor upgrade with a 10 gigabyte Ethernet connection. The current targeting pod display is outdated and experiencing a high failure rate and obsolescence issues. Additionally, the current monitor does not support current and emerging video resolution improvements of the fielded Sniper and LITENING ATPs. The Sniper and LITENING advanced targeting pods are capable of transmitting HD color and video at a much higher resolution than the current monochrome monitor. This upgrade will improve situational awareness and combat lethality. In FY21 the program will complete TMRR, then terminate the investment program (due to lack of funding) and then switch gears focusing on sustaining the current capability for the Multi-Functional Color Display (MFCD).

Costs include any analysis, documentation, and related expenses necessary to establish a Program of Record and support the B-52 weapon system. Additionally, other costs include program management administration and centralized support and initiatives for anticipated weapon system enhancements (to include efforts to improve weapon system operational capabilities, safety, supportability, maintainability, reliability, and total cost of ownership).

Funds may be used to resolve emerging safety of flight and diminishing manufacturing sources issues, accommodate technology insertion and fulfill Federal Aviation Agency (FAA) or other mandates necessary to ensure continue aircrew safety and mission effectiveness.

Funds may be used for engineering, manufacturing, and development activities.

Funds may be used to address emerging and short-notice Diminishing manufacturing and material shortage (DMSMS) issues.

Program was cancelled in FY21 to posture program for a sustainment-focused solution with legacy display.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<b>Title:</b> B-52 Advanced Targeting Pod Display Upgrade	5.397	0.000	0.000	0.000	0.000
<b>Description:</b> B-52 Advanced Targeting Pod Monitor Upgrade with 10 Gig Ethernet connection. The current monitor does not support current and emerging video resolution improvements of the fielded Sniper and LITENING ATPs. The Sniper and LITENING advanced targeting pods are capable of transmitting HD color and video at a much higher resolution than the current monochrome monitor. This upgrade will improve situational					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons	<b>Project (Number/Name)</b> 671807 / Advanced Targeting POD Display Upgrade

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
awareness and combat lethality. In FY21 the program will complete TMRR and prepare the program for a sustainment based solution for the MFCD.					
<b><i>FY 2021 Plans:</i></b> Program funding in FY21 is located in BPAC 675039. Continue Analysis of Alternatives, modeling, simulation, testing, and demonstration, including but not limited to: Studies of existing and planned avionics, communications/navigation, electrical, weapons, flight, and nuclear-related aircraft systems and subsystems to support the future viability of the B-52 fleet.					
<b><i>FY 2022 Base Plans:</i></b> N/A					
<b><i>FY 2022 OCO Plans:</i></b> N/A					
<b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> N/A					
<b>Accomplishments/Planned Programs Subtotals</b>	5.397	0.000	0.000	0.000	0.000

**C. Other Program Funding Summary (\$ in Millions)**

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• APAF 05 B05200: <i>Advanced Target Pod MFCD Production</i>	-	-	0.000	-	0.000	-	-	-	-	-	-
• APAF 06 000999: <i>Initial Spares</i>	-	-	-	-	-	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

In FY21, the program will posture for a sustainment approach for the legacy Multi-Function Color Display (MFCD).



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Air Force</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons	<b>Project (Number/Name)</b> 671807 / Advanced Targeting POD Display Upgrade

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>ATP Display Upgrade</b>	
TMRR	[REDACTED]
Integration Studies	[REDACTED]

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / <i>B-52 Squadrons</i>	<b>Project (Number/Name)</b> 671807 / <i>Advanced Targeting POD Display Upgrade</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>ATP Display Upgrade</i></b>				
TMRR	2	2020	3	2021
Integration Studies	1	2020	2	2020

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons				<b>Project (Number/Name)</b> 671810 / B-52 AEHF Integration			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
671810: B-52 AEHF Integration	-	0.000	5.024	29.690	0.000	29.690	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The B-52 Advanced Extremely High Frequency (AEHF) Integration satellite communications (SATCOM) system provides a survivable, low probability of intercept/detection, high bandwidth system that ensures secure intra/inter-flight and two-way command and control communications in the modern anti-access/aerial denial battle space. This communications upgrade replaces the Military Strategic and Tactical Relay (MILSTAR) Ultra High Frequency (UHF) SATCOM capability (MILSTAR is nearing system end of life) on the B-52. The AEHF Integration effort will integrate the radio, antenna and system components required to provide two-way EHF communication for the B-52.

Funds may be used to address emerging and short-notice Diminishing Manufacturing and Material Shortage (DMSMS) issues. As AEHF Integration provides future communication growth to the B-52, emerging security/certification requirements (nuclear certification, cyber security, program protection, crypto modernization, etc.) as well as other aircraft upgrades may require studies and/or support for potential impact to AEHF. Funds may be used to conduct Technology Maturation and Risk Reduction (TMRR) activities and procure, test, and field the latest terminals.

DMS efforts to include removal of end-of-life software/hardware within simulators systems and move to a modular, common open system architecture that is sustainable and cyber-resilient. Implement requirements and standards defined under the Simulator Common Architecture Requirements and Standards (SCARS) initiative.

Funds may be used to resolve emerging safety of flight, accommodate technology insertion of this system and related communications systems, and fulfill Federal Aviation Agency (FAA) or other mandates necessary to ensure continued aircrew safety and mission effectiveness.

In order to maintain currency with the latest aircraft configuration, the B-52 Systems Improvements projects will update existing trainers or use Computer-Based Training (CBT) to add any new systems improvement functionality to meet user training requirements and update/maintain the Systems Integration Lab (SIL) for the Weapon System Trainers (WSTs).

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<b>Title:</b> B-52 AEHF Integration	0.000	5.024	29.690	0.000	29.690
<b>Description:</b> The B-52 Advance Extremely High Frequency (AEHF) Integration SATCOM system provides a survivable, low probability of intercept/detection, high bandwidth system that ensures secure intra/inter-flight and two-way command and control communications in the modern anti-access/aerial denial battle space. This communications upgrade replaces the Military Strategic and Tactical Relay (MILSTAR) and its Ultra High Frequency (UHF) SATCOM capability (MILSTAR is nearing system end of life) on the B-52. The AEHF					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons	<b>Project (Number/Name)</b> 671810 / B-52 AEHF Integration
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Integration effort will integrate the radio, antenna and system components required to provide two-way EHF communication for the B-52.					
<b><i>FY 2021 Plans:</i></b> Continue risk reduction activities and program planning efforts. Program held an Acquisition Strategy Panel (ASP) review on 30 Mar 21 and received approval to continue risk reduction efforts to System Requirements Review (SRR) and releasing Request for Proposal (RFP) to get the program through Preliminary Design Review (PDR).					
<b><i>FY 2022 Base Plans:</i></b> Begin Engineering Manufacturing and Development (EMD) phase in 3QFY22.					
<b><i>FY 2022 OCO Plans:</i></b> N/A					
<b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> Increase in FY22 due to ramp up to PDR and Milestone B for initiation of the program's EMD phase.					
<b>Accomplishments/Planned Programs Subtotals</b>	0.000	5.024	29.690	0.000	29.690

**C. Other Program Funding Summary (\$ in Millions)**  
N/A

**Remarks**

**D. Acquisition Strategy**  
The Milestone Decision Authority (MDA) for B-52 AEHF Integration is the Air Force Program Executive Officer (AFPEO) for Nuclear Command, Control, and Communications (NC3). The program will utilize the B-1/B-52 Flexible Acquisition and Sustainment Contract to award Risk Reduction studies, Program Planning activities, and the EMD effort to the Original Equipment Manufacturer (OEM). The OEM will be responsible for the integration of the AEHF terminal, which will be provided as Government Furnished Equipment (GFE).



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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons	<b>Project (Number/Name)</b> 671810 / B-52 AEHF Integration
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Risk Reduction	C/CPAF	various : various	-	-		4.824	Mar 2021	26.999	Nov 2021	-		26.999	-	-	-
<b>Subtotal</b>			-	-		4.824		26.999		-		26.999	-	-	N/A

<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Other Government Services	C/CPAF	Not specified. : TBD	-	-		0.100	Jul 2021	0.929	Jul 2022	-		0.929	-	-	-
<b>Subtotal</b>			-	-		0.100		0.929		-		0.929	-	-	N/A

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
A&AS, Travel, Support	Various	various : various	-	-		0.100	Sep 2021	1.762	Sep 2022	-		1.762	-	-	-
<b>Subtotal</b>			-	-		0.100		1.762		-		1.762	-	-	N/A

			Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>			-	-		5.024		29.690		-		29.690	-	-	N/A

**Remarks**

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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons	<b>Project (Number/Name)</b> 671810 / B-52 AEHF Integration
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>EMD</b>	
TMRR Activities	
Milestone B	
EMD	
Flight Test	
Milestone C	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / <i>B-52 Squadrons</i>	<b>Project (Number/Name)</b> 671810 / <i>B-52 AEHF Integration</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>EMD</b>				
TMRR Activities	1	2020	3	2022
Milestone B	3	2022	3	2022
EMD	4	2022	4	2025
Flight Test	1	2025	2	2025
Milestone C	1	2026	1	2026

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0101113F / B-52 Squadrons				Project (Number/Name) 675039 / B-52 System Improvements			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
675039: B-52 System Improvements	-	12.050	11.166	0.150	0.000	0.150	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

In FY 2020, PE 0101113F, B-52 Squadrons, Project 675039, B-52 System Integration efforts were transferred to PE 0101113F, B-52 Squadrons, Project 671805, B-52 VLF/LF Modernization, Project 671803, B-52 Test Support, and Project 671807 Advanced Target POD MFCD in order to provide a separate BPACs for FY19 new start effort.

In FY 2021 (\$11.166M) - Project 671807 Advanced Target POD MFCD funding is shown in B-52 Squadrons, Project 675039. (\$6.116M), Congressional Add AFGSC Innovation Hub (\$5.000M), B-52 System Integration (\$0.050M)

**A. Mission Description and Budget Item Justification**

B-52 System Improvements is a comprehensive project to facilitate future capabilities and ensure the B-52's viability in performing current and future wartime missions. The scope of work may include development of an Analysis of Alternative (AoA), studies and analysis, a Capability Development Document (CDD), and/or any other analyses or documentation necessary to establish a Program of Record (POR). Additionally, this project may include airborne integration experiments or demonstrations of emerging technologies. Support of the platform integration efforts are necessary to identify and resolve challenges associated with integrating multiple programs and activities planned for the B-52 fleet.

Funds may be used to address emerging and short-notice Diminishing Manufacturing and Material Shortage (DMSMS) issues.

Costs include any analysis, documentation, and related expenses necessary to establish a POR and support the B-52 weapon system. Additionally, other costs include PMA and centralized support and initiatives for anticipated weapon system enhancements (to include efforts to improve weapon system operational capabilities, safety, supportability, maintainability, reliability, and total cost of ownership).

Funds may be used to resolve emerging safety of flight and diminishing manufacturing sources issues, accommodate technology insertion and fulfill Federal Aviation Agency (FAA) or other mandates necessary to ensure continue aircrew safety and mission effectiveness.

B-52 Mission Data Recorder: Provides permanent crash survivable flight data recorder information to meet Military Flight Operational Quality Assurance (MFOQA) and other regulatory requirements. Produces digital recordings enhancing aircrew mission reconstruction and weapon release validation.

B-52 AFGSC Innovation Hub supports Air Force efforts to take innovative approaches to B-52 modernization.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons	<b>Project (Number/Name)</b> 675039 / B-52 System Improvements
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B-52 Quad Crew Initiative (ALQ-172 Enhancement): Modernization to the B-52 Electronic Warfare systems is critical for situational awareness, self-protection and survivability in a contested environment. Program will better integrate the Line Replaceable Units (LRUs) and provide more inherent capabilities to the ALQ-172 system allowing it to be more fully automated. The planned automation and integration plan will remove the need for a sole function Electronic Warfare Officer (EWO) on the B-52.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p><b>Title:</b> B-52 Systems Improvements</p> <p><b>Description:</b> Initiate Analysis of Alternatives, modeling, simulation, testing, and demonstration, including but not limited to: Studies of existing and planned avionics, communications/navigation, electrical, weapons, flight, and nuclear-related aircraft systems and subsystems to support the future viability of the B-52 fleet.</p> <p><b>FY 2021 Plans:</b> Continue Analysis of Alternatives, modeling, simulation, testing, and demonstration, including but not limited to: Studies of existing and planned avionics, communications/navigation, electrical, weapons, flight, and nuclear-related aircraft systems and subsystems to support the future viability of the B-52 fleet.</p> <p><b>FY 2022 Base Plans:</b> Continue Analysis of Alternatives, modeling, simulation, testing, and demonstration, including but not limited to: Studies of existing and planned avionics, communications/navigation, electrical, weapons, flight, and nuclear-related aircraft systems and subsystems to support the future viability of the B-52 fleet</p> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Negligible increase from FY21 to FY22</p>	0.050	0.050	0.150	0.000	0.150
<p><b>Title:</b> Mission Data Recorder</p> <p><b>Description:</b> Provides permanent crash survivable flight data recorder information to meet Military Flight Operational Quality Assurance (MFOQA) and other regulatory requirements. Produces digital recordings enhancing aircrew training/operational mission.</p> <p><b>FY 2021 Plans:</b> N/A</p> <p><b>FY 2022 Base Plans:</b> NA</p> <p><b>FY 2022 OCO Plans:</b></p>	10.000	0.000	0.000	0.000	0.000

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons	<b>Project (Number/Name)</b> 675039 / B-52 System Improvements
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
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N/A					
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> N/A					

<p><b>Title:</b> Advanced Targeting POD Display Upgrade</p> <p><b>Description:</b> B-52 Advanced Targeting Pod (ATP) Display Upgrade project was meant to replace the legacy monitor to resolve supportability and obsolescence issues, as well as support video resolution improvements of the fielded Sniper and LITENING ATPs. The Sniper and LITENING ATPs are capable of transmitting HD color and video at a much higher resolution than the current monochrome monitor. In FY21, B-52 ATP Display Upgrade (BPAC 671807) was budgeted \$6.116M, but the funding was misaligned to B-52 System Improvement (BPAC 675039).</p> <p><b>FY 2021 Plans:</b> Conclude TMRR development activities and prepare the program for a sustainment solution for the B-52 ATP Monitor Upgrade. As a result, the majority of FY21 funding was realigned within B-52 Squadrons.</p> <p><b>FY 2022 Base Plans:</b> N/A</p> <p><b>FY 2022 OCO Plans:</b> No activity in FY22.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> N/A</p>	0.000	6.116	0.000	0.000	0.000
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<b>Accomplishments/Planned Programs Subtotals</b>	10.050	6.166	0.150	0.000	0.150
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	FY 2020	FY 2021
<p><b>Congressional Add:</b> AFGSC Innovation Hub</p> <p><b>FY 2020 Accomplishments:</b> Support future investments such as Agile PODs, Future Comm Data Links, Hypersonic Kill Chain Research &amp; Development</p> <p><b>FY 2021 Plans:</b> Continue to support future investments such as Agile PODs, Future Comm Data Links, Hypersonic Kill Chain Research &amp; Development</p>	2.000	5.000
<b>Congressional Adds Subtotals</b>	2.000	5.000

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons	<b>Project (Number/Name)</b> 675039 / B-52 System Improvements
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 05 B05200: B-52	5.460	0.470	0.476	-	0.476	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

MDR held an Acquisition Strategy Panel (ASP) review 13 Apr 20. MDR is the permanent integration of a fielded temporary modification (Digital B-52 Recorder Instrumentation Enhancement for the Reserves (DBRIEFR) System). Program's EMD phase is fully funded and it will be fielded as a buy-to-budget.

The B-52 Quad Crew program will utilize the B-1/B-52 Flexible Acquisition and Sustainment Contract to award studies and development effort to the Original Equipment Manufacturer. Additionally, the program will also utilize existing sustainment contracts for studies and development of ALQ-172 functionally to support the transition to the B-52 Quad Crew.

ATP Display Upgrade was cancelled in FY21 and will conclude TMRR efforts to transition into a sustainment-focused solution with the legacy display.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons	<b>Project (Number/Name)</b> 675039 / B-52 System Improvements
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<b>Product Development (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
System Improvements Studies and Analysis	SS/ Various	The Boeing Company, 559 SMXS/MXDPBA : Oklahoma City, OK	-	0.000	Jul 2020	0.000	Dec 2020	0.000	Jan 2022	-		0.000	-	-	-
Low Cost Mods TBD BPAC 675057	TBD	TBD : Oklahoma City, OK	-	0.000	Jul 2020	-		0.000	Jan 2022	-		0.000	-	-	-
Mission Data Recorder	C/CPFF	SwRI : Midwest City, OK	-	10.000	Jul 2020	-		0.000	Jan 2022	-		0.000	-	-	-
IR Missile Warning System	C/CPAF	NA : TBD	-	0.000	Jul 2020	-		0.000	Jan 2022	-		0.000	-	-	-
AFGSC Innovation Hub	C/CPAF	TBD : Barksdale, LA	-	2.000	Nov 2020	5.000		0.000	Jan 2022	-		0.000	-	-	-
Quad Crew	TBD	TBD : Oklahoma City, OK	-	0.000	Jul 2020	-		0.000	Jan 2022	-		0.000	-	-	-
Advanced Targeting POD Display Upgrade	TBD	TBD : Oklahoma City, OK	-	0.000	Jul 2020	6.116	Dec 2020	0.000	Jan 2022	-		0.000	-	-	-
<b>Subtotal</b>			-	12.000		11.116		0.000		-		0.000	-	-	N/A

**Remarks**

TBD

<b>Management Services (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
B-52 Centralized Support, Program Management Administration, TDY, A&AS Contractor Support - 675039	Various	TBD : NV	-	0.050	Mar 2020	0.050	Jan 2021	0.150	Jan 2022	-		0.150	-	-	-
B-52 Centralized Support, Travel - 675039	Various	Various : TBD	-	0.000	Mar 2020	0.000	Jan 2021	0.000	Jan 2022	-		0.000	-	-	-
<b>Subtotal</b>			-	0.050		0.050		0.150		-		0.150	-	-	N/A



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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons	<b>Project (Number/Name)</b> 675039 / B-52 System Improvements
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	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	-	12.050	11.166	0.150	-	0.150	-	-	N/A

**Remarks**

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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date: May 2021**

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / <i>B-52 Squadrons</i>	<b>Project (Number/Name)</b> 675039 / <i>B-52 System Improvements</i>
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FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b><i>Systems Improvements</i></b>	
System Improvements Studies and Analysis, etc. (Began 2Q16)	
<b><i>AFGSC Innovation Hub</i></b>	
Industry Collaboration Efforts	
<b><i>Mission Data Recorder</i></b>	
EMD Integration effort for Mission Data Recorder	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / <i>B-52 Squadrons</i>	<b>Project (Number/Name)</b> 675039 / <i>B-52 System Improvements</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Systems Improvements</i></b>				
System Improvements Studies and Analysis, etc. (Began 2Q16)	1	2020	4	2026
<b><i>AFGSC Innovation Hub</i></b>				
Industry Collaboration Efforts	1	2021	4	2021
<b><i>Mission Data Recorder</i></b>				
EMD Integration effort for Mission Data Recorder	4	2020	4	2021

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons				<b>Project (Number/Name)</b> 675041 / Bomber Tactical Data Link			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
675041: Bomber Tactical Data Link	-	2.878	0.000	0.000	0.000	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The B-52 Combat Network Communications Technology (CONNECT) Capability Development Document (CDD), dated 18 March 2004, captures the requirements for a Tactical Data Link (TDL) capability on the B-52. The B-52 TDL provides low latency, jam-resistant situational awareness and C2 communications needed to support in-theater operations and missions. This project will consist of integrating an existing off-the-shelf TDL terminal into the B-52. Integration includes Group A wiring, rack and antennae, and the Group B terminal, blanking unit and notch filter LRUs. The TDL terminal will be fully integrated with CONNECT. This TDL capability allows the warfighter to utilize this capability by maintaining situational awareness, avoiding threats, and employing an array of weapons.

Funds may be used to address emerging and short-notice DMSMS issues. As the TDL upgrade brings additional capability to the B-52, emerging security requirements (JRE messaging, crypto modernization, etc.) as well as other aircraft upgrades may require study/support for potential impact to the CONNECT and TDL system. Funds may also be used for Engineering Development Models (EDMs) as well as testing and fielding terminals.

DMS efforts to include removal of end-of-life software/hardware within simulators systems and move to a modular, common open system architecture that is sustainable and cyber-resilient. Additionally, implementation requirements and standards are defined under the Simulator Common Architecture Requirements and Standards (SCARS) initiative.

Funds may be used to procure, test, and field terminals. DMS efforts to include removal of end-of-life software/hardware within simulators systems and move to a modular, common open system architecture that is sustainable and cyber-resilient. Implement requirements and standards defined under the Simulator Common Architecture Requirements and Standards (SCARS) initiative. Funds may be used to resolve emerging safety of flight and diminishing manufacturing sources issues, accommodate technology insertion and fulfill Federal Aviation Agency (FAA) or other mandates necessary to ensure continued aircrew safety and mission effectiveness. In order to maintain currency with the latest aircraft configuration, the B-52 Systems Improvements projects will update existing trainers or use Computer-Based Training (CBT) to add any new systems improvement functionality to meet user training requirements and update/maintain the Systems Integration Lab (SIL) for the Weapon System Trainers (WSTs).

Funds may be used to resolve emerging safety of flight and DMS issues, accommodate technology insertion, and fulfill FAA (or other) mandates necessary to ensure continued aircrew safety and mission effectiveness.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<b>Title:</b> Bomber Tactical Data Link	2.878	0.000	0.000	0.000	0.000

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons	<b>Project (Number/Name)</b> 675041 / Bomber Tactical Data Link
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**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p><b>Description:</b> The TDL will provide low latency, jam-resistant situation awareness and command/control needed to support in-theater operations/missions via a line-of-sight (LOS) Link 16 capability. The program will consist of integrating an existing off-the-shelf Link 16 terminal into the B-52. This will include Group A wiring, rack and antennae and the Group B terminal, blanking unit and notch filter LRUs. The terminals will be installed inside the fuselage of the aircraft and external antennas will be mounted on the fuselage. The TDL terminal and LOS capability will be integrated with the rest of the CONECT subsystem.</p> <p><b>FY 2021 Plans:</b> N/A</p> <p><b>FY 2022 Base Plans:</b> N/A</p> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> N/A</p>					
<b>Accomplishments/Planned Programs Subtotals</b>	2.878	0.000	0.000	0.000	0.000

**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• APAF 05 Line Item B05200: BP11 Production	11.934	11.164	25.841	-	25.841	-	-	-	-	-	-
• APAF 06 000999: Initial Spares	2.381	2.495	-	-	-	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

The Milestone Decision Authority (MDA) approved the 28 October 2016 decision of the B-52 TDL Acquisition Strategy Panel (ASP), which authorized the program to enter into the EMD phase with the Original Equipment Manufacturer (OEM).

MDA approved Acquisition Decision Memorandum (ADM) for revised Acquisition Program Baseline (APB) on 31 Jan 21. Objective and thresholds for Milestone C and Initial Operational Capability were updated, and removed the Full Rate Production (FRP) schedule parameter in the APB.



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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons	<b>Project (Number/Name)</b> 675041 / Bomber Tactical Data Link
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b><i>Bomber Tactical Data Link</i></b>	
EMD	
Milestone C	
Production and Install	
IOC	

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**Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / <i>B-52 Squadrons</i>	<b>Project (Number/Name)</b> 675041 / <i>Bomber Tactical Data Link</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Bomber Tactical Data Link</i></b>				
EMD	1	2020	2	2022
Milestone C	2	2022	2	2022
Production and Install	2	2022	4	2025
IOC	1	2024	1	2024



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons				<b>Project (Number/Name)</b> 675055 / GPS-IU			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
675055: GPS-IU	-	1.986	0.000	0.693	0.000	0.693	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

This program, BA 7, PE 0101113F, project 675055, Global Positioning System Interface Unit (GPS-IU), is a new start.

**A. Mission Description and Budget Item Justification**

Global Positioning System Interface Unit (GPS-IU) is considered an FY22 new start due to program schedule delays. The GPS-IU integrates GPS Position, Navigation and Timing (PNT) data into navigation, communications, and weapons systems on board the B-52. The GPS-IU acts as a controller for a MIL-STD-1553 data bus communications path. The major areas of support include GPS interface control and monitoring, targeting pod functions, navigation displays for the Pilot and Copilot stations, and Identification Friend or Foe (IFF) control functions.

Originally developed with a 33MHz processor with 4MB of Static Random Access Memory (SRAM), the GPS-IU has become overloaded as more software has been added to the B-52. Currently operating at 86 percent throughput capacity and at 90 percent memory capacity, exceeding the designated safety threshold of 95 percent memory load in 2019. The GPS-IU is also facing parts obsolescence issues. The upgrade will improve system reliability and address Diminishing Manufacturing Sources and Material Shortages (DMSMS) issues on subcomponents of the GPS-IU. The modified GPS-IU will retain the existing functions and interfaces of the legacy GPS-IU, and provide additional interfaces to allow for future growth requirements, including two Ethernet Ports and two connectors on the face-plate for future growth.

GPS-IU requires upgrading to incorporate any other GPS dependent capabilities on the B-52 platform. B-52 fleet will have the capability to carry additional GPS dependent weapons and targeting pods, and the increased capacity to incorporate future GPS-dependent capabilities beyond 2018.

The GPS-IU upgrade program will provide increased throughput and memory capacity by replacing the current GPS IU Line Replaceable Unit (LRU). The new LRU will contain the necessary associated electronics to allow for increased processor throughput, more memory, and sustainable electronic packages. The new LRU contains 7 Circuit Card Assemblies (CCA) which include a Backplane CCA, Front panel CCA, Power Supply CCA, Ethernet Switch CCA, Single Board Computer CCA with 1553/429 daughter card, Graphics card CCA and I/O CCA. The I/O card combines the functions of three of the legacy IU Circuit Cards (Discrete Inputs Analog, Audio Video (DAAV), Discrete Outputs (DOA) and Serial Busses functionality) The Backplane and Motherboard will require an upgrade to integrate these new CCAs. This upgrade will improve system reliability while also addressing Diminishing Manufacturing Sources and Material Shortages (DMSMS) issues that exists for the legacy GPS-IU.

Funds may be used to address emerging and short-notice DMSMS, Development Testing (DT)/ Operational Testing(OT) issues, resolving emerging safety of flight and diminishing manufacturing sources issues, accommodate technology insertion and fulfill Federal Aviation Agency (FAA) or other mandates necessary to ensure continued aircrew safety and mission effectiveness.

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons	<b>Project (Number/Name)</b> 675055 / GPS-IU
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DMS efforts to include removal of end-of-life software/hardware within simulators systems and move to a modular, common open system architecture that is sustainable and cyber-resilient. Implement requirements and standards defined under the Simulator Common Architecture Requirements and Standards (SCARS) initiative.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<b>Title:</b> Global Positioning System Interface Unit (GPS-IU)	1.986	0.000	0.693	0.000	0.693
<b>Description:</b> Global Positioning System (GPS) Interface Unit (IU) Upgrade will replace six circuit card assemblies in the GPS IU, the backplane, and the chassis.					
<b>FY 2021 Plans:</b> N/A					
<b>FY 2022 Base Plans:</b> FY22 funding will support continued EMD effort and test activities.					
<b>FY 2022 OCO Plans:</b> N/A					
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY22 increase supports EMD effort/test activities due to program schedule delay. No previous FY21 RDT&E funding.					
<b>Accomplishments/Planned Programs Subtotals</b>					
	1.986	0.000	0.693	0.000	0.693

**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• APAF 06 Line Item	6.730	12.014	0.000	-	0.000	-	-	-	-	-	-
B05200: BP11 Production											
• APAF 06 000999: Initial Spares	-	-	7.863	-	7.863	-	-	-	-	-	-

**Remarks**

FY20 funds supports Environmental and Laboratory System Integration Testing (LSIT) and developmental/operational flight test.

Due to late delivery of components for testing, the EMD schedule slipped approximately 16 months. Program re-baselined in 3QFY21.

**D. Acquisition Strategy**

The GPS-IU Modernization program began development in the Technology Maturation and Risk Reduction (TMRR) phase via a sole source contract to Boeing Defense, Space & Security (DSS) in Oklahoma City, OK. Program is currently in the EMD phase via a sole source contract to Boeing DSS, awarded 4QFY18. Deliverables include software, eight modernized prototypes, logistics support, ground and flight test support, and engineering drawings. Milestone B was approved June 2018.



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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons	<b>Project (Number/Name)</b> 675055 / GPS-IU
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>GPS-IU</b>																												
EMD																												
DT/OT																												
MS C																												
Production Contract Award																												
Production, Assy, & Installs																												
RAA/IOC																												
FOC																												

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / <i>B-52 Squadrons</i>	<b>Project (Number/Name)</b> 675055 / <i>GPS-IU</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>GPS-IU</i></b>				
EMD	1	2020	1	2023
DT/OT	3	2022	4	2022
MS C	4	2022	4	2022
Production Contract Award	1	2023	1	2023
Production, Assy, & Installs	1	2023	2	2025
RAA/IOC	2	2024	2	2024
FOC	2	2025	2	2025

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons				<b>Project (Number/Name)</b> 675056 / B-52 Radar Modernization Program (RMP)			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
675056: B-52 Radar Modernization Program (RMP)	-	93.702	157.792	162.862	0.000	162.862	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The B-52 Radar Modernization Program (RMP) supports nuclear and conventional operations by replacing the current APQ-166 radar on the B-52H aircraft. The APQ-166 system will be increasingly difficult to sustain due to diminished manufacturing sources and obsolescent technologies; the current failure rate of the APQ-166 places long-duration missions at risk. This modernization program will encompass the radar antenna array, 12 individual LRUs, radar control panel, radome, and Group A allocation that comprise the entire radar system. RMP will take advantage of advances in technology and on-going development efforts to acquire, to the maximum extent possible, previously developed Radar systems and integrate them into the B-52. The use of new technology will increase both the overall reliability of the radar system and the capabilities for new missions. RMP will allow the operational command (AF Global Strike Command) to fully utilize the capabilities of the B-52H aircraft to employ an array of nuclear and conventional weapons and to perform mission-essential navigation and weather avoidance functions. In addition, applicable training devices for the new radar subsystem must also be developed, modified and/or upgraded in conjunction with the aircraft modifications. This modification includes the installation of EMD kits on two B-52H test aircraft to support Developmental/Operational Test and Evaluation.

This upgrade will affect all three Weapon System Trainers (WST), the WST Training Systems Integration Laboratory (SIL), and both B-52H Offensive Station Maintenance Trainers (OSMTs), and the Bombing-Navigation System Maintenance Trainers (BNSMTs) in addition to an existing desktop trainer. This program also upgrades one B-52 SIL with radar functionality, and builds a new Radar Development Lab and a new Radar SIL. As the RMP upgrade brings additional capability to the B-52, it includes emerging security/certification requirements (nuclear certification, cyber security, program protection, simulator common standards, etc.) in addition to increased radar integration (advanced targeting pod, Combat Network Communication Technology (CONNECT), Tactical Data Link (TDL), offensive avionics system, GPS Integration Unit (GPS-IU) mission planning, modular open system architecture (MOSA) considerations, crew vehicle interfaces, Electronic Warfare System, and B-52 Software Block (BSB), etc). Funds may be used to address emerging and short-notice Diminishing Manufacturing Sources and Material Shortage (DMSMS) issues. DMSMS efforts to include removal of end-of-life/obsolete software/hardware within the weapons system, simulators systems, and MOSA implementation. Additionally, funds may be used to resolve emerging safety of flight mandates necessary to ensure continued aircrew safety and nuclear/conventional mission effectiveness.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<b>Title:</b> Radar Modernization Program	93.702	157.792	162.862	0.000	162.862
<b>Description:</b> Support nuclear and conventional operations by replacing the current APQ-166 radar on the B-52H aircraft. Development and production of new systems to replace the legacy equipment and to be installed on all 76 B-52H aircraft.					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons	<b>Project (Number/Name)</b> 675056 / B-52 Radar Modernization Program (RMP)

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<p><b><i>FY 2021 Plans:</i></b> Preliminary Design Review (PDR) accomplished in 1QFY21. Program will continue integration/technical design with OEM and subcontractors, Milestone B, and EMD contract award in mid-FY21 followed by preparations for weapon system level Critical Design Review (CDR) in early FY22.</p> <p><b><i>FY 2022 Base Plans:</i></b> Continue preparing for and conduct weapon system level CDR in early FY22 followed by fabrication, qualification, and delivery of subsystem lab/aircraft kits; software code development/integration; installation/checkout of subsystems in B-52 System Integration Lab (SIL); and preparations for aircraft kit installation on the first of two test jets beginning in late FY22/early FY23 timeframe.</p> <p><b><i>FY 2022 OCO Plans:</i></b> NA</p> <p><b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> Increase in FY22 over FY21 due to ramp-up in EMD efforts to accomplish CDR. FY22 will continue to support manpower staffing build up through system CDR, lab/aircraft kit purchases, and follow-on hardware/software integration activities in preparation for test jet installation by late FY22/early FY23 timeframe</p>					
<b>Accomplishments/Planned Programs Subtotals</b>	93.702	157.792	162.862	0.000	162.862

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• APAF 05 Lineltem B05200: BP11 Production	0.000	0.000	0.000	-	0.000	-	-	-	-	-	-
• APAF 07 Line Item B05200: Post Production Support	0.000	0.098	0.000	-	0.000	-	-	-	-	-	-
• APAF 06 000999: Initial Spares	0.118	0.197	0.000	-	0.000	-	-	-	-	-	-
<b>Remarks</b> FY22 funding for B-52 RMP is \$172.058M: RMP BPAC 675056 (\$162.862M) and Crypto Mod BPAC 675160 (\$9.196M).											

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / <i>B-52 Squadrons</i>	<b>Project (Number/Name)</b> 675056 / <i>B-52 Radar Modernization Program (RMP)</i>

**D. Acquisition Strategy**

The Milestone Decision Authority approved the B-52 RMP Acquisition Strategy (AS) on 13 March 2018. Per the AS, the OEM completed radar and other supplier selections in June 2019. The OEM is executing ongoing contract work with the subsystem suppliers, integration, acquisition planning, and risk reduction activities leading to a completion of system PDR in 1QFY21 followed by Milestone B and EMD contract award in 3QFY21.



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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons	<b>Project (Number/Name)</b> 675056 / B-52 Radar Modernization Program (RMP)
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<b>Product Development (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Product Development	C/CPAF	Not specified. : TBD	-	0.000	Jul 2020	64.408	Jun 2021	129.660	Dec 2021	-		129.660	-	-	-
Risk Reduction	C/CPAF	Not specified. : TBD	-	78.342	Mar 2020	73.951	Jan 2021	13.600	Dec 2021	-		13.600	-	-	-
<b>Subtotal</b>			-	78.342		138.359		143.260		-		143.260	-	-	N/A

**Remarks**  
FY 2021 Cost has been reduced from \$84.851 million to \$73.951 million to account for a \$10.900 million Congressional mark.

<b>Support (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Support	C/CPAF	Not specified. : TBD	-	1.249	Mar 2020	-		-		-		-	-	-	-
<b>Subtotal</b>			-	1.249		-		-		-		-	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Test and Evaluation	C/CPAF	Not specified. : TBD	-	-		4.605	Jan 2021	2.094	Dec 2021	-		2.094	-	-	-
Test RMP BPAC 675056	C/CPAF	Not specified. : TBD	-	0.300	Mar 2020	0.406	Feb 2021	0.500	Dec 2021	-		0.500	-	-	-
Studies RMP Development	C/CPAF	Not specified. : TBD	-	0.555	Mar 2020	1.800	Mar 2021	-		-		-	-	-	-
<b>Subtotal</b>			-	0.855		6.811		2.594		-		2.594	-	-	N/A

<b>Management Services (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Management Services	C/CPAF	Not specified. : TBD	-	0.000	Mar 2020	-		-		-		-	-	-	-
Management Support, A&AS, PMA	Various	Not specified. : TBD	-	7.443	Mar 2020	5.127	Mar 2021	17.008	Dec 2021	-		17.008	-	-	-



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Air Force</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons	<b>Project (Number/Name)</b> 675056 / B-52 Radar Modernization Program (RMP)

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b><i>Radar Modernization Program</i></b>																												
Risk Reduction																												
MS B																												
EMD																												
Developmental Testing																												
MS-C																												
Production Installs																												
IOC																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / <i>B-52 Squadrons</i>	<b>Project (Number/Name)</b> 675056 / <i>B-52 Radar Modernization Program (RMP)</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Radar Modernization Program</i></b>				
Risk Reduction	1	2020	3	2021
MS B	3	2021	3	2021
EMD	3	2021	4	2025
Developmental Testing	1	2023	1	2025
MS-C	4	2024	4	2024
Production Installs	1	2026	4	2026
IOC	4	2026	4	2026

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons	<b>Project (Number/Name)</b> 675057 / B-52 Low Cost Improvement (LCI)
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
675057: B-52 Low Cost Improvement (LCI)	-	2.607	2.600	0.058	0.000	0.058	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

This program will include projects to facilitate future B-52 capabilities. Scope of work may involve, but is not limited to, Avionics, Navigation, Situational Awareness (SA) and Defensive Systems. Additionally, develop and integrate emerging technologies for specialized B-52 missions to include Intelligence Surveillance and Reconnaissance (ISR), Targeting and Weapons. Additionally, this funding also includes future prototyping efforts, DMS efforts to include removal of end-of-life software/hardware within simulators systems and move to a modular, and common open system architecture that is sustainable and cyber-resilient. Additionally, implementation requirements and standards are defined under the Simulator Common Architecture Requirements and Standards (SCARS) initiative. Funds may be used to address emerging and short-notice DMSMS issues. Funds may be used to resolve emerging safety of flight and DMS issues, accommodate technology insertion, and fulfill Federal Aviation Agency (FAA) or other mandates necessary to ensure continued aircrew safety and mission effectiveness.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<b>Title:</b> B-52 Low Cost Improvements	2.607	2.600	0.058	0.000	0.058
<p><b>Description:</b> Develop and integrate emerging technologies for specialized B-52 missions to include ISR, targeting, and weapons. This includes performing demonstrations and experimentation of emerging and advanced technologies, as well as supporting external agency projects of the technology in a relevant environment.</p> <p><b>FY 2021 Plans:</b> FY21 activities supported emerging and advanced technologies to include the government-developed Bomber Modular Data Acquisition System used to capture/record aircraft bus parameters, analog signals, discrete signals, and videos from cockpit displays and over the shoulder cameras.</p> <p><b>FY 2022 Base Plans:</b> Develop and integrate emerging technologies for specialized B-52 missions to include ISR, targeting, and weapons. This includes performing demonstrations and experimentation of emerging and advanced technologies, as well as supporting external agency projects of the technology in a relevant environment.</p> <p><b>FY 2022 OCO Plans:</b> NA</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b></p>					

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons	<b>Project (Number/Name)</b> 675057 / B-52 Low Cost Improvement (LCI)
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Funds reduced to support higher B-52 priorities.					
<b>Accomplishments/Planned Programs Subtotals</b>	2.607	2.600	0.058	0.000	0.058

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• APAF 05 Line item B05200: BP11 Production	2.412	2.457	8.925	-	8.925	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**  
Studies and analyses will be conducted by various Air Force Life Cycle Management Center and Air Force Global Strike Command organizations.



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Air Force</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons	<b>Project (Number/Name)</b> 675057 / B-52 Low Cost Improvement (LCI)

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>Low Cost Improvements</b>	
Low Cost Improvements Studies and Analyses	



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / <i>B-52 Squadrons</i>	<b>Project (Number/Name)</b> 675057 / <i>B-52 Low Cost Improvement (LCI)</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>Low Cost Improvements</b>				
Low Cost Improvements Studies and Analyses	2	2021	4	2026

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0101113F / <i>B-52 Squadrons</i>				<b>Project (Number/Name)</b> 675129 / <i>B-52 CERP</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
675129: <i>B-52 CERP</i>	-	175.359	273.020	484.068	0.000	484.068	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

B-52 Commercial Engine Replacement Program (CERP) name was revised to B-52 CERP Rapid Virtual Prototyping (RVP) to differentiate from the future MTA effort as outlined in the program's acquisition strategy.

**A. Mission Description and Budget Item Justification**

The B-52 Commercial Engine Replacement Program (CERP) supports nuclear and conventional operations by replacing the current TF33-PW-103 engine on the B-52H aircraft. The TF33-PW-103 engine is increasingly difficult to sustain due to diminished manufacturing sources and obsolescent technologies; the AF Propulsion Directorate projects the engine will become unsustainable by 2030. This sustainment program will replace the current TF33-PW-103 engine with jet engines of similar size, weight, and thrust characteristics. The development, production and installation of new engines and related subsystems will replace the legacy equipment on all 76 B-52H aircraft. B-52 CERP will take advantage of advances in technology and on-going development efforts to acquire engines and integrate them into the B-52. The use of new technology will increase both the overall reliability/maintainability of the propulsion system and produce additional electrical power generation capabilities for emerging requirements. The B-52 CERP will allow the operational command (Air Force Global Strike Command) to fully utilize the capabilities of the B-52H aircraft to employ an array of nuclear and conventional weapons while saving fuel and extending the range/loiter capabilities of the aircraft. In addition, applicable training devices for the engine throttles and engine health monitoring subsystem must also be developed, modified and/or upgraded in conjunction with the aircraft modifications. This upgrade will also require corresponding modification of the Weapon System Trainers (WST). As B-52 CERP brings additional capability to the B-52, emerging security/certification requirements (nuclear hardening, cyber security, program protection, etc.) will also need to be addressed. Several concurrent aircraft upgrades during the CERP may necessitate the construction of facilities or facility upgrades/modification. In addition, it may necessitate studies be performed to determine optimal engine installation and deployment options.

Additionally, funds will be used to procure long lead components for test aircraft to include engines and all components require to install on rapid prototype aircraft.

Cost includes any other analysis or documentation and related expenses necessary to establish a program of record and support the B-52 Weapon System. Cost includes Program Management Administration (PMA) costs, centralized support and initiatives for anticipated weapon system enhancements, to include efforts to improve weapon system operational capabilities, safety, supportability, maintainability, reliability, and total cost of ownership.

Funds may be used to resolve emerging safety of flight and diminishing manufacturing sources issues, accommodate technology insertion and fulfill Federal Aviation Agency (FAA) or other mandates necessary to ensure continued aircrew safety and mission effectiveness.

DMS efforts to include removal of end-of-life software/hardware within simulators systems and move to a modular, common open system architecture that is sustainable and cyber-resilient. Implement requirements and standards defined under the Simulator Common Architecture Requirements and Standards (SCARS) initiative.

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons	<b>Project (Number/Name)</b> 675129 / B-52 CERP
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BY (FY22) funding totals include 484.068M requested for the Pacific Defense Initiative.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p><b>Title:</b> B-52 CERP</p> <p><b>Description:</b> This sustainment program will replace the current TF33-PW-103 engine with jet engines of similar size, weight, and thrust characteristics. The development, production and installation of new engines and related subsystems will replace the legacy equipment on all 76 B-52H aircraft. B-52 CERP will take advantage of advances in technology and on-going development efforts to acquire engines and integrate them into the B-52.</p> <p><b>FY 2021 Plans:</b> Continue CERP RVP, Rapid Prototyping Phase 1 efforts, selection of the engine vendor, and Virtual System Prototype Increment 1 delivery.</p> <p><b>FY 2022 Base Plans:</b> Continue CERP RVP, Rapid Prototype Phase 1 toward delivery of Virtual System Prototype (VSP) Increment 2. Begin CERP Rapid Physical Prototyping (RPP), award Rapid Prototype Phase 2 contract, transitioning the VSP to physical prototypes.</p> <p><b>FY 2022 OCO Plans:</b> NA</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase from FY21 to FY22 due to Rapid Prototype Phase 2 contract, engine contract, and long lead components for two prototype aircraft.</p>	175.359	273.020	484.068	0.000	484.068
<b>Accomplishments/Planned Programs Subtotals</b>	175.359	273.020	484.068	0.000	484.068

**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• APAF 05 0101113F: B-52 SQUADRONS	-	-	-	-	-	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

Acquisition strategy and FY16 NDAA Middle Tier of Acquisition (MTA) Section 804 authority approved Sept 2018. B-52 CERP has two planned MTA efforts: Rapid Virtual Prototyping (RVP) and Rapid Physical Prototyping (RPP). CERP RVP includes risk reduction activities and executing Rapid Prototyping Phase 1 (RP1) activities. RP1 is sole source prototype aircraft development with the aircraft integrator (Boeing). Competitive engine selection is government led and the engine vendor is a

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b>	<b>R-1 Program Element (Number/Name)</b>	<b>Project (Number/Name)</b>
3600 / 7	PE 0101113F / <i>B-52 Squadrons</i>	675129 / <i>B-52 CERP</i>

directed sub-contractor. Engines are government furnished material (GFM) to Boeing. CERP RVP delivers the Virtual System Prototypes. CERP RPP includes the follow-on Rapid Prototype Phase 2 (RP2) contract with Boeing for physical prototyping efforts, which delivers two prototype aircraft.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons	<b>Project (Number/Name)</b> 675129 / B-52 CERP
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Systems Improvements Studies and Analysis	SS/ Various	The Boeing Co : Oklahoma City, OK	-	0.110	Feb 2020	-		-		-		-	-	-	-
Rapid Prototyping Phase 1 Contract Award	SS/CPIF	The Boeing Co : Oklahoma City, OK	-	114.153	Feb 2020	151.231	Feb 2021	142.940	Jan 2022	-		142.940	-	-	-
Engine Contract Award	C/FFP	TBD : TBD, OK	-	-		5.700	Jun 2021	30.694	Mar 2022	-		30.694	-	-	-
Rapid Prototyping Material	SS/CPIF	The Boeing Co : Oklahoma City, OK	-	-		55.016	Mar 2021	244.432	Jan 2022	-		244.432	-	-	-
Rapid Prototyping Phase 2 Contract Award	SS/CPIF	The Boeing Co : Oklahoma City, OK	-	-		-		19.736	Mar 2022	-		19.736	-	-	-
<b>Subtotal</b>			-	114.263		211.947		437.802		-		437.802	-	-	N/A

<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Documentation - Technical Support	MIPR	Booz Allen Hamilton : OKC, OK	-	3.034	Jul 2020	4.271	May 2021	3.820	Jun 2022	-		3.820	-	-	-
SIBR/FFRDC	Allot	Not specified. : TBD	-	7.287	Mar 2020	7.541	Jan 2021	16.052	Jan 2022	-		16.052	-	-	-
Reprogramming	Allot	Not specified. : TBD	-	34.000	Jul 2020	-		-		-		-	-	-	-
<b>Subtotal</b>			-	44.321		11.812		19.872		-		19.872	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Edwards AFTC	PO	Edwards AFB : Edwards AFB, CA	-	1.960	Feb 2020	12.500	Feb 2021	7.616	Jan 2023	-		7.616	-	-	-
Mock Up A/C and AMARG	PO	AMARG : Tuscon/ Wichita	-	1.620	Aug 2020	1.000	May 2021	0.500		-		0.500	-	-	-
96th Test Wing	PO	SEEK EAGLE : Eglin AFB, FL	-	0.119	May 2020	-		0.325	Oct 2021	-		0.325	-	-	-



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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / <i>B-52 Squadrons</i>	<b>Project (Number/Name)</b> 675129 / <i>B-52 CERP</i>
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b><i>B-52 CERP</i></b>																												
System Requirement Phase																												
Virtual Power Pod Prototype																												
Prototype Development Phase 1																												
Virtual System Prototype Increment 1																												
Prototype Development Phase 2																												
Virtual System Prototype Increment 2																												
Physical System Prototype 1																												
Physical System Prototype 2																												

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / <i>B-52 Squadrons</i>	<b>Project (Number/Name)</b> 675129 / <i>B-52 CERP</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>B-52 CERP</i></b>				
System Requirement Phase	1	2020	4	2020
Virtual Power Pod Prototype	1	2020	1	2020
Prototype Development Phase 1	2	2020	2	2022
Virtual System Prototype Increment 1	4	2021	4	2021
Prototype Development Phase 2	3	2022	4	2026
Virtual System Prototype Increment 2	2	2022	2	2022
Physical System Prototype 1	2	2025	2	2025
Physical System Prototype 2	3	2025	3	2025



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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0101113F / B-52 Squadrons				Project (Number/Name) 675160 / B-52 Crypto Modernization			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
675160: B-52 Crypto Modernization	-	0.000	4.509	17.453	0.000	17.453	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

Upgrades aircraft with Mobile User Objective System (MUOS) capable ARC-210 radio systems to prevent loss of beyond line of sight (BLOS) voice and data communications capability. The program will ensure the B-52 meets National Security Agency (NSA) mandates and DoD mandates and directives.

In order to maintain currency with the latest aircraft configuration, the B-52 Systems Improvements projects will update existing trainers or use Computer-Based Training (CBT) to add any new systems improvement functionality to meet user training requirements and update/maintain the Systems Integration Lab (SIL) for the Weapon System Trainers (WSTs).

Funds may be used to resolve emerging safety of flight and short-notice diminishing manufacturing and material shortage (DMSMS) source issues, improve related communications systems, modify the SIL to update to the current configuration, accommodate technology insertion and fulfill Federal Aviation Administration (FAA) or other mandates necessary to ensure continued aircrew safety and mission effectiveness.

DMS efforts to include removal of end-of-life software/hardware within simulators systems and move to a modular, common open system architecture that is sustainable and cyber-resilient. Implement requirements and standards defined under the Simulator Common Architecture Requirements and Standards (SCARS) initiative.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<b>Title:</b> B-52 Crypto Modernization	0.000	4.509	8.257	0.000	8.257
<b>Description:</b> Upgrades aircraft with MUOS capable ARC-210 radio systems to prevent loss of BLOS voice and data communications capability.					
<b>FY 2021 Plans:</b> Continue EMD contract efforts that include finishing the SIL build, IQT, FQT, and parts ordering for EMD aircraft mods.					
<b>FY 2022 Base Plans:</b> Crypto Modernization Program: Continue EMD phase to support DT/OT and MS-C documentation creation. Accomplish A/C mod #1 (2QFY22), DT/OT (4QFY22), and A/C mod #2 (4QFY22).					
<b>FY 2022 OCO Plans:</b>					

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons	<b>Project (Number/Name)</b> 675160 / B-52 Crypto Modernization
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
NA					
<b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> Funding increase from FY21 to FY22 due to ramp up in Engineering and Manufacturing Development(EMD) effort beginning with test aircraft modification, followed by completion of developmental and operational testing (DT/OT) to support Milestone C decision.					
<b><i>Title:</i></b> B-52 Radar Modernization Program	-	0.000	9.196	0.000	9.196
<b><i>Description:</i></b> Radar Modernization Program (RMP): Product Development and Integration - Continue software code development/integration; installation/checkout of sub-systems in B-52 System Integration Lab (SIL) for the B-52 RMP. FY22 funding of \$9.196M to be awarded Jan 2022.					
<b><i>FY 2021 Plans:</i></b> N/A					
<b><i>FY 2022 Base Plans:</i></b> Radar Modernization Program (RMP): Product Development and Integration - Continue software code development/integration; installation/checkout of sub-systems in B-52 System Integration Lab (SIL) for the B-52 RMP. FY22 funding of \$9.196M to be awarded Jan 2022.					
<b><i>FY 2022 OCO Plans:</i></b> N/A					
<b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> N/A					
<b>Accomplishments/Planned Programs Subtotals</b>	0.000	4.509	17.453	0.000	17.453

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• APAF 05 Line item B05200: BP11 Production	0.000	0.000	3.452	0.000	3.452	-	-	-	-	-	-
<b>Remarks</b> EMD contract awarded Dec 2018. EMD Contract re-baselined Mar 2020											

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force Date: May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / <i>B-52 Squadrons</i>	<b>Project (Number/Name)</b> 675160 / <i>B-52 Crypto Modernization</i>
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**D. Acquisition Strategy**

The Milestone Decision Authority (MDA) approved the 31 January 2018 decision of the B-52 Crypto Modernization Acquisition Strategy Panel (ASP), which authorized the program to enter into the EMD phase with the Original Equipment Manufacturer (OEM). The program office awarded a contract to the OEM on 20 December 2018. EMD efforts are underway and scheduled to be complete by FY23. Once complete, the program office will brief the updated ASP and Milestone C for production and fielding for approval from the MDA.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons	<b>Project (Number/Name)</b> 675160 / B-52 Crypto Modernization
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<b>Product Development (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Crypto Modernization: Development and Integration Activities	SS/CPIF	OEM : OKC, OK	-	0.000		1.587	Mar 2021	6.312	Jan 2022	-		6.312	-	-	-
Radar Modernization Program: Product Development and Integration	SS/CPIF	OEM : TBD	-	-		-		9.196	Jan 2022	-		9.196	-	-	-
<b>Subtotal</b>			-	0.000		1.587		15.508		-		15.508	-	-	N/A

**Remarks**  
Radar Modernization Program (RMP): Product Development and Integration - Continue software code development/integration; installation/checkout of subsystems in B-52 System Integration Lab (SIL) for the B-52 Radar Modernization Program. \$9.428M to be awarded Jan 2022.

<b>Support (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Program Administration	MIPR	Not specified. : TBD	-	0.000		1.000	May 2021	0.545	May 2022	0.000		0.545	-	-	-
<b>Subtotal</b>			-	0.000		1.000		0.545		0.000		0.545	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Test Support	PO	Various : TBD	-	-		1.792	Mar 2021	1.300	Feb 2022	-		1.300	-	-	-
<b>Subtotal</b>			-	-		1.792		1.300		-		1.300	-	-	N/A

<b>Management Services (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Travel	Various	Not specified. : TBD	-	-		0.130	Jan 2021	0.100	Jan 2022	-		0.100	-	-	-



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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / <i>B-52 Squadrons</i>	<b>Project (Number/Name)</b> 675160 / <i>B-52 Crypto Modernization</i>
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
<b><i>Crypto Modernization</i></b>																													
EMD																													
PDR																													
CDR																													
IQT/FQT																													
DT/OT																													
MS C																													

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / <i>B-52 Squadrons</i>	<b>Project (Number/Name)</b> 675160 / <i>B-52 Crypto Modernization</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Crypto Modernization</i></b>				
EMD	1	2020	1	2023
PDR	1	2020	1	2020
CDR	4	2020	4	2020
IQT/FQT	3	2021	3	2021
DT/OT	2	2022	4	2022
MS C	1	2023	1	2023

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons				<b>Project (Number/Name)</b> 675165 / B-52 Quad Crew			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
675165: B-52 Quad Crew	-	0.000	0.000	10.203	0.000	10.203	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

Establish risk reduction activity to support B-52 Quad Crew aircraft and subsystems development and integration effort. Risk reduction efforts includes ALQ-172 subsystem associated associated aircraft integration to move functionality to the B-52 navigator crew stations.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<b>Title:</b> B-52 Quad Crew	0.000	0.000	10.203	0.000	10.203
<b>Description:</b> The B-52 Quad Crew effort transitions Electronic Warfare display functionality to the existing B-52 navigator stations, reducing the aircrew from five to four crew members.					
<b>FY 2021 Plans:</b> NA					
<b>FY 2022 Base Plans:</b> Establish risk reduction activity to support B-52 Quad Crew aircraft and subsystems development and integration effort. Risk reduction efforts includes ALQ-172 subsystem associated aircraft integration to move functionality to the B-52 navigator crew stations					
<b>FY 2022 OCO Plans:</b> NA					
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY22 New Start					
<b>Accomplishments/Planned Programs Subtotals</b>	0.000	0.000	10.203	0.000	10.203

**C. Other Program Funding Summary (\$ in Millions)**

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• APAF 06 0101113F: B-52 SQUADRONS	-	-	-	-	-	-	-	-	-		

**Remarks**



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / <i>B-52 Squadrons</i>	<b>Project (Number/Name)</b> 675165 / <i>B-52 Quad Crew</i>

**D. Acquisition Strategy**

The Milestone Decision Authority (MDA) for B-52 Quad Crew is AFLCMC/WB and the program will utilize the B-1/B-52 Flexible Acquisition and Sustainment Contract to award studies and development effort to the Original Equipment Manufacturer. Additionally, the program will also utilize existing sustainment contracts for studies and development ALQ-172 functionally to support the transition to the B-52 Quad Crew. The OEM will be responsible for the of the integration of the ALQ-172 which will be provided as Government Furnished Equipment.



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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force Date: May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / B-52 Squadrons	<b>Project (Number/Name)</b> 675165 / B-52 Quad Crew
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>QUAD CREW</b>																												
EMD																												
MS B																												
MS C																												
Production																												

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101113F / <i>B-52 Squadrons</i>	<b>Project (Number/Name)</b> 675165 / <i>B-52 Quad Crew</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>QUAD CREW</b>				
EMD	2	2022	2	2024
MS B	2	2022	2	2022
MS C	2	2024	2	2024
Production	3	2024	4	2026

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0101122F / <i>Air-Launched Cruise Missile (ALCM)</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	10.116	1.430	0.453	0.000	0.453	-	-	-	-	-	-
674797: <i>ALCM Upgrades</i>	-	10.116	1.430	0.453	0.000	0.453	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

The AGM-86B, Air Launched Cruise Missile (ALCM), is a subsonic, air-to-surface strategic nuclear missile, operational since 1982. Armed with a W-80 warhead, it is designed to evade air and ground-based defenses in order to strike targets at any location within any enemy's territory. The ALCM is designed for B-52H internal and external carriage.

RDT&E funds support development of new tests and evaluation procedures, software, and equipment. RDT&E funds also provide sustainment solutions for Line Replaceable Units (LRU) and technology insertion to ensure ALCM sustainability supports Air Force strategic nuclear deterrence and Global Strike mission requirements through 2030. Additionally, RDT&E funds support aging and surveillance analysis to pro-actively identify components which will degrade system reliability.

The ALCM Test Plan Development and Evaluation program develops plans and procedures for testing nuclear systems, and implements those procedures as directed by the Chairman, Joint Chiefs of Staff (CJCS) and to satisfy the recurring requirements to test Chemical, Biological, Radiological, and Nuclear (CBRN) susceptibility.

An extensive Service Life Extension Program (SLEP) is in place to address age related issues and to ensure reliability and sustainability through 2030. Technology insertion is anticipated to address serviceability of components at or near end of life.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development	<b>R-1 Program Element (Number/Name)</b> PE 0101122F I Air-Launched Cruise Missile (ALCM)
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<b>B. Program Change Summary (\$ in Millions)</b>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>
Previous President's Budget	10.217	1.433	0.459	0.000	0.459
Current President's Budget	10.116	1.430	0.453	0.000	0.453
Total Adjustments	-0.101	-0.003	-0.006	0.000	-0.006
• Congressional General Reductions	-0.101	-0.003			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-0.006	0.000	-0.006

**Change Summary Explanation**

No Significant Changes

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>
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<b>Title:</b> Inertial Navigation Element (INE)	1.057	1.200	0.000
<b>Description:</b> Conducting analysis and engineering efforts to ensure short and long term supportability of the ALCM Inertial Navigation Element (INE).			
<b>FY 2021 Plans:</b> The need for more rigorous qualification testing was highlighted in the test planning for INE. FY21 efforts will complete planning and execution of INE qualification testing.			
<b>FY 2022 Plans:</b> N/A			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Development and testing - including qualification testing -- completes with FY21 funding. Therefore INE RDT&E decreases in FY22.			
<b>Title:</b> ALCM Test Plan Development and Evaluation	9.059	0.230	0.453
<b>Description:</b> Develop test procedures to implement CJCS-directed requirement for Electromagnetic (EM) testing for nuclear systems.			
<b>FY 2021 Plans:</b>			

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0101122F / <i>Air-Launched Cruise Missile (ALCM)</i>
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Execute Neutron Test in support of ALCM Chemical Biological Radiological and Neutron (CBRN) Survivability Requirement IAW AFI 10-2607  <b>FY 2022 Plans:</b> Support test plan development for future CBRN testing  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> INE program completes in FY21; remaining funds for CBRN testing and future development information to support ALCM through 2030.			
<b>Accomplishments/Planned Programs Subtotals</b>	10.116	1.430	0.453

<b>D. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• MPAF 03 Line Item MALCBG: <i>ALCM, Missile Modifications</i>	77.387	80.837	83.498	-	83.498	-	-	-	-	-	-
• MPAF 04 Line Item MALCBG: <i>ALCM, Replenishment Spares</i>	2.321	2.359	2.407	-	2.407	-	-	-	-	-	-
• OPAF 03 Line Item MALCBG: <i>ALCM, Electronics &amp; Telecommunications Equipment (BP83)</i>	1.806	1.840	1.873	-	1.873	-	-	-	-	-	-
• MPAF 04 Line Item 999/Replen Spa...: <i>ALCM, Initial Spares</i>	0.119	0.328	0.435	-	0.435	-	-	-	-	-	-

**Remarks**

**E. Acquisition Strategy**

Previously, the Air Launched Cruise Missile (ALCM) was assessed in the nuclear environment for Chemical, Biological, Radiological and Nuclear (CBRN) Survivability for High Altitude Electromagnetic Pulse (HEMP) and Total Ionizing Dose at White Sands Missile Range (WSMR).

Follow-on test development will assess the neutron and gamma component in the nuclear environment for CBRN survivability. Test development and execution will utilize organic and contractor agencies.

INE SLEP plans for a three phase reliability assessment with comprehensive plan to address short and long term supportability.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0101122F / <i>Air-Launched Cruise Missile (ALCM)</i>	
Phase 1 - Short-term parts shortage mitigation analyses with Tomahawk Reference Measuring Unit and Computer Phase 2 - Definition of scope of efforts and establishing the manufacturing methodology Phase 3 - Delivery of working engineering samples, certification of production, and production of INE's equal to the function and reliability of 'like new' devices		



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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101122F / Air-Launched Cruise Missile (ALCM)	<b>Project (Number/Name)</b> 674797 / ALCM Upgrades
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<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
INE Prototype	SS/ Various	NG : UT	-	1.057	Jan 2020	1.200	Jun 2021	-		-		-	-	-	-
CBRN Test Plan Development & Evaluation	Various	WSMR, Boeing : NV	-	0.810	Dec 2019	0.000		0.333	Mar 2022	-		0.333	-	-	-
<b>Subtotal</b>			-	1.867		1.200		0.333		-		0.333	-	-	N/A

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Management and Engineering Services for research, development, test and evaluation on ALCM	C/CPAF	Not specified. : TBD	-	8.229		0.210	Jul 2021	0.100	Jul 2022	-		0.100	-	-	-
PMA - Government Costs	Various	Various : Various	-	0.020		0.020	Jun 2021	0.020	Jun 2022	-		0.020	-	-	-
<b>Subtotal</b>			-	8.249		0.230		0.120		-		0.120	-	-	N/A

**Remarks**  
Test Development and Evaluation PMA is for Supplies and Travel in support of project number 674797

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	-	10.116	1.430	0.453	-	0.453	-	-	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Air Force</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101122F / <i>Air-Launched Cruise Missile (ALCM)</i>	<b>Project (Number/Name)</b> 674797 / <i>ALCM Upgrades</i>

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>INE Sustainment</b>																												
INE CCA Development																												
<b>CBRN Test</b>																												
CBRN Test Plan Development																												
CBRN Test Execution																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101122F / <i>Air-Launched Cruise Missile (ALCM)</i>	<b>Project (Number/Name)</b> 674797 / <i>ALCM Upgrades</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>INE Sustainment</b>				
INE CCA Development	1	2020	3	2021
<b>CBRN Test</b>				
CBRN Test Plan Development	1	2020	4	2026
CBRN Test Execution	1	2020	4	2026

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0101126F / B-1B Squadrons
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	1.000	15.737	29.127	0.000	29.127	-	-	-	-	-	-
675344: <i>B-1B Modernization</i>	-	1.000	15.737	29.127	0.000	29.127	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Note**

This program, BA 7, PE 0101126F, project 675344, B-1 AFMC Test Assets, is a new start.

**A. Mission Description and Budget Item Justification**

The B-1B Lancer is a swing-wing, supersonic, long-range conventional bomber. It carries the largest payload of both guided and unguided weapons in the AF inventory. The multi-mission B-1B is the backbone of America's long-range conventional bomber force and can rapidly deliver massive quantities of precision (and non-precision) weapons against any adversary, anywhere in the world, at any time.

The B-1B modernization projects alleviate aircraft obsolescence issues due to Diminishing Manufacturing Sources (DMS) while at the same time providing improved capabilities to the B-1B weapon system that require significant hardware and software development and testing.

The Fiscal Year (FY) 2021 President's Budget retired 17 B-1B aircraft, bringing the total aircraft inventory to 45. No further divestment planned in FY22.

**RADIO CRYPTO COMPLIANCE:**

The B-1B Radio Crypto Compliance requirements, P-3A 92316, originate from JROCM 040-11, VACM Cease Key CED-026-11, UHF SATCOM (Ultra-high frequency Satellite Communication ) Decommission and Cease Key for DAMA (Demand Assigned Multi Access) Orderwire, HALF QUICK II Cease use date, and DoD Chief Information Officer (CIO) Mobile User Objective System (MUOS) transition directive. Requirements must be met to ensure B-1B maintains secure line of sight, beyond line of sight, and anti-jam communication with ground and air forces. The initiative will replace the existing ARC-210 RT-1797 and ARC-210 RT-1851 with common ARC-210 next generation radios. The program will ensure the B-1B fleet meets National Security Agency (NSA) mandates and DoD mandates and directives as soon as possible with the minimum amount of hardware installs. Additionally, the program will provide MUOS capability. This modification includes procurements of 41 aircraft kits + 4 EMD kits that will be installed in conjunction with organic/intermediate maintenance.

**MULTIFUNCTIONAL INFORMATION DISTRIBUTION SYSTEM (MIDS) - JOINT TACTICAL RADIO SYSTEMS (JTRS):**

The B-1B MIDS-JTRS program replaces the existing MIDS Low Volume Terminal (LVT) 1 Link 16 terminal to meet NSA Crypto Modernization (CM) Device Cease Key and Federal Aviation Administration/National Telecommunications and Information Administration (FAA/NTIA) Frequency Remap mandates, as well as DoD Link 16 mandate that also coincides with the 2022 NSA mandate. Current systems become non-compliant in 2022, resulting in B-1B degraded and reduced communication capabilities. MIDS-JTRS resolves all LVT 1 deficiencies and adds substantial combat capability enhancements to Link 16 Enhanced Throughput (LET) and Concurrent Multi-Netting (CMN-4) with Concurrent Retention Receive (CRR). MIDS-JTRS also provides multi-data link capability, improving situational awareness and allowing rapid

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0101126F / B-1B Squadrons	
<p>in-flight re-targeting in a cooperative combat environment. Funds are included to accommodate DoT/DoD-approved Frequency Remap and Crypto Modernization Device Cease mandates as outlined in previous AF and DoD budget exhibits. MIDS-JTRS implementation includes hardware, software, and wiring updates, including, but not limited to, additional J-messages capability and Ethernet.</p> <p><b>B-1 AFMC TEST ASSETS:</b> This project is a New Start. The B-1 AFMC Test Assets project will provide funding for the test aircraft, manpower, and facilities at the Air Force Test Center located at Edwards Air Force Base (AFB), California. This project will support the developmental testing and sustainment needs of the B-1 weapon system. Funds support Programmed Depot Maintenance (PDM) for one test aircraft (A/C 85-0075), which is performed at Tinker AFB, Oklahoma. Funds support any analysis, documentation, and related activities necessary to establish a program of record and support the B-1 weapon system. Additionally, other costs include PMA and centralized support and initiatives for anticipated weapon system enhancements (to include efforts to improve weapon system operational capabilities, safety, supportability, maintainability, reliability, and total cost of ownership).</p> <p><b>BOMB RACK UNIT 56 (BRU-56):</b> The BRU-56 upgrade was meant to mitigate a safety risk present within the legacy BRU-56 ejector rack, as well as add increased carriage capability. No mishaps has occurred since the Class A mishap in 2003 and Class C mishap in 2010. In FY 2021, BRU-56 was cancelled 28 Apr 21.</p> <p><b>GAP AND INTEGRATION ANALYSIS:</b> Program funds cover engineering/planning studies, related engineering efforts, and the auxiliary equipment needed for development projects that have not yet been fielded. Funds may be used to resolve emerging safety of flight and DMS issues, accommodate technology insertion, and fulfill FAA (or other) mandates necessary to ensure continued aircrew safety and mission effectiveness. Costs includes Program Management Administrative (PMA) costs, total ownership cost, as well as initiatives for anticipated weapon system enhancements, to include efforts for improving weapon system operational capabilities, safety, supportability, maintainability, and reliability. All B-1B development projects support planned requirements for unique identification in their production phases.</p> <p>B-1 funding also supports innovation activities to include studies, analyses, requirements definition, and quick-reaction capability prototypes/demonstrations to accelerate planning for technology transition, technology insertion, and future acquisition programs.</p> <p>Funds may be used to resolve emerging safety of flight and diminishing manufacturing sources issues, accommodate technology insertion and fulfill FAA or other mandates necessary to ensure continued aircrew safety and mission effectiveness. Funds may be used to address emerging and short-notice diminishing manufacturing and material shortage (DMSMS) issues.</p> <p>This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0M was expended for civilian pay expenses in this program element, and in FY21 \$2.696M is forecasted for civilian pay expenses in this program element</p>		

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0101126F / B-1B Squadrons
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This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	1.000	15.766	29.954	0.000	29.954
Current President's Budget	1.000	15.737	29.127	0.000	29.127
Total Adjustments	0.000	-0.029	-0.827	0.000	-0.827
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	-0.029	-0.827	0.000	-0.827

**Change Summary Explanation**

No significant changes

**C. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<b>Title:</b> B-1 AFMC Test Assets	0.000	0.000	19.222	0.000	19.222
<b>Description:</b> The B-1 AFMC Test Assets project will provide funding for the test aircraft, manpower, and facilities at the Air Force Test Center located at Edwards Air Force Base (AFB), California.					
This project will support the developmental testing and sustainment needs of the B-1 weapon system. Funds include cost of one test aircraft 85-0075 Programmed Depot Maintenance (PDM) performed at Tinker AFB, Oklahoma.					
Costs include any analysis, documentation, and related expenses necessary to establish a program of record and support the B-1 weapon system. Additionally, other costs include PMA and centralized support and initiatives for anticipated weapon system enhancements (to include efforts to improve weapon system operational capabilities, safety, supportability, maintainability, reliability, and total cost of ownership).					

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0101126F / B-1B Squadrons
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**C. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Funds may be used to resolve emerging safety of flight and diminishing manufacturing sources issues, accommodate technology insertion and fulfill FAA or other mandates necessary to ensure continued aircrew safety and mission effectiveness. Funds may be used to address emerging and short-notice diminishing manufacturing and material shortage (DMSMS) issues.  <b>FY 2021 Plans:</b> N/A  <b>FY 2022 Base Plans:</b> Fully Funds one test aircraft Programmed Depot Maintenance (PDM) to support developmental activities. PDM for test aircraft 85-0075 will be performed at Tinker AFB, OK.  <b>FY 2022 OCO Plans:</b> N/A  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Test aircraft PDM required every 4-5 years. Funding supports PDM activities for test aircraft 85-0075, which the aircraft requires in FY22 to continue flying and supporting B-1B modernization activities.					

<b>Title:</b> Radio Crypto Compliance  <b>Description:</b> The B-1B Radio Crypto Compliance requirements, P-3A 92316, originate from JROCM 040-11, VACM Cease Key CED-026-11, UHF SATCOM (Ultra-high frequency Satellite Communication ) Decommission and Cease Key for DAMA (Demand Assigned Multi Access) Orderwire, HALF QUICK II Cease use date, and DoD CIO MUOS transition directive. If the requirements/directives are not met, B-1B will lose it's secure line of sight, beyond line of sight, and Anti-Jam communication with ground and air forces. The initiative will replace the existing ARC-210 RT-1797 and ARC-210 RT-1851 with common ARC-210 next generation radios. Additionally, the program will provide Mobile User Objective System (MUOS) capability. This modification includes procurements of 41 aircraft kits + 4 EMD kits that will be installed in conjunction with organic/ intermediate maintenance.  The Radio Crypto program ensures the B-1B meets mandatory National Security Agency (NSA) and DoD mandates and directives as soon as possible with the minimum amount of hardware installs. The minimal evasive task will use current aircraft infrastructure to the greatest extent possible by only replacing the two obsolete ARC-210 Gen 3/4 radios with modernized ARC-210 Gen 6 radios and associative aircraft wiring/ software in order to support the new radios. Additionally, the program plans to incorporate Mobile User Objective	0.000	7.883	5.615	0.000	5.615
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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0101126F / B-1B Squadrons
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>System (MUOS) Satellite Communication capability that supports the DoD Chief Information Officer (CIO) directive to move all DoD assets to MUOS constellation (70% by FY26). This increment will lay in Ethernet cable required by MUOS Data (J-REAP C), install MUOS ancillaries (HPA/LNA), and additional software to execute MUOS capability on the aircraft.</p> <p><b>FY 2021 Plans:</b> FY21 will place on contract engineering and manufacturing efforts to complete the design phase of the program. Additionally, contract actions will commence to complete the development of the program through flight test and design audits.</p> <p>Major Milestone: Preliminary Design Review (PDR)/progression towards Critical Design Review (CDR)</p> <p><b>FY 2022 Base Plans:</b> Continue Engineering and Manufacturing Development (EMD) efforts.</p> <p>FY22 completes EMD efforts for Increment 1 only, which is the set of efforts primarily associated with complying with necessary mandates. Currently, the program is accelerating its effort towards CDR, software development/ testing, and initial ground testing.</p> <p>Major Milestone: CDR/STRR (Software Test Readiness Review)</p> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Reduction in funding associated with separating the program into two increments to prioritize mandate compliance under Increment 1.</p>					
<p><b>Title:</b> Multifunctional Information Distribution System-Joint Tactical Radio System (MIDS-JTRS)</p> <p><b>Description:</b> The B-1B MIDS-JTRS program replaces the existing MIDS Low Volume Terminal (MIDS-LVT) 1 Link 16 terminal to meet NSA 2022 Crypto Modernization (CM) Device Cease Key, a DoD Link 16 mandate/ directive that coincides with the NSA mandate, and FAA/NTIA Frequency Remap mandates. Current system become non-compliant in 2022. MIDS-JTRS resolves all LVT 1 deficiencies and adds substantial combat capability enhancements to Link 16 Enhanced Throughput (LET) and Concurrent Multi-Netting (CMN-4) with Concurrent Retention Receive (CRR). MIDS-JTRS also provides multi-datalink capability, improving situational</p>	0.760	7.854	4.290	0.000	4.290

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0101126F / B-1B Squadrons
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**C. Accomplishments/Planned Programs (\$ in Millions)**

awareness and allowing rapid in-flight re-targeting in a cooperative combat environment. The B-1B loses voice communication and Link-16 access if the MIDS-JTRS terminals are not installed.

Program efforts will focus on all mandates and directives, which includes software, wiring, and hardware updates/installs from the MIDS-LVT (1) terminal to the MIDS-JTRS terminal. Increment 2 includes wiring and heavy software. Increment 2 does not have hardware installs. Program efforts include, but not limited to, incorporating additional J-messages and Ethernet.

**FY 2021 Plans:**

Continue Engineering and Manufacturing Development (EMD) Phase

Major Milestone: PDR, CDR, STRR (Software Test Readiness Review), GTRR (Ground Test Readiness Review), FTRR (Flight Test Readiness Review), and DT/OT (Developmental and Operational Test)

**FY 2022 Base Plans:**

Continue Engineering and Manufacturing Development (EMD) Phase

Major Milestone:

Joint Interoperability Test Command (JITC) Testing, Functional and Physical Configuration Assessments (FCA/PCA), and Milestone C

**FY 2022 OCO Plans:**

NA

**FY 2021 to FY 2022 Increase/Decrease Statement:**

Decrease from FY21 to FY22 associated with accelerating in FY21 detailed EMD efforts to complete CDR, software readiness, ground & flight readiness, DT/OT.

**Title:** Bomb Rack Unit - 56

**Description:** The Bomb Rack Unit 56 (BRU-56) upgrade planned to address a safety risk present within the legacy BRU-56 ejector rack, as add increased carriage capability. This deficiency led to one Class A mishap in 2003 and one Class C mishap in 2010.

**FY 2021 Plans:**

In FY 2021, BRU-56 was terminated 28 Apr 21 for higher Air Force priorities.

FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
0.240	0.000	0.000	0.000	0.000

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0101126F / B-1B Squadrons
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Signed Termination - Acquisition Decision Memorandum (T-ADM) was signed on 28 Apr 2021 by Air Force Program Executive Officer (AFPEO) for Bombers to stop work and end contract activity in a prudent manner and take appropriate steps to efficiently close out all ongoing efforts in accordance with current laws and regulations. Air Force implemented maintenance procedures to address mishaps from occurring. No mishaps has occurred since the Class A mishap in 2003 and Class C mishap in 2010.  <b>FY 2022 Base Plans:</b> N/A  <b>FY 2022 OCO Plans:</b> N/A  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> No funding in FY22.					
<b>Accomplishments/Planned Programs Subtotals</b>	1.000	15.737	29.127	0.000	29.127

<b>D. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• APAF 05 Line Item	0.458	0.041	0.071	-	0.071	-	-	-	-	-	-
B01B00: <i>Training Support to Units, Mods PE 0809731F</i>											
• APAF 05 B01B00: <i>B-1B</i>	-	-	-	-	-	-	-	-	-	-	-
• APAF 05 B00100: <i>B-1</i>	12.201	21.767	30.447	-	30.447	-	-	-	-	-	-
• APAF 05 Line Item B01B00	0.000	0.717	0.847	-	0.847	-	-	-	-	-	-
Spares: <i>B-1B Squadrons, Spares</i>											

**Remarks**

**E. Acquisition Strategy**  
 Radio Crypto acquisition strategy implements the program in two increments to accelerate the highest priority mandates fulfillment first. Increment 1 addresses National Security Agency (NSA) and DoD mandates and directives as soon. Increment 2 will provide Mobile User Objective System (MUOS) capability. The Engineering & Manufacturing Development (EMD) portions of the increments will be a Cost Plus Fixed Fee (CPFF) sole source contract with a five and a half years EMD effort and a Firm Fixed Price (FFP) competitively-selected contract with a two-year Production and Installation effort for Increment 1 (for mandate compliance).

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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Air Force Date: May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0101126F / <i>B-1B Squadrons</i>
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MIDS-JTRS acquisition strategy implements the program in two increments in order to meet the upcoming 2022 NSA mandate. Increment 1 addresses mandate compliance by replacing the MIDS-LVT with MIDS-JTRS terminal. Increment 2 provides additional J-message capability and installs Ethernet. The strategy for both increment is CPFF sole source contract to Boeing (OEM) with a five years EMD effort and a FFP for production.

BRU-56 program was canceled by Termination - Acquisition Decision Memorandum (T-ADM) on 28 April 2021. Remaining efforts will be taken for contract closeout and orderly shutdown of program in accordance with current laws and regulations.

B-1 AFMC Test Assets will utilize funding to fully fund one Programmed Depot Maintenance (PDM) for the test aircraft, A/C 85-0075, at Tinker AFB, OK.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101126F / B-1B Squadrons	<b>Project (Number/Name)</b> 675344 / B-1B Modernization
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<b>Product Development (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
B-1 AFMC Test Assets	SS/CPAF	Tinker AFB : TINKER, OK	-	-		-		19.222	Dec 2021	-		19.222	-	-	-
Radio Crypto Compliance	SS/CPFF	Boeing : OKC, OK	-	-	5.921	Jun 2021	3.311	Dec 2021		-		3.311	-	-	-
Multi-functional Information Distribution System (MIDS) Joint Tactical Radio System (JTRS) (EMD #1)	SS/CPFF	Boeing : OKC, OK	-	-	5.893	May 2021	1.390	Dec 2021		0.000	Nov 2021	1.390	-	-	-
Multi-functional Information Distribution System (MIDS) Joint Tactical Radio System (JTRS) (retrofits and bricking costs)	MIPR	ViaSat : Carlsbad, CA	-	0.090	May 2021	0.000	May 2021	0.716	Dec 2021	-		0.716	-	-	-
Bomb Rack Unit (BRU) 56 - Hardware	C/CPFF	EDO, LLC : Amityville, NY	-	0.000	Mar 2020	0.000	May 2021	-		-		-	-	-	-
<b>Subtotal</b>			-	0.090		11.814		24.639		0.000		24.639	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
BRU-56 Testing DT/OT	C/CPAF	Not specified. : TBD	-	-		0.000		-		-		-	-	-	-
BRU-56 Statement of Capability From SEEK EAGLE	PO	Eglin AFB : FL	-	0.225	Mar 2020	0.000	Jul 2021	-		-		-	-	-	-
MIDS-JTRS DT/OT and JITC Testing	PO	Edwards : CA	-	0.670	Jan 2021	-		0.434	Dec 2021	0.000	Feb 2022	0.434	-	-	-
<b>Subtotal</b>			-	0.895		0.000		0.434		0.000		0.434	-	-	N/A

<b>Management Services (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
PMA	Various	Various : OKC, OK	-	0.015		3.923	Nov 2020	4.054	Jan 2022	-		4.054	-	-	-





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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101126F / B-1B Squadrons	<b>Project (Number/Name)</b> 675344 / B-1B Modernization
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

BRU-56 EMD																												
BRU-56 CDR																												



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<b>Exhibit R-4A, RDT&amp;E Schedule Details: PB 2022 Air Force</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101126F / B-1B Squadrons	<b>Project (Number/Name)</b> 675344 / B-1B Modernization

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>B-1 AFMC Test Assets</b>				
B-1B A/C 85-0075 PDM	1	2022	4	2022
<b>Radio Crypto Compliance</b>				
Radio Crypto (RC) - EMD Increment #1	1	2020	4	2024
RC PDR #1	1	2021	1	2021
RC CDR #1	2	2022	2	2022
RC DT/OT #1	4	2023	2	2024
RC MS C #1	4	2024	4	2024
RC - EMD Increment #2	2	2023	3	2026
RC PDR #2	1	2024	1	2024
RC CDR #2	3	2024	3	2024
RC DT/OT #2	4	2025	1	2026
RC MS C #2	3	2026	3	2026
<b>Multi-Functional Information Distribution System - Joint Tactical Radio Systems (MIDS-JTRS)</b>				
MIDS-JTRS - EMD Increment #1	1	2020	3	2022
MIDS-JTRS PDR #1	1	2021	1	2021
MIDS-JTRS CDR #1	1	2021	1	2021
MIDS-JTRS DT/OT #1	4	2021	1	2022
MIDS-JTRS MS C #1	2	2022	2	2022
MIDS-JTRS - EMD Increment #2	1	2023	2	2025
MIDS-JTRS PDR #2	4	2023	4	2023
MIDS-JTRS CDR #2	4	2023	4	2023

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**Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force** **Date: May 2021**

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101126F / B-1B Squadrons	<b>Project (Number/Name)</b> 675344 / B-1B Modernization
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Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
MIDS-JTRS MS C #2	4	2024	4	2024
<b><i>Bomb Rack Unit - 56 (BRU-56)</i></b>				
BRU-56 EMD	1	2020	3	2021
BRU-56 CDR	2	2020	2	2020

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0101127F / B-2 Squadrons
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	0.000	85.742	181.068	144.047	0.000	144.047	-	-	-	-	-	-
675345: <i>B-2 Modernization</i>	0.000	71.391	166.496	129.387	0.000	129.387	-	-	-	-	-	-
676021: <i>BASELINE SUPPORT</i>	0.000	14.351	14.572	14.660	0.000	14.660	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

The B-2 is currently undergoing modernization of avionics/communications systems, engines, armament systems, low observable components, core training system components, aircraft supportability improvements, and support equipment development.

The Air Force will also study multiple structural, avionics, and engine modifications that could improve the performance of the aircraft and engines and reduce maintenance man-hours and the logistics footprint of the fleet. Focus of the studies will be on non-mission capable (maintenance) drivers, safety issues, and obsolescence issues through modernization of key components in the airframe, avionics, and engines resulting in improved aircraft availability of a high demand/low density fleet.

In FY 2020 and prior, the B-2 DMS-M effort was documented in PE 0605931F B-2 DMS, Project 653844 B-2 DMS. Beginning in FY 2021, this effort is documented in PE 0101127F B-2 Squadrons, Project 675345 B-2 Modernization. The FY 2021 budget reflected a significant restructure of the B-2 DMS-M program that reduced the program scope to modernize the B-2's primary flight displays. The legacy displays are not supportable due to obsolescence and repair issues which will severely impact future aircraft availability and are currently the number-one driver for reduced fleet readiness. The DMS-M effort was re-named to B-2 Display Modernization (BDM) to reflect the current scope of the effort. The BDM program will resume the Engineering and Manufacturing Development phase, during which the engineering baseline will be finalized and production representative kits will be purchased to support software development, platform integration, integrated development/operational test, pre-Milestone C production assessment, and B-2 nuclear certification testing. Diminishing manufacturing sources and materiel shortages for affected components will be addressed to protect the planned production program by mitigating unplanned part redesign and requalification risks. The program will ensure the most efficient restructure minimizing rework from the baseline DMS-M program.

The Adaptive Communication Suite (ACS) is a non-integrated system that provides SATCOM connectivity for Command and Control enroute to the target. A critical capability is the ability to receive Airborne Mission Transfer (AMT) and Beyond Line-of-Sight Situational Awareness. This effort includes improvements to the suite of B-2 ACS UHF communications system in order to become part of the baseline configuration, as well as modernization upgrades to conform to mandates.

B-2 Armament upgrades integrate new and/or advanced weapons on the B-2 to attack a wider array of target sets, to include hardened, deeply buried targets, as well as destroy more targets per sortie. Integration of the Joint Air-to-Surface Standoff Missile Extended Range (JASSM-ER) weapon will further enhance the B-2s ability to attack and destroy high value target sets. Additional studies and efforts will refine B-2 targeting accuracy using GPS guided weapons.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force / BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0101127F / <i>B-2 Squadrons</i>	
<p>The Low Observable Signature and Supportability Modifications (LOSSM) program supports the B-2 ability to penetrate anti-access combat environments, performing missions directed by the National Command Authority while ensuring aircrew survivability. The LOSSM program reduces low observable (LO) maintenance drivers, and signature degradation, while maintaining LO reliability / Maintainability / Supportability, and provides high signature confidence to combatant commanders.</p> <p>The B-2 Crash Survivable Memory Unit (CSMU) provides a more capable Flight Data Recorder (FDR) with increased capacity for storing Flight Information Data (FID) for recovery and use in the event of a mishap.</p> <p>The Radar Aided Targeting System (RATS) is planned to be a software only solution implemented in several B-2 system level Operational Flight Programs (OFPs) to provide radar-aided enhanced targeting capability through weapon hand-off navigational updates for guided nuclear and conventional weapons in a non-GPS environment.</p> <p>The B-2 Identification Friend or Foe (IFF) Mode 5/S modification program replaces the current IFF transponder with a new Mode 5 and Mode S capable transponder ensuring compliance with DoD Combat Identification mandates and global Communications, Navigation, Surveillance/Air Traffic Management (CNS/ATM) requirements. Mode 5 is the DoD standard for secure combat identification and provides improved discrimination between closely spaced platforms, while reducing interference with civil air traffic control transponders, enabling the B-2 fleet to accomplish its anti-access and global strike mission. Mode 5 replaced the obsolete Mode 4 combat identification. Mode S is a civil air traffic control secondary surveillance radar process that allows selective interrogation of aircraft according to the unique 24-bit address. Mode S provides improved accuracy and altitude resolution and reduced interference from closely spaced aircraft through selective interrogation of assigned transponder addresses.</p> <p>The B-2 Training System upgrades include updates to training device hardware and components, simulation software, courseware and academic materials, instructional system design architectures, engineering drawings, and system documentation that is not driven by a funded aircraft modification.</p> <p>B-2 funding also supports innovation activities to include studies, analyses, requirements definition, and quick-reaction capability prototypes/demonstrations to accelerate planning for technology transition, technology insertion, and future acquisition programs.</p> <p>This program element may include necessary civilian pay expenses required to manage, execute, and deliver WEAPON SYSTEM capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.</p> <p>This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.</p>		

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0101127F / B-2 Squadrons
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	93.076	187.399	173.200	0.000	173.200
Current President's Budget	85.742	181.068	144.047	0.000	144.047
Total Adjustments	-7.334	-6.331	-29.153	0.000	-29.153
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-9.200	-11.331			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	5.000	5.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-2.166	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-0.968	0.000	-29.153	0.000	-29.153

**Congressional Add Details (\$ in Millions, and Includes General Reductions)**

**Project:** 675345: *B-2 Modernization*

Congressional Add: *B-2 Trainers Modernization*

Congressional Add Subtotals for Project: 675345

Congressional Add Totals for all Projects

	<b>FY 2020</b>	<b>FY 2021</b>
	5.000	5.000
Congressional Add Subtotals for Project: 675345	5.000	5.000
Congressional Add Totals for all Projects	5.000	5.000

**Change Summary Explanation**

FY 2020 adjustments of -\$4.166M (\$2M BTR to PNT; \$2.166M source on OMNIBUS); -\$3.168M Small Business Innovative Research (SBIR)

FY 2021 Program increase - training modernization \$5.000M; Prior year carryover -\$11.000M; Undistributed Reduction - Excess to Need -\$0.331M

FY 2022 reduced -\$29.153M for higher Air Force priorities.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0101127F / B-2 Squadrons				<b>Project (Number/Name)</b> 675345 / B-2 Modernization			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
675345: B-2 Modernization	0.000	71.391	166.496	129.387	0.000	129.387	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

The B-2 is currently undergoing modernization of avionics/communications systems, engines, armament systems, low observable components, core training system components, aircraft supportability improvements, and support equipment development.

The Air Force will also study multiple structural, avionics, and engine modifications that could improve the performance of the aircraft and engines and reduce maintenance man-hours and the logistics footprint of the fleet. Focus of the studies will be on non-mission capable (maintenance) drivers, safety issues, and obsolescence issues through modernization of key components in the airframe, avionics, and engines resulting in improved aircraft availability of a high demand/low density fleet.

In FY 2020 and prior, the B-2 DMS-M effort is documented in PE 0605931F B-2 DMS-M, Project 653844 B-2 DMS-M. Beginning in FY 2021, this effort is documented in PE 0101127F B-2 Squadrons, Project 675345 B-2 Modernization. The FY 2021 budget reflects a significant restructure of the B-2 DMS-M program that reduces the program scope to modernize the B-2's primary flight displays. The legacy displays are not supportable due to obsolescence and repair issues which will severely impact future aircraft availability and are currently the number-one driver for reduced fleet readiness. B-2 Display Modernization (BDM) program will resume the Engineering and Manufacturing Development phase, during which the engineering baseline will be finalized and production representative kits will be purchased to support software development, platform integration, integrated development/operational test, pre-Milestone C production assessment, and B-2 nuclear certification testing. Diminishing manufacturing sources and materiel shortages for affected components will be addressed to protect the planned production program by mitigating unplanned part redesign and re-qualification risks. The program will ensure the most efficient restructure minimizing rework from the baseline DMS-M program.

Modern communications are key enablers for the B-2. The Adaptive Communication Suite (ACS) provides baseline improvements to the B-2 ACS UHF SATCOM communication system in order to modernize the system and increase data throughput to support key mission enablers such as AMT, weather, and intelligence updates.

B-2 Armament upgrades integrate new and/or advanced weapons on the B-2 to attack a wider array of target sets, to include hardened, deeply buried targets, as well as destroy more targets per sortie. Integration of the Joint Air-to-Surface Standoff Missile Extended Range (JASSM-ER) weapon will further enhance the B-2's ability to attack and destroy high value target sets. Additional studies and efforts will refine B-2 targeting accuracy using GPS guided weapons.

The Low Observable Signature and Supportability Modifications (LOSSM) program supports the B-2 ability to penetrate anti-access combat environments, performing missions directed by the National Command Authority while ensuring aircrew survivability. The LOSSM program reduces low observable (LO) maintenance, and stabilizes and improves the combat-ready LO signature for the B-2 fleet. This program encompasses multiple improvement projects including, but not limited to, improved LO materials (electrically conductive materials, adhesives, electrically resistive materials, radar absorbing material, fastener fills, coatings, welds, material removal tools, and improved processes), LO structures (radar radomes, antennas, hot trailing edges and tiles, intermediate section doors, tailpipes, windows, lib bay panels, leading edge, permanent fasteners, exhaust pockets, gust load alleviation system, inlets, radar absorbing structures, overall signature stability, and Alternate

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101127F / B-2 Squadrons	<b>Project (Number/Name)</b> 675345 / B-2 Modernization
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High Frequency Material expansion), and radio frequency (RF) diagnostic tools, evaluation systems, and other tools (Tier One Material Inspection System, Signature Diagnostic System, next generation Tier II and Tier III systems, Test Article 0998 optimization, conductivity probes, tailpipe inspection tools, LO-related special test equipment, data archival, and communications tools). LOSSM yields high ROIs and maintains signature confidence for war time readiness posturing.

The B-2 Crash Survivable Memory Unit (CSMU) provides a more capable Flight Data Recorder (FDR) with increased capacity from 16 minutes to 25 hours of storing Flight Information Data (FID) for recovery and use in the event of a mishap. The initiative includes replacement of the current CSMU with an adapted Commercial Off the Shelf (COTS) replacement, modification of the Flight Data Recorder Processor (FDRP) to provide 28 vdc power to the new CSMU, modification of the FDRP Operational Flight Program (OFP), and addition of a Underwater Locator Beacon (ULB). The current CSMU/FDRP does not meet the minimum requirements specified in the Aircraft Information Program (AIP) reference documents (AFI 63-133 and AFH 63-1402).

The B-2 Identification Friend or Foe (IFF) Mode 5/S modification replaces the current IFF transponder with a new Mode 5 and Mode S capable transponder ensuring compliance with DoD Combat Identification mandates and global Communications, Navigation, Surveillance/Air Traffic Management (CNS/ATM) requirements. Mode 5 is the DoD standard for secure combat identification and provides improved discrimination between closely spaced platforms, while reducing interference with civil air traffic control transponders, enabling the B-2 fleet to accomplish its anti-access and global strike mission. Mode 5 replaced the obsolete Mode 4 combat identification. Mode S is a civil air traffic control secondary surveillance radar process that allows selective interrogation of aircraft according to the unique 24-bit address. Mode S provides improved accuracy and altitude resolution and reduced interference from closely spaced aircraft through selective interrogation of assigned transponder addresses.

The B-2 Training System upgrades include, but are not limited to, updates to training device hardware and components, simulation software, courseware and academic materials, instructional system design architectures, engineering drawings, and system documentation that is not driven by a funded aircraft modification. Upgrades may include Diminishing Manufacturing Sources efforts to include removal of end-of-life software/hardware within simulator systems and move to a modular, common open system architecture that is sustainable and cyber-resilient. Additional Training System Upgrades may also include efforts to implement requirements and standards defined under the Simulator Common Architecture Requirements and Standards (SCARS) initiative.

The Radar Aided Targeting System (RATS) is planned to be a software only solution implemented in several B-2 system level Operational Flight Programs (OFPs) to provide radar-aided enhanced targeting capability through weapon hand-off navigational updates for guided nuclear and conventional weapons in a non-GPS environment. Funding supports timely software development, test and roll-out of software into a future B-2 OFP, specifically to support the B61-12 integration.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver B-2 weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>Title:</b> Low Observable Signature and Supportability Mods and Trainers</p> <p><b>Description:</b> B-2 Low Observable Signature and Supportability Modifications (LOSSM) pursues multiple low-cost development upgrades for Low Observable (LO) materials, diagnostics and procedures to enhance LO signature and/or improve aircraft supportability, as well as other development or study efforts for training system improvements.</p>	18.831	10.402	9.791

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101127F / B-2 Squadrons	<b>Project (Number/Name)</b> 675345 / B-2 Modernization

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>FY 2021 Plans:</b> Continue development of on-going LOSSM and Training System core upgrades. Continue development efforts for advanced LO materials, structures, procedures, and other enhanced diagnostics and measurement systems. Continue development efforts for Advanced Signature Reduction efforts, the Next Generation Zonal Radar, an Abrasion Resistant Coating, an upgrade to the Tier One Material Inspection System, Tailpipe Improvement analysis, and Test Article 0998. Continue Signature Diagnostic System Spiral 12.</p> <p><b>FY 2022 Plans:</b> Not applicable.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decrease from FY 2021 to FY 2022 due to a decrease in development activities in FY 2022.</p>			
<p><b>Title:</b> B-2 Joint Air-to-Surface Standoff Missile - Extended Range (JASSM-ER) Integration</p> <p><b>Description:</b> Integrates the Joint Air to Surface Standoff Missile, Extended Range weapon (JASSM-ER) onto the B-2.</p> <p><b>FY 2021 Plans:</b> Continue to execute EMD efforts for JASSM-ER integration onto the B-2. EMD efforts include combined DT/OT and AMAC for P6.4 capabilities. Note: Efforts in year 2021 will be accomplished with FY20 funds.</p> <p><b>FY 2022 Plans:</b> Not applicable. Integration completed in FY21 with FY20 funds, awaiting incorporation in B-2 IFC release P6.4 in FY22</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Not applicable. Integration completed in FY21 with FY20 funds, awaiting incorporation in B-2 IFC release P6.4 in FY22</p>	11.853	0.000	0.000
<p><b>Title:</b> B-2 Communications Upgrade -- formerly known as Adaptable Communications Suite (ACS)</p> <p><b>Description:</b> The B-2 Communications Upgrade -- formerly known as Adaptable Communications Suite -- provides a non-integrated avionics and communications system that allows the B-2 fleet to receive mission data, time sensitive targeting information, intelligence and weather updates, positive command and control procedures, and perform operational reconnaissance.</p> <p><b>FY 2021 Plans:</b> Continue acquisition planning, risk reduction, and requirements maturation for a modernized ACS system. Begin system development for modernized ACS system (ACS Increment 4.0) and purchase test assets. The modernized system will be known as the B-2 Communications Upgrade.</p> <p><b>FY 2022 Plans:</b></p>	0.197	0.200	19.726



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101127F / B-2 Squadrons	<b>Project (Number/Name)</b> 675345 / B-2 Modernization		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>Complete risk reduction, requirements maturation, and Preliminary Design Review for a modernized ACS system (ACS Increment 4.0, to be known as B-2 Communications Upgrade). Continue system development post Milestone B.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increases from FY 2021 to FY 2022 due to increases in development activities in FY22. In FY 2022 ACS Increment 4.0 will execute risk reduction and preliminary design activities to achieve Milestone B requirements. ACS Increment 4.0 is required to address obsolescence and supportability issues for B-2 onboard communications.</p>				
<p><b>Title:</b> B-2 Identification Friend or Foe (IFF) Mode 5/S Program</p> <p><b>Description:</b> The B-2 IFF Mode 5/S replaces the current IFF transponder with a new Mode 5 and Mode S capable IFF transponder ensuring compliance with DoD/NATO Combat Identification mandates (Mode 5) and global Communications, Navigation, Surveillance/Air Traffic Management (CNS/ATM) requirements (Mode S). Mode 5 provides improved combat identification security and accuracy enabling the B-2 fleet to accomplish its anti-access and global strike mission. Mode S provides improved accuracy, altitude resolution, and reduced interference from closely spaced aircraft through interrogation of assigned transponder addresses.</p> <p><b>FY 2021 Plans:</b> Execute Engineering and Manufacturing Development (EMD) phase activities to include Critical Design Review, software code development, hardware and software integration into the B-2 Weapon System Support Center (WSSC), Test Readiness Review, and initiation of developmental testing in the WSSC environment. Includes AMAC testing for P6.5.</p> <p><b>FY 2022 Plans:</b> Continue executing Engineering and Manufacturing Development (EMD) phase activities to include completion of developmental testing in the WSSC environment, certification of hardware/software for aircraft install, Flight Readiness Review, on-aircraft ground/flight development/operational testing, System Verification Review, Production Readiness Review, and Milestone C/Full Rate Production Decision. Includes AMAC testing for P6.5.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increase from FY 2021 to FY 2022 to complete developmental testing, certify for aircraft install, on-aircraft ground/flight development/operational testing, and AMAC testing for P6.5.</p>		7.554	6.028	12.309
<p><b>Title:</b> B-2 Crash Survivable Memory Unit (CSMU)</p> <p><b>Description:</b> The B-2 Crash Survivable Memory Unit (CSMU) provides a more capable Flight Data Recorder (FDR) with increased capacity for storing Flight Information Data (FID) for recovery and use in the event of a mishap. The initiative includes replacement of the current CSMU with an adapted Commercial Off the Shelf (COTS) replacement, modification of the Flight Data Recorder Processor (FDRP) to provide 28 vdc power to the new CSMU, modification of the FDRP Operational Flight Program (OFP), and addition of a Underwater Locator Beacon (ULB).</p>		1.870	1.098	0.000

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101127F / B-2 Squadrons	<b>Project (Number/Name)</b> 675345 / B-2 Modernization
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
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<p><b>FY 2021 Plans:</b> Complete Non-recurring Engineering (NRE) to adapt Commercial Off the Shelf (COTS) CSMU to the B-2 Flight Data Recorder (FDR) system, complete modification of the FDRP, and update the FDRP OFF. Development completes in FY21.</p> <p><b>FY 2022 Plans:</b> No development efforts in FY 2022.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreases from FY 2021 to FY 2022 due to completing development in FY21.</p>			
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<p><b>Title:</b> B-2 Radar Aided Targeting System (RATS)</p> <p><b>Description:</b> The Radar Aided Targeting System (RATS) is planned to be a software only solution implemented in several B-2 system level Operational Flight Programs (OFPs) to provide radar-aided enhanced targeting capability through weapon hand-off navigational updates for System 2 nuclear weapons in a non-GPS environment.</p> <p><b>FY 2021 Plans:</b> Execute EMD efforts for RATS integration onto the B-2. EMD efforts include combined DT/OT and AMAC for P6.4 capabilities. Note: Activities in FY-2021 will be accomplished with FY-2020 funds.</p> <p><b>FY 2022 Plans:</b> Integration effort completes in FY21 with FY20 funds; awaiting FY22 fielding in P6.4</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Not applicable. No FY21 or FY22 funds for RATS</p>	7.104	0.000	0.000
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<p><b>Title:</b> B-2 Display Modernization (BDM)</p> <p><b>Description:</b> The B-2 Display Modernization program is a modernization of the B-2 multi-purpose display units (MDUs) and includes removal of the Defensive Management System-Modernization (DMS-M) modification from the B-2 fleet test aircraft and lab environment. This is not a new start, but a continuation of 3600 scope that was part of the previous DMS-M program. Prior years DMS-M efforts were in PE 0605931F.</p> <p><b>FY 2021 Plans:</b> Continue engineering for modification of the B-2 Test Aircraft, A/C 1087, (currently configured for DMS-M) and development labs to support restructured program. Continue development and software integration of MDU Replacements (MDU-R). Conduct appropriate systems engineering and design reviews to support restructured program.</p> <p><b>FY 2022 Plans:</b></p>	0.000	143.768	87.561
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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101127F / B-2 Squadrons	<b>Project (Number/Name)</b> 675345 / B-2 Modernization

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Begin modification of the B-2 Test Aircraft and development labs to support the BDM program. Continue software development and integration activities. Deliver engineering development units of MDU-R hardware to the development labs. Order MDU-R hardware for Engineering and Manufacturing Development kits. Conduct appropriate systems engineering and design reviews, and release the Request for Proposal (RFP) for the Production phase of the program.  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decrease from FY 2021 to FY 2022 due to scope reduction as a result of DMS-M strategy pivot.			
<b>Title:</b> B-2 Expanded Strike  <b>Description:</b> The Expanded Strike program adds the Advanced 5,000 pound Joint Direct Attack Munition (A5K JDAM) and Hard Target Void Sensing Fuze (HTVSF) to the B-2 arsenal providing additional armament capability for hardened, deeply buried targets.  <b>FY 2021 Plans:</b> N/A  <b>FY 2022 Plans:</b> N/A  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Expanded Strike program terminated in FY 2021 Budget. No events are planned.	18.982	0.000	0.000
<b>Accomplishments/Planned Programs Subtotals</b>	66.391	161.496	129.387

	<b>FY 2020</b>	<b>FY 2021</b>
<b>Congressional Add:</b> B-2 Trainers Modernization  <b>FY 2020 Accomplishments:</b> Develop plan to execute FY 2020 Congressional add for B-2 Trainers Modernization efforts.  <b>FY 2021 Plans:</b> Any planned efforts in FY21 will be accomplished with FY20 Congressional add funds.	5.000	5.000
<b>Congressional Adds Subtotals</b>	5.000	5.000

<b>C. Other Program Funding Summary (\$ in Millions)</b>										
<b>Line Item</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete Total Cost</b>
• APAF 05 Line Item B00200: B-2 LOSSM Mod Funding, PE 0101127F	0.276	19.194	16.389	-	16.389	-	-	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101127F / B-2 Squadrons	<b>Project (Number/Name)</b> 675345 / B-2 Modernization
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 05 Line Item B00200 (1)...: B-2 CSMU Mod Funding, PE 0101127F	-	-	1.568	-	1.568	-	-	-	-	-	-
• APAF 05 Line Item B00200 (2)...: B-2 IFF Mode 5/S Mod Funding, PE 0101127F	-	-	15.398	-	15.398	-	-	-	-	-	-
• APAF 05 B2DMS0: B-2 DMS	-	-	-	-	-	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

Key elements of the overall acquisition strategy include: use of sole source contract with a prime/integrating contractor (Northrop Grumman), employ the program office as the system integrator when practical, leverage mature technology and systems development investments by other Department of Defense organizations, encourage prime contractor competition of subsystems and key components to reduce risk and cost, use of cost plus incentive fee (CPIF) development contracts, and combine developmental upgrades with software sustainment blocks to minimize the number of software releases, aircraft downtime, and differences in fielded configurations.

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2022 Air Force</b>											<b>Date: May 2021</b>				
<b>Appropriation/Budget Activity</b> 3600 / 7						<b>R-1 Program Element (Number/Name)</b> PE 0101127F / B-2 Squadrons					<b>Project (Number/Name)</b> 675345 / B-2 Modernization				

<b>Product Development (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Product Development	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	-	-	-
Low Observable Signature and Supportability Mods	Various	Various : Various	0.000	18.392	Oct 2019	9.892	Oct 2020	9.279	Oct 2021	-		9.279	-	-	-
B-2 Joint Air-to-Surface Standoff Missile - Extended Range (JASSM-ER) Integration	Various	Various : Various	0.000	0.000	Oct 2019	-		-		-		-	-	-	-
B-2 Adaptable Communications Suite (ACS)	Various	Various : Various	0.000	0.197	Dec 2019	0.200	Dec 2020	19.726		-		19.726	-	-	-
B-2 IFF Mode 5/S	Various	Various : Various	0.000	7.554	Nov 2019	6.028	Nov 2020	12.309		-		12.309	-	-	-
B-2 Crash Survivable Memory Unit (CSMU)	Various	Various : Various	0.000	1.870	Jun 2020	1.098	Dec 2020	-		-		-	-	-	-
Not specified.	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	-	-	-
B-2 RATS	Various	Various : Various	0.000	14.582	Oct 2019	-		-		-		-	-	-	-
B-2 Display Modernization (BDM)	Various	Various : Various	0.000	-		128.623	Feb 2021	78.009		-		78.009	-	-	-
Aircrew Training	Various	Various : Various	0.000	5.502	Dec 2019	5.510		0.512		-		0.512	-	-	-
Mission Planning	Various	Various : Various	0.000	10.463	Jan 2020	-		-		-		-	-	-	-
<b>Subtotal</b>			0.000	58.560		151.351		119.835		-		119.835	-	-	N/A

**Remarks**  
Northrop-Grumman is the prime contractor and serves as integrator and hence main contractor for many (ie "Various"), but not all, B-2 modernization efforts.

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Test and Evaluation	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	-	-	-
Government Test	MIPR	Various : CA	0.000	1.321	Dec 2019	2.828		4.900	Oct 2021	-		4.900	-	-	-
<b>Subtotal</b>			0.000	1.321		2.828		4.900		-		4.900	-	-	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101127F / B-2 Squadrons	<b>Project (Number/Name)</b> 675345 / B-2 Modernization
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<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			

**Remarks**  
B-2 Display Modernization (BDM) transitioned to PE 0101127F in FY 2021

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Management Services	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	-	-	-
PMA	Various	Various : TBD	0.000	11.510	Oct 2019	12.317	Oct 2020	4.652		-		4.652	-	-	-
<b>Subtotal</b>			0.000	11.510		12.317		4.652		-		4.652	-	-	N/A

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	0.000	71.391	166.496	129.387	-	129.387	-	-	N/A

**Remarks**  
Award dates listed are the first incremental funding opportunity associated with each cost category.

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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101127F / B-2 Squadrons	<b>Project (Number/Name)</b> 675345 / B-2 Modernization
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>B-2 Modifications Schedule</b>																												
Low Observable Signature and Supportability Mods and Trainers																												
JASSM-ER Integration EMD Phase																												
IFF Mode 5/S EMD Phase																												
Crash Survivable Memory Unit Milestone B																												
Crash Survivable Memory Unit EMD Contract																												
B-2 Display Modernization (BDM) Acquisition Planning & Transition																												
B-2 Display Modernization (BDM) Displays EMD Phase																												

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101127F / B-2 Squadrons	<b>Project (Number/Name)</b> 675345 / B-2 Modernization
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>B-2 Modifications Schedule</i></b>				
Low Observable Signature and Supportability Mods and Trainers	1	2020	4	2023
JASSM-ER Integration EMD Phase	1	2020	3	2022
IFF Mode 5/S EMD Phase	1	2020	3	2022
Crash Survivable Memory Unit Milestone B	2	2020	2	2020
Crash Survivable Memory Unit EMD Contract	2	2020	3	2022
B-2 Display Modernization (BDM) Acquisition Planning & Transition	2	2020	1	2021
B-2 Display Modernization (BDM) Displays EMD Phase	2	2021	4	2023



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0101127F / B-2 Squadrons				<b>Project (Number/Name)</b> 676021 / BASELINE SUPPORT			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
676021: BASELINE SUPPORT	0.000	14.351	14.572	14.660	0.000	14.660	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

Baseline Support maintains and upgrades the B-2 unique flight test aircraft as well as hardware/software and test equipment to support developmental systems integration, and flight test, reducing the need for additional operational aircraft and accelerating deployment of advanced operational capabilities to the warfighter. Baseline Support also provides for other B-2 unique government costs and includes assorted studies of aircraft performance and cost trades as well as acquisition planning activities, up to and including proposal preparation, for future aircraft, engine, weapon, communication, navigation or other capabilities.

Funds may be used to resolve emerging safety of flight and diminishing manufacturing sources issues, accommodate technology insertion and fulfill FAA or other mandates necessary to ensure continued aircrew safety and mission effectiveness.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>Title:</b> Baseline Support Acq Plan/Studies/Integr Test Support</p> <p><b>Description:</b> Baseline Support provides for other B-2 unique government costs, including acquisition planning activities for future capabilities, long range planning, studies, and program integration activities, as well as integration and test support of upgraded crypto components as needed.</p> <p><b>FY 2021 Plans:</b> Continue Baseline Support activities including acquisition planning for future capabilities, long range planning, studies, and program integration activities.</p> <p><b>FY 2022 Plans:</b> Continue Baseline Support activities including acquisition planning for future capabilities, long range planning, studies, and program integration activities.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Program decrease due to slight reduction in effort.</p>	0.297	0.297	0.290
<p><b>Title:</b> Baseline Support Flight Test</p> <p><b>Description:</b> Description: Baseline Support Flight Test maintains and upgrades the B-2 unique flight test aircraft as well as hardware/software and test equipment to support developmental systems integration and flight test, reducing the need for additional operational aircraft and accelerating deployment of advanced operational capabilities to the warfighter.</p> <p><b>FY 2021 Plans:</b></p>	14.054	14.275	14.370

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101127F / B-2 Squadrons	<b>Project (Number/Name)</b> 676021 / BASELINE SUPPORT
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022
Continue B-2 Flight Test activities, maintaining and upgrading the B-2 unique flight test aircraft as well as hardware/software and test equipment, to support developmental systems integration and flight test.			
<b>FY 2022 Plans:</b> Continue B-2 Flight Test activities, maintaining and upgrading the B-2 unique flight test aircraft as well as hardware/software and test equipment, to support developmental systems integration and flight test.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY 2022 funding increase accounts for minor increase in B-2 test requirements for FY 2022.			
<b>Accomplishments/Planned Programs Subtotals</b>	14.351	14.572	14.660

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

Key elements of the overall acquisition strategy include: use of a sole source contract with a prime/integrating contractor (Northrop Grumman) for most but not all B-2 programs; use of cost plus incentive fee (CPIF) development contracts; and the combination of developmental upgrades with software sustainment blocks to minimize the number of software releases, aircraft downtime, and differences in fielded configurations.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101127F / B-2 Squadrons	<b>Project (Number/Name)</b> 676021 / BASELINE SUPPORT
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<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Support	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	-	-	-
Other Government Costs	Various	Various : Various	0.000	10.225	Oct 2019	10.019	Oct 2020	10.128	Oct 2021	-		10.128	-	-	-
<b>Subtotal</b>			0.000	10.225		10.019		10.128		-		10.128	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test and Evaluation	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	-	-	-
Government Test	MIPR	AFTC : CA	0.000	2.750	Oct 2019	2.716	Oct 2020	2.531		-		2.531	-	-	-
<b>Subtotal</b>			0.000	2.750		2.716		2.531		-		2.531	-	-	N/A

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Management Services	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	-	-	-
PMA	Various	Various : TBD	0.000	1.376	Oct 2019	1.837	Oct 2020	2.001		-		2.001	-	-	-
<b>Subtotal</b>			0.000	1.376		1.837		2.001		-		2.001	-	-	N/A

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>		0.000	14.351	14.572	14.660	-	-	14.660	N/A

**Remarks**  
Award dates listed are the first incremental funding opportunity associated with each cost category.

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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101127F / <i>B-2 Squadrons</i>	<b>Project (Number/Name)</b> 676021 / <i>BASELINE SUPPORT</i>
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FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b><i>B-2 Baseline Support</i></b>	
FY20 Flight Test Core Support Annual Contract Award	

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101127F / <i>B-2 Squadrons</i>	<b>Project (Number/Name)</b> 676021 / <i>BASELINE SUPPORT</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>B-2 Baseline Support</i></b>				
FY20 Flight Test Core Support Annual Contract Award	1	2020	1	2023

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / <i>Minuteman Squadrons</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	0.000	90.595	89.306	113.622	0.000	113.622	-	-	-	-	-	-
672983: <i>MM Ground and Comm Equipment</i>	0.000	55.627	15.879	19.811	0.000	19.811	-	-	-	-	-	-
672984: <i>MM III Baseline Support</i>	0.000	14.816	68.983	90.123	0.000	90.123	-	-	-	-	-	-
672985: <i>MM Support Equip</i>	0.000	6.859	0.000	0.000	0.000	0.000	-	-	-	-	-	-
672986: <i>MM Crypto Mods</i>	0.000	13.293	4.444	3.688	0.000	3.688	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

The MM Ground and Comm Equipment program replaces obsolete/unsupportable ground-based weapon system equipment located at Launch Control Centers (LCCs) and Launch Facilities (LFs) necessary to continue Minuteman III (MM III) operations until replaced by Ground Based Strategic Deterrent (GBSD). Current efforts include development, qualification, integration, and testing of replacement equipment such as the LGM-30G Fast Rising B-Plug Service Life Extension Program (FRBP SLEP).

MM III Baseline Support program replaces or upgrades obsolete/unsupportable flight test unique equipment installed on the missile during flight test, used to test MM III systems on the ground, or located at test facilities to collect, process, and analyze test data. Flight test equipment supports test and evaluation of MM III capabilities, and MM III Operational Test Launches (OTLs) to determine ICBM force readiness, reliability and capability shortfalls. Efforts include development, qualification, integration and testing of replacement equipment such as LGM-30G Arm/Disarm Switch Replacement (ADSR) and LGM-30G Flight Test Telemetry and Termination System (FT3). These programs will also implement processes, procedures and data systems to mitigate the transition risk from MM III to GBSD. As other similar equipment is identified for replacement, it will be added to this program. MM III Baseline Support also provides for other MM III unique government costs, studies of system performance, contract closeout costs, cost trades and acquisition planning activities, up to and including proposal preparation, for future capabilities. Efforts also include any minor needs required to prepare for full acquisition purposes.

MM Support Equipment program designs, develops, and tests replacement of obsolete/non-serviceable weapon system support equipment. These programs will also implement processes, procedures and data systems to mitigate the transition risk from MM III to Ground Based Strategic Deterrent (GBSD). Efforts include design, development, and testing of support equipment such as LGM-30G Pendulous Integrating Gyroscopic Accelerometer/G6B4 Build Equipment Replacement (PIGA/G6B4 BER) and LGM-30G Control Monitor Procedure Trainer Upgrade (CMPT). Programs may execute Diminishing Manufacturing Sources and Material Shortages/Program Management Administration support through the ISC 2.0 contract established to support the ICBM enterprise through the life of MM III.

MM Crypto Mods executes United States Strategic Command, Air Force Global Strike Command, and Air Force Safety Center requirements by implementing the KS-60 capabilities in LGM-30G ICBM Cryptography Upgrade II (ICU II) of remote key/code change and irreversible transformation as mandated in the approved Capabilities Development Document (dated 4 Jan 05) and addresses Nuclear Weapon System Safety Group Operational Safety Review requirements 98-2, 00-1 and 02-2. It also incorporates continuous signal lockout capabilities to prevent the widespread loss of status monitoring. These features will greatly increase security during code changes

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / <i>Minuteman Squadrons</i>
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by reducing the frequency of open sites by 75 days annually and will reduce associated resource costs for 450 Launch Facilities (LFs) and 45 Launch Control Centers (LCCs).

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY 2020 \$1.100M and in FY2021 \$1.100M was expended for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	104.219	116.569	116.618	0.000	116.618
Current President's Budget	90.595	89.306	113.622	0.000	113.622
Total Adjustments	-13.624	-27.263	-2.996	0.000	-2.996
• Congressional General Reductions	0.000	-0.163			
• Congressional Directed Reductions	0.000	-27.100			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-10.000	0.000			
• SBIR/STTR Transfer	-3.624	0.000			
• Other Adjustments	0.000	0.000	-2.996	0.000	-2.996

**Change Summary Explanation**

Fiscal Year 2020 funding reflects a Small Business Innovation Research (SBIR) adjustment of \$3.624 million and a below threshold reprogramming of \$10.0 million for higher Air Force priorities.

Fiscal Year 2021 funding reflects Congressionally Directed Reductions of \$25.6 million for "Restoring acquisition accountability: Concurrency of FT3 development" and \$1.5 million for "Restoring acquisition accountability: Schedule slip of APT-R." Fiscal Year 2021 funding also reflects a Congressional General Reduction of \$0.163 million for an undistributed mark.

Fiscal Year 2022 funding reflects a \$2.996 million reduction for higher Air Force priorities.



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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / Minuteman Squadrons	<b>Project (Number/Name)</b> 672983 / MM Ground and Comm Equipment
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
672983: MM Ground and Comm Equipment	0.000	55.627	15.879	19.811	0.000	19.811	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The MM Ground and Comm Equipment program replaces obsolete/unsupportable ground-based weapon system equipment located at Launch Control Centers (LCCs) and Launch Facilities (LFs) necessary to continue Minuteman III operations until replaced by Ground Based Strategic Deterrent (GBSD). Current efforts include development, qualification, integration, and testing of replacement equipment such as the LGM-30G Fast Rising B-Plug Service Life Extension Program (FRBP SLEP).

This program element may include necessary emergent or unanticipated civilian pay expenses required to manage, execute, and deliver Minuteman Squadron for emergent or unanticipated weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605833F or 0605831F. In FY 2020 1.100M and in FY2021 1.100M was expended for civilian pay expenses in this program element.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<b>Title:</b> LGM-30G Air Launch Control System Replacement (ALCS-R)	51.133	0.000	0.000	-	0.000
<b>Description:</b> In FY 2019, Project 672983, MM Ground and Comm Equipment - Air Launch Control System Replacement (ALCS-R) was terminated. The requirement for air-based, survivable launch capability will be fulfilled through an alternative path: a dual-capable Secondary Launch Platform - Airborne, under the Ground Based Strategic Deterrent (GBSD) program. The GBSD program is budgeted in PE 0605230F, Ground Based Strategic Deterrent.					
The purpose of the ALCS-R program was to design, develop, produce and deploy a replacement for the legacy nuclear command and control system that provides the capability to launch Intercontinental Ballistic Missiles from an airborne platform, currently the Navy E-6B, as well as consider future alternate launch requirements. The legacy system consists of a nuclear hardened radio and MM III interface at each Launch Facility, and a suite of launch and cryptographic equipment that generates and transmits commands from the E-6B. ALCS dependent on the Strategic Air Command Code Processing System for codes data supplied to airborne equipment, and the Navy E-6B radio Command, Control, and Communication data path to transmit signals to the Launch Facilities.					
<b>FY 2021 Plans:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / <i>Minuteman Squadrons</i>	<b>Project (Number/Name)</b> 672983 / <i>MM Ground and Comm Equipment</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
N/A					
<b>FY 2022 Base Plans:</b> N/A					
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> N/A					
<p><b>Title:</b> LGM-30G Fast Rising B-Plug Service Life Extension Program (FRBP SLEP)</p> <p><b>Description:</b> The Fast Rising B-Plug (FRBP) provides security functions for the Personnel Access System (PAS) of the Launch Facilities (LFs). It is a 14,000 pound cylinder with 12 locking pins used to deny/delay access to intruders during LF maintenance activities.</p> <p>This effort includes critical hardware and software modifications to address high obsolescence risk and reliability issues affecting the operational wings.</p> <p>Note: Due to a database issue, FRBP SLEP does not reflect \$1.5 million realignment of funds from FRBP SLEP to FT3. Correct Fiscal Year 2021 amount is \$14.379 million.</p> <p><b>FY 2021 Plans:</b></p> <ul style="list-style-type: none"> <li>• Complete system functional and requirements reviews</li> <li>• Preliminary Design Review</li> <li>• Test and Evaluations Planning</li> </ul> <p><b>FY 2022 Base Plans:</b></p> <ul style="list-style-type: none"> <li>• Critical Design Review</li> <li>• Test &amp; Evaluation execution</li> </ul> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increase due to program completing CDR and entering Testing and Evaluation phase.</p>	4.494	15.879	19.811	-	19.811
<b>Accomplishments/Planned Programs Subtotals</b>	55.627	15.879	19.811	-	19.811

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / <i>Minuteman Squadrons</i>	<b>Project (Number/Name)</b> 672983 / <i>MM Ground and Comm Equipment</i>
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• MPAF 03 M30MLG: <i>MM III Modifications</i>	22.617	47.640	65.690	-	65.690	-	-	-	-	-	-
• MPAF 01 00099L: <i>Missile Replacement Eq-Ballistic</i>	3.817	0.000	0.000	-	0.000	-	-	-	-	-	-
• APAF 06 000999: <i>Replen Spares/Repair Parts</i>	45.123	60.276	38.645	-	38.645	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

Ground and Communication equipment replacement efforts are reviewed to determine the best method for execution, including vendor qualification and procurement with no development required, develop and/or modification with organic depot capabilities or development with industry. Industry development for Ground and Communication equipment efforts will be executed through contracts available under the Future ICBM Sustainment and Acquisition Construct (FISAC) or competitive source selections. Nuclear Surety Cross Check Analysis (NSCCA) and Independent Verification and Validation (IV&V) efforts are contracted separately. Nuclear Surety and Vulnerability analysis requirements are covered in the Acquisition Strategy.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / Minuteman Squadrons	<b>Project (Number/Name)</b> 672983 / MM Ground and Comm Equipment
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
LGM-30G Airborne Launch Control Center Replacement (ALCS-R) TMRR Contractor A	C/FPIF	Lockheed Martin : Littleton, CO	0.000	19.166	Dec 2019	-		-		-		-	-	-	-
LGM-30G Airborne Launch Control Center Replacement (ALCS-R) TMRR Contractor B	C/FPIF	Rockwell Collins : Cedar Rapids, IA	0.000	21.188	Dec 2019	-		-		-		-	-	-	-
LGM-30G Airborne Launch Control Center Replacement (ALCS-R) SIL	MIPR	Aerospace : El Segundo, CA	0.000	0.079	May 2020	-		-		-		-	-	-	-
LGM-30G Fast Rising B-Plug Service Life Extension Program (FRBP SLEP) EMD	C/CPFF	Northrop Grumman : Salt Lake City, UT	0.000	3.357	Aug 2020	12.561	Oct 2020	16.396	Oct 2021	-		16.396	-	-	21.949
<b>Subtotal</b>			0.000	43.790		12.561		16.396		-		16.396	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
LGM-30G Airborne Launch Control Center Replacement (ALCS-R) Testing	Various	Various : Various	0.000	1.224	Dec 2019	-		-		-		-	-	-	-
LGM-30G Fast Rising B-Plug Service Life Extension Program (FRBP SLEP) Test & Evaluation	Various	Various : Various	0.000	0.132	Jan 2020	0.761	Oct 2020	0.838	Oct 2021	-		0.838	-	-	0.000
<b>Subtotal</b>			0.000	1.356		0.761		0.838		-		0.838	-	-	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / Minuteman Squadrons	<b>Project (Number/Name)</b> 672983 / MM Ground and Comm Equipment
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<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
LGM-30G Airborne Launch Control Center Replacement (ALCS-R) Integration Support Contract	C/FP	BAE : Layton, UT	0.000	3.494	Oct 2019	-		-		-		-	-	-	-
LGM-30G Airborne Launch Control Center Replacement (ALCS-R) A&AS	C/FPIF	BAE : Layton, UT	0.000	1.753	Oct 2019	-		-		-		-	-	-	-
LGM-30G Airborne Launch Control Center Replacement (ALCS-R) PMA	Various	Various : Various	0.000	4.229	Oct 2019	-		-		-		-	-	-	-
LGM-30G Fast Rising B-Plug Service Life Extension Program (FRBP SLEP) A&AS	C/FP	BAE : Layton, UT	0.000	0.721	Dec 2019	0.903	Nov 2020	0.753	Oct 2021	-		0.753	-	-	3.692
LGM-30G Fast Rising B-Plug Service Life Extension Program (FRBP SLEP) PMA	Various	Various : Various	0.000	0.284	Apr 2020	1.654	Jan 2021	1.824	Jan 2022	-		1.824	-	-	0.000
<b>Subtotal</b>			0.000	10.481		2.557		2.577		-		2.577	-	-	N/A

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	0.000	55.627	15.879	19.811	-	19.811	-	-	N/A

**Remarks**

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**Exhibit R-4, RDT&E Schedule Profile:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / <i>Minuteman Squadrons</i>	<b>Project (Number/Name)</b> 672983 / <i>MM Ground and Comm Equipment</i>
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
<b><i>MM Ground and Comm Equipment</i></b>																													
FRBP SLEP Milestone B (Aug 2020)																													
FRBP SLEP Engineering & Manufacturing Development Phase																													
FRBP SLEP Milestone C (Jan 2023)																													
FRBP SLEP Production & Deployment Phase																													
FRBP SLEP FOC (Mar 2026)																													

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / <i>Minuteman Squadrons</i>	<b>Project (Number/Name)</b> 672983 / <i>MM Ground and Comm Equipment</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>MM Ground and Comm Equipment</i></b>				
FRBP SLEP Milestone B (Aug 2020)	4	2020	4	2020
FRBP SLEP Engineering & Manufacturing Development Phase	4	2020	2	2023
FRBP SLEP Milestone C (Jan 2023)	2	2023	2	2023
FRBP SLEP Production & Deployment Phase	2	2023	2	2026
FRBP SLEP FOC (Mar 2026)	2	2026	2	2026

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0101213F / Minuteman Squadrons				<b>Project (Number/Name)</b> 672984 / MM III Baseline Support			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
672984: MM III Baseline Support	0.000	14.816	68.983	90.123	0.000	90.123	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

MM III Baseline Support program replaces or upgrades obsolete/unsupportable flight test unique equipment installed on the missile during flight test, used to test MM III systems on the ground, or located at test facilities to collect, process, and analyze test data. Flight test equipment supports test and evaluation of MM III capabilities, and MM III Operational Test Launches (OTLs) to determine ICBM force readiness, reliability and capability shortfalls. Efforts include development, qualification, integration and testing of replacement equipment such as LGM-30G Arm Disarm Switch Replacement (ADSR) and LGM-30G Flight Test Telemetry and Termination System (FT3). As other similar equipment is identified for replacement, it will be added to this program. MM III Baseline Support also provides for other MM III unique government costs, studies of system performance, contract closeout costs, cost trades and acquisition planning activities, up to and including proposal preparation, for future capabilities.

This program element may include necessary emergent or unanticipated civilian pay expenses required to manage, execute, and deliver Minuteman Squadron for emergent or unanticipated weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605833F or 0605831F. In FY 2020 1.100M and in FY2021 1.100M was expended for civilian pay expenses in this program element.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<b>Title:</b> LGM-30G Arm Disarm Switch Replacement (ADSR)	6.404	4.274	0.161	-	0.161
<p><b>Description:</b> The ADSR program designs, develops, fabricates and tests replacements for the aging Arm/Disarm (A/D) switches currently on the MM III Missile fleet. The A/D switch is responsible for completing or interrupting ordnance electrical circuits. A/D switches are placed at five key locations in the system: Interstage I-II, Stage II Liquid Injection Thrust Vector Control (LITVC) and Roll Control, Interstage II-III, PSRE Staging, and PSRE Isolation Valves. Aging and surveillance is an ongoing study to generate a trade-off curve between reliability/availability and cost.</p> <p>Reliability/availability are monitored by periodic testing to discover unforeseen issues. Because not all existing A/D switches can be repaired/refurbished, the number in inventory will eventually be inadequate to meet the need of the PDM cycle. Supply is estimated to deplete by approximately FY24 with repair/refurbish mitigation. Repair/refurbish is a reliable mitigation plan to meet the ongoing needs of the fleet while a manufacturer is selected and the manufacturing system is selected to develop a replacement A/D switch that meets requirements and production quantities through 2036.</p> <p><b>FY 2021 Plans:</b></p>					



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / <i>Minuteman Squadrons</i>	<b>Project (Number/Name)</b> 672984 / <i>MM III Baseline Support</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<ul style="list-style-type: none"> <li>• Conduct qualification testing on A/D designs</li> <li>• Conduct Critical Design Review activities</li> </ul> <p><b>FY 2022 Base Plans:</b></p> <ul style="list-style-type: none"> <li>• Conclude qualification testing</li> <li>• Conduct Milestone C</li> </ul> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreased due to conclusion of EMD activities and commencement of Production and Deployment effort.</p>					
<p><b>Title:</b> LGM-30G Flight Test Telemetry and Termination System (FT3)</p> <p><b>Description:</b> The FT3 Program replaces the Mod 7 Instrumentation Wafer (Mod 7) and associated Signal Conditioner Monitor Group, and All Ordnance Destruct System (AODS) with a flight test kit. In addition, a replacement of the Launch Support System (LSS) is required to deploy the flight test kit. The flight test kit which consists of the Flight Destruct System (FDS) and a wafer-less Integrated Instrumentation System (IIS), along with an upgraded LSS, will meet 30th Space Wing Range Safety and Air Force Global Strike Command (AFGSC) requirements and resolve obsolescence concerns/issues.</p> <p>The AODS, Mod 7 Instrumentation Wafer, and LSS include many components that are not economically available, are no longer compliant with applicable Range Safety requirements, or are in need of technical modernization. Replacement of the Vandenberg Air Force Base flight test unique equipment is necessary to sustain future AFGSC Operational Test Launches (OTL), supporting USSTRATCOM requirements starting in FY22.</p> <p>The OTLs are critical to validating the continued accuracy and reliability of the MM III ICBM Weapon System until Ground Based Strategic Deterrent (GBSD) is fielded by providing valuable data to ensure a safe, secure, and effective nuclear deterrent. The FT3 System of Systems (SoS) will perform the same function as the existing systems with upgraded design features in order to comply with Air Force Space Command Manual (AFSPCMAN) 91-710, Range Safety User Requirements, Range Commander's Council 319, Flight Termination Systems Commonality Standard, and RCC-324, Global Positioning and Inertial Measurements Range Safety Tracking Systems' Commonality Standard.</p> <p>As of Feb 2020, the FT3 Program is executing to a Rapid Fielding replan to meet a requirement to be first launch ready, Oct 2022. Rapid Fielding requires concurrent activities in order to meet required first launch ready</p>	7.797	64.578	89.506	-	89.506

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / <i>Minuteman Squadrons</i>	<b>Project (Number/Name)</b> 672984 / <i>MM III Baseline Support</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
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date; failure to be first flight ready in Oct 2022 jeopardizes MMIII OTL schedule. Rapid Fielding execution has increased concurrency of technical milestones, delaying some noncritical activities to post first flight (Oct 2022).

Note: Due to a database issue, FT3 does not reflect 1.5 million realignment of funds from FRBP SLEP to FT3. Correct Fiscal Year 2021 amount is 66.078 million.

***FY 2021 Plans:***

- Conclude component qualification testing
- Conclude LSS system-level qualification testing
- Conclude flight system-level qualification testing
- Request and receive Limited Deployment Decision for LSS
- Begin LSS install activities in one launch facility
- Install new Integrated Launch Support Center
- Conduct System of Systems Level TRR

***FY 2022 Base Plans:***

- Conduct System of Systems Level qualification testing at Utah Lab
- Conduct System of Systems Level qualification testing at Vandenberg AFB CA
- Complete Flight Systems Production Readiness Review
- Complete Milestone C
- Conduct Systems Verification Review (SVR) #1
- Deliver first flight test kit
- Prepare for first launch

***FY 2021 to FY 2022 Increase/Decrease Statement:***

Funding increased due to system of systems qualification test activities.

***Title:*** LGM-30G Baseline Support

***Description:*** This program provides for other MM III unique government costs, studies of system performance, contract closeout costs, cost trades, and acquisition planning activities, up to and including proposal preparation, for future capabilities.

***FY 2021 Plans:***

- Conduct studies of system performance.

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<p><b><i>Title:</i></b> LGM-30G Baseline Support</p> <p><b><i>Description:</i></b> This program provides for other MM III unique government costs, studies of system performance, contract closeout costs, cost trades, and acquisition planning activities, up to and including proposal preparation, for future capabilities.</p> <p><b><i>FY 2021 Plans:</i></b></p> <ul style="list-style-type: none"> <li>• Conduct studies of system performance.</li> </ul>	0.615	0.131	0.456	-	0.456

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / <i>Minuteman Squadrons</i>	<b>Project (Number/Name)</b> 672984 / <i>MM III Baseline Support</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<ul style="list-style-type: none"> <li>Conduct cost trades and acquisition planning activities, up to and including proposal preparation, for future capabilities.</li> </ul> <p><b>FY 2022 Base Plans:</b></p> <ul style="list-style-type: none"> <li>Conduct studies of system performance.</li> <li>Conduct cost trades and acquisition planning activities, up to and including proposal preparation, for future capabilities.</li> </ul> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increased due to increase in number of studies.</p>					
<b>Accomplishments/Planned Programs Subtotals</b>	14.816	68.983	90.123	-	90.123

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• MPAF 03 M30MLG: <i>Minuteman III Modifications BP21</i>	0.000	0.000	4.534	-	4.534	-	-	-	-	-	-
• MPAF 01 00099L: <i>Missile Replacement Eq-Ballistic</i>	0.000	0.000	0.000	-	0.000	-	-	-	-	-	-
• 000999: <i>Replen Spares/Repair Parts</i>	45.123	60.276	38.645	-	38.645	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

Baseline Support equipment replacement efforts are reviewed to determine the best method for execution, including vendor qualification and procurement with no development required, develop and/or modification with organic depot capabilities or development with industry. Industry development for Baseline Support equipment efforts will be executed through contracts available under competitive source selections. Nuclear Surety Cross Check Analysis (NSCCA) and Independent Verification and Validation (IV&V) efforts are contracted separately. Nuclear Surety and Vulnerability analysis requirements are covered in the Acquisition Strategy.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / Minuteman Squadrons	<b>Project (Number/Name)</b> 672984 / MM III Baseline Support
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
LGM-30G Arm Disarm Switch Replacement (ADSR)	C/CPFF	MOOG/ BIONETICS/ EBAD : Moorpark, CA. Blacksburg VA. Heath OH, CA	0.000	6.063	Jun 2020	3.602	Oct 2020	-		-		-	-	-	8.587
LGM-30G Flight Test Telemetry and Termination System (FT3) TMRR/EMD	C/CPIF	Boeing : Clearfield, UT	0.000	6.720	Feb 2020	52.917	Dec 2020	75.376	Dec 2021	-		75.376	-	-	177.789
LGM-30G Flight Test Telemetry and Termination System (FT3) MOTP	C/CPIF	Northrop Grumman : Clearfield, UT	0.000	0.000	Jul 2020	0.000		-		-		-	-	-	-
<b>Subtotal</b>			0.000	12.783		56.519		75.376		-		75.376	-	-	N/A

<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
LGM-30G Arm Disarm Switch Replacement (ADSR) Support	C/Variou	Hill AFB : Clearfield, UT	0.000	0.139	Jan 2020	0.139	Jan 2021	0.161	Jan 2022	-		0.161	-	-	-
LGM-30G Flight Test Telemetry and Termination System (FT3) Support	C/Variou	Various : Clearfield, UT	0.000	0.000	Sep 2020	4.549	Oct 2020	5.599	Nov 2021	-		5.599	-	-	-
LGM-30G Baseline Support	C/Variou	Various : Various	0.000	0.615	Mar 2020	0.131	Mar 2021	0.456	Mar 2022	-		0.456	-	-	-
<b>Subtotal</b>			0.000	0.754		4.819		6.216		-		6.216	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
LGM-30G Flight Test Telemetry and Termination System (FT3) NSCCA-PATE	C/Variou	Northrop Grumman : Clearfield, UT	0.000	0.000	Jun 2020	-		-		-		-	-	-	-

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / Minuteman Squadrons	<b>Project (Number/Name)</b> 672984 / MM III Baseline Support
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<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
LGM-30G Flight Test Telemetry and Termination System (FT3) Lead Developmental Test Organization	MIPR	AEDC/TST : AAFB, TN	0.000	0.000	Oct 2020	0.659	Dec 2020	0.344	Nov 2021	-		0.344	-	-	-
<b>Subtotal</b>			0.000	0.000		0.659		0.344		-		0.344	-	-	N/A

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
LGM-30G Arm Disarm Switch Replacement (ADSR) PMA	Various	Various : Various	0.000	0.202	Jan 2020	0.533	Jan 2021	-		-		-	-	-	-
LGM-30G Flight Test Telemetry and Termination System (FT3) PMA	Various	Various : Various	0.000	0.000	Jan 2020	5.392	Oct 2020	6.436	Nov 2021	-		6.436	-	-	-
LGM-30G Flight Test Telemetry and Termination System (FT3) A&AS	C/FFP	Various : Clearfield, UT	0.000	1.077	Feb 2020	1.061	Oct 2020	1.751	Nov 2021	-		1.751	-	-	-
<b>Subtotal</b>			0.000	1.279		6.986		8.187		-		8.187	-	-	N/A

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	0.000	14.816	68.983	90.123	-	90.123	-	-	N/A

**Remarks**



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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / <i>Minuteman Squadrons</i>	<b>Project (Number/Name)</b> 672984 / <i>MM III Baseline Support</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>MM III Baseline Support</i></b>				
ADSR Milestone B (Mar 2020)	2	2020	2	2020
ADSR Engineering and Manufacturing Development Phase	2	2020	1	2022
ADSR PDR (July 2020)	4	2020	4	2020
ADSR CDR (Jan 2021)	2	2021	2	2021
ADSR Milestone C (Jan 2022)	2	2022	2	2022
ADSR Production and Deployment Phase	2	2022	4	2023
FT3 Engineering and Manufacturing Development Phase	1	2020	3	2024
FT3 PRR (Feb 2022)	2	2022	2	2022
FT3 Milestone C (Mar 2022)	2	2022	2	2022
FT3 Production and Deployment Phase	2	2021	3	2024
FT3 RAA (Jun 2022)	3	2022	3	2022
FT3 Operations and Support Phase	2	2022	4	2026

**Note**

FT3 Program:

- EMD and the P&D Phases overlap due to Rapid Fielding concurrent activities required during the EMD effort to meet need date for first flight
- P&D Phase begins earlier than MS C due to a Limited Deployment Decision for LSS; LSS must be installed prior to FT3 System of Systems qualification testing
- Only one LSS will be produced and installed. The LSS is the ground system that integrates with the flight test kit
- P&D Phase ends when the last of the eight LRIPs fly, 4QFY24
- O&S Phase begins when the FT3 Program awards contract to start production of replenishment spares, 2QFY22 (3020 BP25)
- Plan is to purchase up to 36 FRP units (up to 4 per year) which will support the MMIII OTL mission
- O&S phase will include sustainment of the LSS and associated FT3 support equipment (3400) through the life of MMIII OTL

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0101213F / Minuteman Squadrons				Project (Number/Name) 672985 / MM Support Equip			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
672985: MM Support Equip	0.000	6.859	0.000	0.000	0.000	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

MM Support Equipment program designs, develops, and tests replacement of obsolete/non-serviceable weapon system support equipment. These programs will also implement processes, procedures and data systems to mitigate the transition risk from MM III to Ground Based Strategic Deterrent (GBSD). Efforts include design, development, and testing of support equipment such as LGM-30G Pendulous Integrating Gyroscopic Accelerometer/G6B4 Build Equipment Replacement (PIGA/G6B4 BER) and LGM-30G Control Monitor Procedure Trainer Upgrade (CMPT).

This program element may include necessary emergent or unanticipated civilian pay expenses required to manage, execute, and deliver Minuteman Squadron for emergent or unanticipated weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605833F or 0605831F. In FY 2020 1.100M and in FY2021 1.100M was expended for civilian pay expenses in this program element.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p><b>Title:</b> LGM-30G Pendulous Integrated Gyroscopic Accelerometer/G6B4 Build Equipment Replacement (PIGA/G6B4 BER)</p> <p><b>Description:</b> The Minuteman III PIGA and G6B4 gyros are repaired at the Boeing Guidance Repair Center (BGRC) in Heath, OH. PIGAs and G6B4s are repaired and tested for operational readiness using the government furnished PIGA &amp; G6B4 Build Equipment which is 30 years old and in need of replacement. The PIGA and G6B4 BER Program uses the current configuration as a baseline and replaces obsolete components with COTS components where possible.</p> <p><b>FY 2021 Plans:</b> N/A</p> <p><b>FY 2022 Base Plans:</b> N/A</p> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> N/A</p>	4.972	0.000	0.000	0.000	0.000
<p><b>Title:</b> LGM-30G Control Monitor Procedure Trainer Upgrade (CMPT)</p>	1.887	0.000	0.000	-	0.000



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / <i>Minuteman Squadrons</i>	<b>Project (Number/Name)</b> 672985 / <i>MM Support Equip</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<p><b>Description:</b> CMPT replaces the classroom trainer supporting start-up and shut-down of the MM III LF and missile, computer memory loading operations, and maintenance procedures. The program updated software, outdated operating systems, and obsolete/unsupportable hardware (desktop computers, motherboards, simulated programmer group, drivers, simulated cable sets, tape sets, and other miscellaneous parts) located at each Missile Wing and Vandenberg AFB necessary to continue support training capability of the CMPTs through 2030.</p> <p><b>FY 2021 Plans:</b> N/A</p> <p><b>FY 2022 Base Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> N/A</p>					
<b>Accomplishments/Planned Programs Subtotals</b>	6.859	0.000	0.000	0.000	0.000

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• MPAF 03 M30MLG: <i>MM III Modifications</i>	0.258	0.000	0.000	-	0.000	-	-	-	-	-	-
• MPAF 01 00099L: <i>Missile Replacement Eq-Ballistic</i>	57.493	69.868	54.316	-	54.316	-	-	-	-	-	-
• 000999: <i>Replen Spares/Repair Parts</i>	45.123	60.276	38.645	-	38.645	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

Support and test equipment replacement efforts are reviewed to determine the best method for execution including vendor qualification and procurement with no development required, develop and/or modification with organic depot capabilities or development with industry. Industry development efforts for support equipment will be executed through contracts available under the Future ICBM Sustainment and Acquisition Construct (FISAC) or competitive source selections. Nuclear Surety Cross Check Analysis (NSCCA) and Independent Verification and Validation (IV&V) efforts are contracted separately. Nuclear Surety and Vulnerability analysis requirements are covered in the Acquisition Strategy.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / Minuteman Squadrons	<b>Project (Number/Name)</b> 672985 / MM Support Equip
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
LGM-30G Pendulous Integrating Gyroscopic Accelerometer/G6B4 Build Equipment Replacement (PIGA/G6B4 BER)	SS/FPIF	Boeing : Layton, UT	0.000	4.709	Oct 2020	-		-		-		-	-	-	-
LGM-30G Control Monitor Procedure Trainer Upgrade (CMPT) EMD	PO	309th SMXG : Hill AFB, UT	0.000	1.281	Jun 2020	-		-		-		-	-	-	-
<b>Subtotal</b>			0.000	5.990		-		-		-		-	-	-	N/A

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
LGM-30G Pendulous Integrating Gyroscopic Accelerometer/G6B4 Build Equipment Replacement (PIGA/G6B4 BER) PMA	Various	Various : Various	0.000	0.263	Nov 2020	-		-		-		-	-	-	-
LGM-30G Control Monitor Procedure Trainer Upgrade (CMPT) PMA	Various	Various : Various	0.000	0.188	Jan 2020	-		-		-		-	-	-	-
LGM-30G Control Monitor Procedure Trainer Upgrade (CMPT) A&AS	C/FFP	BAE : Clearfield, UT	0.000	0.418	Mar 2020	-		-		-		-	-	-	-
<b>Subtotal</b>			0.000	0.869		-		-		-		-	-	-	N/A

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
	<b>Project Cost Totals</b>		0.000	6.859	0.000	-	-	-	-

**Remarks**

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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / <i>Minuteman Squadrons</i>	<b>Project (Number/Name)</b> 672985 / <i>MM Support Equip</i>
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FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>MM Support Equipment</b>																																
PIGA/G6B4 BER TMRR Phase																																
PIGA/G6B4 BER Milestone B (Jan 2021)																																
PIGA/G6B4 BER Engineering and Manufacturing Development Phase																																
PIGA/G6B4 BER CDR (Sept 2021)																																
PIGA/G6B4 BER TRR (Jun 2022)																																
PIGA/G6B4 BER RAA (Jan 2023)																																
CMPT Engineering and Manufacturing Development Phase																																
CMPT Milestone C (Jun 2020)																																
CMPT Production and Deployment Phase																																
CMPT RAA (Sept 2020)																																

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / <i>Minuteman Squadrons</i>	<b>Project (Number/Name)</b> 672985 / <i>MM Support Equip</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>MM Support Equipment</i></b>				
PIGA/G6B4 BER TMRR Phase	1	2020	4	2020
PIGA/G6B4 BER Milestone B (Jan 2021)	2	2021	2	2021
PIGA/G6B4 BER Engineering and Manufacturing Development Phase	2	2021	2	2023
PIGA/G6B4 BER CDR (Sept 2021)	4	2021	4	2021
PIGA/G6B4 BER TRR (Jun 2022)	3	2022	3	2022
PIGA/G6B4 BER RAA (Jan 2023)	2	2023	2	2023
CMPT Engineering and Manufacturing Development Phase	1	2020	3	2020
CMPT Milestone C (Jun 2020)	3	2020	3	2020
CMPT Production and Deployment Phase	4	2020	4	2020
CMPT RAA (Sept 2020)	4	2020	4	2020

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0101213F / <i>Minuteman Squadrons</i>				<b>Project (Number/Name)</b> 672986 / <i>MM Crypto Mods</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
672986: <i>MM Crypto Mods</i>	0.000	13.293	4.444	3.688	0.000	3.688	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

MM Crypto Mods executes United States Strategic Command, Air Force Global Strike Command, and Air Force Safety Center requirements by implementing the KS-60 capabilities in LGM-30G ICBM Cryptography Upgrade II (ICU II) of Remote Key/Code Change and Irreversible Transformation as mandated in the approved Capabilities Development Document (dated 4 Jan 05) and addresses Nuclear Weapon System Safety Group Operational Safety Review requirements 98-2, 00-1 and 02-2. It also incorporates Continuous Signal Lockout capabilities to prevent the widespread loss of status monitoring. These features will greatly increase security during code changes by reducing the frequency of open sites by 75 days annually and will reduce associated resource costs for 450 Launch Facilities (LFs) and 45 Launch Control Centers (LCCs).

This program element may include necessary emergent or unanticipated civilian pay expenses required to manage, execute, and deliver Minuteman Squadron for emergent or unanticipated weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605833F or 0605831F. In FY 2020 1.100M and in FY2021 1.100M was expended for civilian pay expenses in this program element.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<b>Title:</b> LGM-30G ICBM Cryptography Upgrade II (ICU II)	13.293	4.444	3.688	-	3.688
<b>Description:</b> ICU II completes design and development, implements KS-60 remote key/code change, irreversible transformation capabilities, and prevents continuous signal lockout.					
<b>FY 2021 Plans:</b>					
• Continue Guided Missile Launcher Electronic Circuit (GMLEC) interface modification					
• Conclude Depot Support Equipment (DSE) development					
<b>FY 2022 Base Plans:</b>					
• Continue Guided Missile Launcher Electronic Circuit (GMLEC) interface modification					
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b>					
Funding decreased due to completion of Depot Support Equipment contract.					
<b>Accomplishments/Planned Programs Subtotals</b>	13.293	4.444	3.688	-	3.688

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / <i>Minuteman Squadrons</i>	<b>Project (Number/Name)</b> 672986 / <i>MM Crypto Mods</i>
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• MPAF 03 M30MLG: <i>MM III Modifications</i>	26.288	33.337	10.782	-	10.782	-	-	-	-	-	-
• MPAF 04 Line Item 000999: <i>Replen Spares/ Repair Parts BP25/26</i>	45.123	60.276	38.645	-	38.645	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

LGM-30G ICBM Cryptography Upgrade II (ICU II) program utilizes the ICBM Prime Integration Contract (IPIC) services of Northrop Grumman (NG), which were competitively awarded for the design and development of the ICU II capability. The contract type of the ICU II Engineering and Manufacturing Development (EMD) contract is Cost Plus Incentive Fee. Also, ICU II EMD uses a separate contract for Nuclear Safety Cross Check Analysis/Performance Analysis and Technical Evaluation (NSCCA/PATE) Independent Validation & Verification (IV&V). This contract is driven by critical nuclear safety requirements to perform an independent assessment of all modifications to nuclear-certified software. The Support Equipment effort includes EMD development of Depot Support Equipment, Guided Missile Launch Electronic Circuit (GMLEC) interface modification, and Acoustic Microscope System. Nuclear Safety and Vulnerability analysis requirements are covered in the Acquisition Strategy.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / Minuteman Squadrons	<b>Project (Number/Name)</b> 672986 / MM Crypto Mods
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
LGM-30G ICBM Cryptography Upgrade II EMD	C/CPIF	Northrop Grumman : Clearfield, UT	0.000	0.070	Oct 2019	-		-		-		-	-	-	160.400
LGM-30G ICBM Cryptography Upgrade II Support Equipment development	C/CPFF	Northrop Grumman : Clearfield, UT	0.000	8.244	Oct 2019	-		-		-		-	-	-	29.300
LGM-30G ICBM Cryptography Upgrade II Support GMLEC	C/CPFF	Northrop Grumman : Clearfield, UT	0.000	2.170	Jun 2020	3.392	Jan 2021	2.805	Jan 2022	-		2.805	-	-	8.367
<b>Subtotal</b>			0.000	10.484		3.392		2.805		-		2.805	-	-	N/A

<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
LGM-30G ICBM Cryptography Upgrade II Nuclear Safety Support (NSCCA/IV&V)	C/CPFF	Northrop Grumman : Clearfield, UT	0.000	1.962	Oct 2019	-		-		-		-	-	-	7.400
LGM-30G ICBM Cryptography SIBR & FFRDC Support	Various	Various : Various	0.000	-		0.264	Jan 2021	0.223	Jan 2022	-		0.223	-	-	-
<b>Subtotal</b>			0.000	1.962		0.264		0.223		-		0.223	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
LGM-30G ICBM Cryptography Upgrade II LDTO	PO	AEDC/TSTS : Arnold AFB, TN	0.000	-		0.075	Nov 2020	0.051	Nov 2021	-		0.051	-	-	-
<b>Subtotal</b>			0.000	-		0.075		0.051		-		0.051	-	-	N/A





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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date: May 2021**

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / <i>Minuteman Squadrons</i>	<b>Project (Number/Name)</b> 672986 / <i>MM Crypto Mods</i>
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b><i>MM Crypto Mods</i></b>	
ICU II Engineering and Manufacturing Development Phase	
ICU II Support Equipment Engineering and Manufacturing Development Phase	
ICU II Engineering and Manufacturing Development Phase (GMLEC)	
ICU II Production and Deployment Phase	
ICU II Required Assets Available (RAA) for Initial Operational Capability (IOC)(Jun 2022)	
ICU II Required Assets Available (RAA) for Full Operational Capability (FOC) (Jan 2024)	

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / <i>Minuteman Squadrons</i>	<b>Project (Number/Name)</b> 672986 / <i>MM Crypto Mods</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>MM Crypto Mods</i></b>				
ICU II Engineering and Manufacturing Development Phase	1	2020	2	2020
ICU II Support Equipment Engineering and Manufacturing Development Phase	1	2020	1	2021
ICU II Engineering and Manufacturing Development Phase (GMLEC)	3	2020	1	2023
ICU II Production and Deployment Phase	1	2020	2	2024
ICU II Required Assets Available (RAA) for Initial Operational Capability (IOC)(Jun 2022)	3	2022	3	2022
ICU II Required Assets Available (RAA) for Full Operational Capability (FOC) (Jan 2024)	2	2024	2	2024

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0101316F / <i>Worldwide Joint Strategic Communications</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	25.312	31.166	15.202	0.000	15.202	-	-	-	-	-	-
671820: <i>Strategic Automated Command and Control System</i>	-	25.312	31.166	15.202	0.000	15.202	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

Worldwide Joint Strategic Communication efforts include Nuclear Command, Control, and Communications (NC3) systems to include the Defense Injection Reception Emergency Action Message (EAM) C2 Terminals (DIRECT), Aircrew Alerting Communications Electromagnetic Pulse (AACE), the Strategic Emergency Action Transmission System (SEATS), the Defense Red Switch Network (DRSN), and the Strategic Automated Command and Control System (SACCS). Funding may be used to modernize these, and other, NC3 systems. Funding may also be used for research, testing, validation, certification, configuration management, and assessment of the Air Force NC3 Weapon System.

SACCS is a dedicated, high speed, multi-level secure, data transmission, processing, and display system. SACCS provides the primary non-survivable command and control capability for receiving and disseminating secure Emergency Action Messages (EAM), Force Direction Messages (FDM), Force Status Reporting (FSR), and exchanging information type messages from USSTRATCOM. SACCS provides messages for effective deployment of strategic bombers, reconnaissance aircraft, mobilization aircraft, tanker support aircraft, and the Intercontinental Ballistic Missile (ICBM) force.

SACCS has equipment that has reached its end of life and is no longer repairable due to diminished manufacturing sources and parts obsolescence. This jeopardizes Air Force Global Strike Command's (AFGSC) ability to meet mission requirements as required by Chairman Joint Chief of Staff Nuclear Technical Performance Criteria and Operational Standards (CJCSI 6811.01). In order to mitigate the risk of SACCS inability to operate once the current spares are completely diminished, and ensure the system remains secure against modern/future threats, the Air Force is developing a replacement system (SACCS-R).

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program elements 0605831F and 0605833F. In FY2020 \$0.294M and in FY2021 \$0.564M was expended for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0101316F / <i>Worldwide Joint Strategic Communications</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	26.177	27.235	15.430	0.000	15.430
Current President's Budget	25.312	31.166	15.202	0.000	15.202
Total Adjustments	-0.865	3.931	-0.228	0.000	-0.228
• Congressional General Reductions	0.000	-0.057			
• Congressional Directed Reductions	0.000	-4.012			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	8.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.865	0.000			
• Other Adjustments	0.000	0.000	-0.228	0.000	-0.228

**Congressional Add Details (\$ in Millions, and Includes General Reductions)**

**Project:** 671820: *Strategic Automated Command and Control System*

Congressional Add: *NC3 Architecture*

	<b>FY 2020</b>	<b>FY 2021</b>
	7.736	8.000
Congressional Add Subtotals for Project: 671820	7.736	8.000
Congressional Add Totals for all Projects	7.736	8.000

**Change Summary Explanation**

FY2021 Congressional Add 8.0M NC3 Architecture  
 FY2021 SACCS-R Congressional Reduction -4.012M

**C. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> SACCS Replacement	17.576	23.166	15.202
<b>Description:</b> Design and develop replacement Strategic Automated Command Control System (SACCS-R). Transition architecture from Time Division Multiplexing to Internet Protocol (TDM-IP). Replace legacy components with supportable networking and information system hardware. The new system will mitigate cybersecurity risks, improves Mean Time Between Failure rates, reliability, availability, improves user interface, decreases annual sustainment costs, addresses Diminishing Manufacturing Sources and Material Shortages and obsolescence challenges, and meets Chairman Joint Chiefs of Staff Nuclear Technical Performance Criteria and Operational Standards (CJCSI 6811.01).			
<b>FY 2021 Plans:</b>			

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0101316F / <i>Worldwide Joint Strategic Communications</i>
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<ul style="list-style-type: none"> <li>- Continue Technology Maturation and Risk Reduction efforts to include a temporary modification to address near term obsolescence issues</li> <li>- Continue transition of TDM circuits to IP circuits through DISA process for establishing new circuits. Order circuits through DISA storefront</li> <li>- Complete last mile installation of new circuits from DISA point of presence to the SACCS terminal</li> <li>- Conduct site modification of SACCS desktop terminals to implement the IP transition</li> <li>- Conduct test readiness review (TRR) and testing on the temporary modification and transition existing SACCS desktop and portable terminals to an IP network</li> <li>- Continue development of Network Operations Center/Security Operations Center (NOC/SOC) and initiate testing of TDM-IP systems with the NOC/SOC</li> <li>- Continue development of the system solution to address the multi-level security requirement (Cross Domain Solution - CDS)</li> <li>- Initiate development of modifications to the Higher Authority Communications/Rapid Message Processing Element (HAC/RMPE), and the Launch Control Center (LCC) end user terminal to support SACCS-R implementation</li> <li>- Start design of updated NMHS interface changes</li> <li>- Start design of Black IP Transport (Storm Cloud) for implementation in SACCS</li> <li>- Initiate preliminary design for the modifications to the Missile Procedure Trainer (MPT) to support SACCS-R implementation at the LCCs</li> <li>- Initiate purchases of development hardware to support replacement of obsolescent equipment at the SACCS Operation Center</li> <li>- Initiate software development effort for modernization of SACCS terminals and SACCS Operations Center</li> <li>- Develop, Design, and Purchase new Port Expansion Processors (PEP) to support TDM-IP effort</li> </ul> <p><b>FY 2022 Plans:</b></p> <ul style="list-style-type: none"> <li>- Continue Technology Maturation and Risk Reduction efforts to include a temporary modification to address near term obsolescence issues</li> <li>- Continue transition of TDM circuits to IP circuits through DISA process for establishing new circuits. Order circuits through DISA storefront</li> <li>- Complete last mile installation of new circuits from DISA point of presence to the SACCS terminal</li> <li>- Continue site modification of SACCS desktop terminals to implement the IP transition</li> <li>- Continue development of NOC/SOC and initiate TRR and continue testing of TDM-IP systems with the NOC/SOC</li> <li>- Conduct the initial fielding of the NOC/SOC</li> <li>- Continue development of the system solution to address the multi-level security requirement (Cross Domain Solution - CDS)</li> <li>- Continue development of modifications to the HAC/RMPE, and the Launch Control Center (LCC) end user terminal to support SACCS-R implementation</li> <li>- Continue design of updated Navy Modernized Hybrid Solution (NMHS) interface changes</li> </ul>			

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0101316F / <i>Worldwide Joint Strategic Communications</i>		
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<ul style="list-style-type: none"> <li>- Continue design of Black IP Transport (Storm Cloud) for implementation in SACCS</li> <li>- Continue preliminary design for the modifications to the Missile Procedure Trainer (MPT) to support SACCS-R implementation at the LCCs</li> <li>- Continue purchases of development hardware to support replacement of obsolescent equipment at the SACCS Operation Center</li> <li>- Continue software development effort for modernization of SACCS terminals and SACCS Operations Center</li> <li>- Continue the purchase new Port Expansion Processors (PEP) to support TDM-IP effort</li> <li>- Integrate and test new PEP into the SACCS</li> </ul> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decrease due to leveling efforts to implement/test temporary modification to support interim TDM-IP transition/OMNI Crypto replacement.</p>				
<b>Accomplishments/Planned Programs Subtotals</b>		17.576	23.166	15.202
		<b>FY 2020</b>	<b>FY 2021</b>	
<b>Congressional Add:</b> NC3 Architecture		7.736	8.000	
<p><b>FY 2020 Accomplishments:</b> - Provided AFGSC innovation and analysis capability through Modeling and Simulation activities, Airman development, leadership development, and Concept for Force Development activities</p> <ul style="list-style-type: none"> <li>- Provided analysis capability to fund access to FFRDCs and UARCs for AFGSC Decision Support</li> <li>- Continued development of NC3 200/300 courseware for Airman</li> <li>- Standing up StrikeWERX node (innovation center) at the Cyber Innovation Facility (CIC) complex</li> </ul> <p><b>FY 2021 Plans:</b> - Provided AFGSC innovation and analysis capability through Modeling and Simulation activities, Airman development, leadership development, and Concept for Force Development activities</p> <ul style="list-style-type: none"> <li>- Provided analysis capability to fund access to FFRDCs and UARCs for AFGSC Decision Support</li> <li>- Continued development of NC3 200/300 courseware for Airman</li> <li>- Funding StrikeWERX node (innovation center) at the Cyber Innovation Facility (CIC) complex</li> </ul>				
<b>Congressional Adds Subtotals</b>		7.736	8.000	

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0101316F / <i>Worldwide Joint Strategic Communications</i>
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**D. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• OPAF 03 PE 0101316F: <i>Strategic Command and Control (833140)</i>	0.300	24.520	29.539	-	29.539	-	-	-	-	-	-

**Remarks**

**E. Acquisition Strategy**

Programmed funds continue to support TMRR efforts including a temporary modification to address near-term obsolescence issues (TDM-IP). The program is using a task order under the ICBM Ground Subsystems Support Contract and organic support from the 595 SCS and the 309 SWEG to conduct TMRR efforts.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)						Project (Number/Name)					
3600 / 7				PE 0101316F / Worldwide Joint Strategic Communications						671820 / Strategic Automated Command and Control System					
Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
SACCS-R TMRR	SS/CPFF	Northrop Grumman : Layton, UT	-	13.158	Nov 2019	17.435	Nov 2020	11.433	Nov 2021	-		11.433	-	-	-
<b>Subtotal</b>			-	13.158		17.435		11.433		-		11.433	-	-	N/A
Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
SACCS-R Engineering Development	Various	Various : Various	-	0.434	Nov 2019	1.637	Nov 2020	1.000	Nov 2021	-		1.000	-	-	-
NC3 Architecture Development	Various	Various : Various	-	7.736		8.000		-		-		-	-	-	-
<b>Subtotal</b>			-	8.170		9.637		1.000		-		1.000	-	-	N/A
Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
SACCS-R Development Test & Evaluation	Various	Various : Various	-	1.378	Nov 2019	0.760	Nov 2020	0.271	Dec 2021	-		0.271	-	-	-
<b>Subtotal</b>			-	1.378		0.760		0.271		-		0.271	-	-	N/A
Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
SACCS-R Program Management Administration	Various	Various : Various	-	1.291	Jan 2020	1.608	Jan 2021	1.259	Nov 2021	-		1.259	-	-	-
SACCS-R Integration Support	C/FFP	BAE Systems, Inc. : Hill AFB, UT	-	1.315	Jan 2020	1.726	Jan 2021	1.239	Nov 2021	-		1.239	-	-	-



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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101316F / <i>Worldwide Joint Strategic Communications</i>	<b>Project (Number/Name)</b> 671820 / <i>Strategic Automated Command and Control System</i>
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<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
<b>Subtotal</b>			-	2.606		3.334		2.498		-		2.498	-	-	N/A

**Remarks**  
 Costs and services in support of program office management and administration processes such as: program oversight, resource justification, budget and programming, milestone and scheduling--PMA costs.

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	-	25.312	31.166	15.202	-	15.202	-	-	N/A

**Remarks**



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101316F / <i>Worldwide Joint Strategic Communications</i>	<b>Project (Number/Name)</b> 671820 / <i>Strategic Automated Command and Control System</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Strategic Automated Command and Control System</i></b>				
SACCS-R Technology Maturation/Risk Reduction	1	2020	3	2023
SACCS-R TDM-IP 1.1	1	2020	1	2022
SACCS-R TDM-IP 1.1 Decision to Retain	1	2022	1	2022
SACCS-R TDM-IP 1.2	1	2021	3	2023
SACCS-R TDM-IP 1.2 Decision to Retain	3	2023	3	2023
SACCS-R PDR	3	2023	3	2023
SACCS-R Milestone B	3	2023	3	2023
SACCS-R Engineering and Manufacturing Development	4	2023	4	2026
SACCS-R ARES 2.0	4	2023	4	2026
SACCS-R CDR	3	2024	3	2024

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0101324F / <i>Integrated Strategic Planning &amp; Analysis Network</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	23.542	24.227	0.000	0.000	0.000	-	-	-	-	-	-
675029: <i>ISPAN Increment 5</i>	-	23.542	24.227	0.000	0.000	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

INTEGRATED STRATEGIC PLANNING AND ANALYSIS NETWORK (ISPAN): The mission of USSTRATCOM is to conduct global operations in coordination with other Combatant Commands, Services, and appropriate U.S. Government agencies to deter and detect strategic attacks against the U.S. and its allies. It provides full-spectrum global strike, and coordinated space, missile defense, and information operations capabilities to meet both deterrent and decisive national security objectives. USSTRATCOM will also provide operational space support, integrated missile defense, global command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR), and specialized planning expertise to the joint warfighter. ISPAN enables USSTRATCOM to carry out these missions. It is one of DoD's most complex classified computer systems and the only national force level planning system.

Conducting continuous, ongoing agile software development activities producing a secure software development environment. In addition, software licenses for developer tools, and independent development environments (IDE) for unclassified, secret, and top-secret agile software development. The agile software development staff maintains hardware, system configuration, storage, back-up and recovery for contractor development and systems integration. Supports Agile processes including code repositories, configuration management, continuous integration/continuous delivery (CI/CD) pipelines, automation testing, automation validation and delivery. The agile developer environment meets classified, security regulations/criteria which includes TS which will promote competition even among offers without TS classified environments.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver ISPAN Increment 5 system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0.000M was expended for civilian pay expenses in this program element, and in FY21 \$0.000M is forecasted for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development	<b>R-1 Program Element (Number/Name)</b> PE 0101324F / Integrated Strategic Planning & Analysis Network
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	24.261	24.227	24.942	0.000	24.942
Current President's Budget	23.542	24.227	0.000	0.000	0.000
Total Adjustments	-0.719	0.000	-24.942	0.000	-24.942
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-0.719	0.000	-24.942	0.000	-24.942

**Change Summary Explanation**

\$4.622M increase from FY21PB is due to a technical adjustment of program OPAF to RDT&E to meet development requirements.

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<b>Title:</b> ISPAN Increment 5	23.542	24.227	0.000	0.000	0.000
<b>Description:</b> ISPAN Increment 5 will modernize the Mission Planning and Analysis System (MPAS) that develops Joint Staff Level I through Level IV nuclear and conventional attack options for national and theater requirements.					
<b>FY 2021 Plans:</b> Funds will be used for Section 804 Beta Phase development and fielding activities to develop the hardware and software architecture for Mission Planning Analysis System Increment 5 modernization.					
<b>FY 2022 Base Plans:</b> Funds will be used for Section 804 Beta Phase development and fielding activities to develop the hardware and software architecture for Mission Planning Analysis System (MPAS) Increment 5 modernization; to include alternate site stand-up, cybersecurity improvements, and continue the life-cycle procurement of commercial-based hardware and software components for the MPAS effort.					
<b>FY 2022 OCO Plans:</b> No OCO Requested					
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b>					

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0101324F / <i>Integrated Strategic Planning &amp; Analysis Network</i>
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
\$4.622M increase from FY21PB is due to a technical adjustment of program OPAF to RDT&E to meet development requirements.					
<b>Accomplishments/Planned Programs Subtotals</b>	23.542	24.227	0.000	0.000	0.000

<b>D. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• OPAF 03 833560: <i>Integrated Strat Plan &amp; Analy Network (ISPAN)</i>	8.601	9.806	4.845	-	4.845	-	-	-	-	-	-

**Remarks**  
 Procurement funds (3080) required starting in FY24.

**E. Acquisition Strategy**  
 Assistant Secretary of the Air Force (Acquisition, Technology & Logistics) (SAF/AQ) designated ISPAN Inc 5 as a FY 2016 NDAA Section 804 Rapid Fielding program and delegated Milestone Decision Authority (MDA) to the Air Force Program Executive Officer (AFPEO) Digital.

Increment 5 will develop and modernize software for the combatant commanders using an Agile DevOps Continuous Delivery / Continuous Integration (CD/CI) acquisition strategy with development contracts that are negotiated and awarded in a competitive environment. The program will consider the best contract options to implement the Agile DevOps CD/CI strategy. Other activities are also accomplished through the use of various contracting vehicles such as Military Interdepartmental Purchase Requests (MIPRs).

Continuous, ongoing agile software development activities; producing a secure software development environment located in existing space at Offutt AFB. Software development environment will meet classification/security regulations/criteria, which will promote competition.

The PEO is the AF PEO Digital. Air Force Life Cycle Management Center at Hanscom AFB (AFLCMC/HB) and the 55 CONS at Offutt AFB are the contracting authorities for ISPAN and provide contracts, legal, and financial management support.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101324F / <i>Integrated Strategic Planning &amp; Analysis Network</i>	<b>Project (Number/Name)</b> 675029 / <i>ISPAN Increment 5</i>
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
ISPAN Inc 5 EMD	Various	Offutt AFB : Offutt AFB, NE	-	15.578	Jan 2020	15.764	Jan 2021	0.000	Jan 2022	-		0.000	-	-	-
<b>Subtotal</b>			-	15.578		15.764		0.000		-		0.000	-	-	N/A

<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Dev Ops Support	Various	Offutt AFB : Offutt AFB, NE	-	1.599	Nov 2019	1.693	Nov 2020	0.000	Nov 2021	-		0.000	-	-	-
Engineering and Technical DMS	C/CPFF	Not specified. : TBD	-	4.463	Nov 2019	4.747	Nov 2020	0.000	Nov 2021	-		0.000	-	-	-
<b>Subtotal</b>			-	6.062		6.440		0.000		-		0.000	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test and Evaluation Item	Various	Not specified. : TBD	-	0.329	Nov 2019	0.350	Nov 2020	0.000	Nov 2021	-		0.000	-	-	-
<b>Subtotal</b>			-	0.329		0.350		0.000		-		0.000	-	-	N/A

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Systems Engineering and Operations	Various	Offutt AFB : Offutt AFB, NE	-	1.573	Nov 2019	1.673	Nov 2020	0.000	Nov 2021	-		0.000	-	-	-
<b>Subtotal</b>			-	1.573		1.673		0.000		-		0.000	-	-	N/A





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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101324F / <i>Integrated Strategic Plannin &amp; Analysis Network</i>	<b>Project (Number/Name)</b> 675029 / <i>ISPAN Increment 5</i>

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>ISPAN Increment 5</b>	
ISPAN Inc 5 section 804 "Beta" Development phase	
Interim Progress Review	
Quarterly Software Releases	
Sustainment Decision IPR (Full Deployment Milestone)	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101324F / <i>Integrated Strategic Planning &amp; Analysis Network</i>	<b>Project (Number/Name)</b> 675029 / <i>ISPAN Increment 5</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>ISPAN Increment 5</b>				
ISPAN Inc 5 section 804 "Beta" Development phase	1	2020	1	2024
Interim Progress Review	4	2022	4	2022
Quarterly Software Releases	1	2020	1	2024
Sustainment Decision IPR (Full Deployment Milestone)	1	2024	1	2024

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0101328F / ICBM Reentry Vehicles
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	13.747	63.484	112.547	96.313	0.000	96.313	-	-	-	-	-	-
674920: W87-1/Mk21A	13.747	63.484	112.547	96.313	0.000	96.313	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Program MDAP/MAIS Code:** 576

**A. Mission Description and Budget Item Justification**

The Mk21A Reentry Vehicle (RV) program will design, develop, produce, and deploy an integrated RV capable of delivering the W87-1 Warhead when released from the Ground Based Strategic Deterrent (GBSD) Intercontinental Ballistic Missile (ICBM). The Mk21A will provide needed performance and security enhancements over the Mk21 RV to meet the upgraded requirements for the Department of Energy W87-1 warhead. The Mk21A will also meet the requirements laid out in the Ground Based Strategic Deterrent (GBSD) Capability Development Document (CDD) as directed by Air Force Global Strike Command.

The major activities in the Technology Maturation and Risk Reduction (TMRR) phase of the Mk21A RV program include: (1) Trade Studies, (2) Prototype designs, (3) government systems engineering, analytics, and test capability development, (4) RV risk reduction, and (5) Weapon System (WS) integration risk reduction. Reentry vehicle components include: high velocity nose tip, high impulse transducer, fuze, aeroshell forward section, body section and rear cover, radio frequency subsystem with antennas, RV spin-up system, inflight disconnect cable, and other electrical cables. The Mk21A program will include prime contractor development of applicable support equipment, data, flight test hardware, infrastructure, and training materials while examining and mitigating weapon system integration risks, nuclear surety, hardness and certification and system vulnerability assessments.

The FY2022 funding request was reduced by \$1.206 million to account for the availability of prior year execution balances.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY 2020 \$1.199M and in FY2021 \$2.959M was expended for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0101328F / ICBM Reentry Vehicles
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	65.671	112.753	74.755	0.000	74.755
Current President's Budget	63.484	112.547	96.313	0.000	96.313
Total Adjustments	-2.187	-0.206	21.558	0.000	21.558
• Congressional General Reductions	0.000	-0.206			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-2.187	0.000			
• Other Adjustments	0.000	0.000	21.558	0.000	21.558

**Change Summary Explanation**

FY2020 funding reflects a Small Business Innovation Research (SBIR) adjustment of 2.187 million.

FY2022 funding reflects an increase in accordance with the current service cost position.

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
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<b>Title:</b> Mk21A Technology Maturation Risk Reduction	63.484	112.547	96.313
<b>Description:</b> The objectives of TMRR for Mk21A are as follows: (1) Deliver one preliminary design and two prototypes for flight testing to inform National Nuclear Security Administration/ Department of Energy designs and further technology maturation (2) Incorporate a modular, open systems architecture (3) Implement Model Based System Engineering (MBSE) enabling the government to Own the Technical Baseline (OTTB) (4) Demonstrate performance of weapon system capabilities through prototyping, modeling, simulation, and testing (5) Conduct flight test of prototype RVs in an ICBM-like environment			
<b>FY 2021 Plans:</b>			
<ul style="list-style-type: none"> <li>• Continue TMRR contract efforts</li> <li>• Continue to modify, modernize, and expand the analytic environment and labs in ongoing TMRR support and the anticipated transition to Engineering and Manufacturing Development (EMD) activities to enable full execution of the program's capability to own the technical baseline throughout the program life cycle</li> <li>• Continue to mature the weapon system RV preliminary design and reduce integration risk by conducting system engineering, test activities, and system modeling and simulation</li> <li>• Continue development of demonstration flight reentry vehicle</li> </ul>			

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0101328F / <i>ICBM Reentry Vehicles</i>
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022
<ul style="list-style-type: none"> <li>• Continue to develop and execute a unified certification strategy which meets nuclear surety, cyber security, and nuclear safety requirements</li> <li>• Initiate prototype reentry vehicle flight test(s)</li> <li>• Continue to expand and develop analytical, information technology, test, and data management capabilities to ensure access to weapon system design information is properly controlled and securely transmitted between government and contractors</li> <li>• Plan, prepare for, and successfully complete Preliminary Design Review</li> </ul> <p><b>FY 2022 Plans:</b></p> <ul style="list-style-type: none"> <li>• Continue TMRR contract efforts</li> <li>• Continue to modify, modernize, and expand the analytic environment and labs in ongoing TMRR support and the anticipated transition to Engineering and Manufacturing Development (EMD) activities to enable full execution of the program's capability to own the technical baseline throughout the program life cycle</li> <li>• Continue to mature the weapon system RV preliminary design and reduce integration risk by initiating/conducting trade studies, system engineering, test activities, and system modeling and simulation</li> <li>• Continue/complete development of demonstration flight reentry vehicle</li> <li>• Continue to develop and execute a unified certification strategy which meets nuclear surety, cyber security, and nuclear safety requirements</li> <li>• Conduct/complete prototype reentry vehicle flight test(s)</li> <li>• Continue to expand and develop analytical, information technology, test, and data management capabilities to ensure access to weapon system design information is properly controlled and securely transmitted between government and contractors</li> <li>• Initiate preparation for TMRR Option year or entrance into Engineering and Manufacturing Development (EMD)</li> </ul> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreased due to the completion of TMRR trade studies and Preliminary Design Review (PDR) in FY21.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	63.484	112.547	96.313

<b>D. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• RDTE 04 0605230F/641025: <i>Ground Based Strategic Deterrent</i>	538.643	1,447.113	2,553.541	-	2,553.541	-	-	-	-	-	-
• MPAF 01 MGBSD0: <i>GBSD</i>	0.000	0.000	10.895	-	10.895	-	-	-	-	-	-
• RDTE 05 0604933F/655082: <i>Fuze Modernization</i>	155.476	156.693	129.709	-	129.709	-	-	-	-	-	-

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0101328F / <i>ICBM Reentry Vehicles</i>
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**D. Other Program Funding Summary (\$ in Millions)**

Line Item	FY 2020	FY 2021	FY 2022	FY 2022	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	Cost To	Total Cost
			Base	OCO	Total					Complete	
• RDTE 04 060351F/641022: <i>Dem/Val - RVAP</i>	17.060	22.337	18.166	-	18.166	-	-	-	-	-	-

**Remarks**

**E. Acquisition Strategy**

The Mk21A RV program acquisition strategy is to deliver an integrated RV capable of delivering the W87-1 Warhead to target beginning in FY30. For the TMRR phase, the Program Office competitively awarded one cost plus fixed fee contract in October 2019. The Air Force is responsible for developing, producing, and maintaining the RV. The NNSA develops/modifies the nuclear weapon inside the RV, including the Weapon Electrical System, which is the firing set that interfaces with the DoD fuze.

The objectives of TMRR for Mk21A are as follows: (1) deliver one preliminary design and two prototypes; (2) incorporate a modular, open systems architecture; (3) implement Model Based System Engineering enabling the government to own the Technical Baseline; (4) demonstrate performance of weapon system capabilities through prototyping, modeling, simulation, and testing; (5) conduct test flight of prototype RVs in ICBM-like environment.

The TMRR phase will include a System Requirements Review, System Functional Review, Preliminary Design Review, and prototype RV flight test(s). The contractor may elect to perform additional risk reduction testing on select components to further evolve the design during TMRR, to lower component integration risk during the EMD phase. The reference design for the Mk21A includes use of Mk21 Mod 6 aeroshells and is open to similar new aeroshell design due to the recent increase in quantities in the Nuclear Weapons Council's Requirements and Planning Document (RPD). Because Mk21 aeroshells were originally developed as test vehicles for the legacy Peacekeeper ICBM, they must be modified for use as war reserve. All RV subsystems must also be procured, including the high impulse transducer, radio frequency subsystem, antennas, spin generators, and cables.

The TMRR contract is a three year based contract plus a one year option potentially extending TMRR and test related activities through 4QFY23. After Milestone B approval, the EMD contract will be awarded no later than 1QFY24.



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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101328F / ICBM Reentry Vehicles	<b>Project (Number/Name)</b> 674920 / W87-1/Mk21A
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<b>Product Development (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Mk21A TMRR Contractor	C/CPFF	Lockheed Martin : King of Prussia, PA	8.028	42.293	Jan 2020	56.906	Nov 2020	23.422	Nov 2021	-		23.422	-	-	201.933
Mk21A EMD Contract(s)	TBD	TBD : TBD	0.000	-		-		0.000		-		0.000	-	-	-
<b>Subtotal</b>			8.028	42.293		56.906		23.422		-		23.422	-	-	N/A

<b>Support (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Mk21A Fuze Trade Study (TMRR)	MIPR	Sandia National Lab : Albuquerque, NM	0.618	1.295	Nov 2019	-		-		-		-	-	-	-
Mk21A Fuze Effort (TMRR)	Various	Various : Various	0.000	-		12.536	Jan 2021	18.500	Nov 2021	-		18.500	-	-	-
Mk21A TMRR Support: PMA (TMRR)	Various	Various : Various	0.019	0.328	Nov 2019	0.565	Nov 2020	0.550	Nov 2021	-		0.550	-	-	-
Mk21A Integration Support: BAE (TMRR)	C/FP	BAE : Hill AFB, UT	1.828	2.576	Oct 2019	2.778	Oct 2020	3.766	Oct 2021	-		3.766	-	-	-
Mk21A Integration Support: FFRDC/UARC (TMRR)	MIPR	Various : Various	0.987	-		-		2.304	Nov 2021	-		2.304	-	-	-
Mk21A EMD Support	Various	TBD : TBD	0.000	-		-		-		-		-	-	-	-
Mk21A Civilian Manpower	Various	US Gov Civilians : Hill AFB, UT	0.397	1.199	Oct 2019	3.211	Oct 2020	2.838	Oct 2021	-		2.838	-	-	-
<b>Subtotal</b>			3.849	5.398		19.090		27.958		-		27.958	-	-	N/A

**Remarks**

- Mk21A Fuze Effort (TMRR): added as a result of trade studies highlighting it as an area of emphasis for the remainder of TMRR for critical risk reduction activities
- FFRDC/UARC costs began to be included as a separate line item under support costs beginning in FY21. Costs were previously included under Mk21A Test and Evaluation line item.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101328F / ICBM Reentry Vehicles	<b>Project (Number/Name)</b> 674920 / W87-1/Mk21A
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<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Mk21A Test & Evaluation (TMRR)	Various	Various : Various	0.000	7.523	Dec 2019	26.819	Nov 2020	37.120	Nov 2021	-		37.120	-	-	-
Mk21A Test & Evaluation: Air Force and NNSA Demonstrator Initiative (ANDI) (TMRR)	MIPR	Various : Various	0.000	8.111		4.875	Oct 2020	4.200	Oct 2021	-		4.200	-	-	-
Mk21A EMD Test Support	Various	TBD : TBD	0.000	-		-		-		-		-	-	-	-
<b>Subtotal</b>			0.000	15.634		31.694		41.320		-		41.320	-	-	N/A

**Remarks**

- TMRR flight test(s) require incremental funding up to two years prior to flight test(s). Funds allow contracts to be established for support and the build-up of flight test vehicles in order to meet the scheduled test(s).
- FY22 Test & Evaluation support includes developing ground test plans and flight test plans to support development of prototype test vehicles and conduct flight test(s). These test(s) will provide detailed, reliable data to inform EMD and to inform the Mk21A development and risk reduction and NNSA of the W87-1 development. The ANDI effort is expected to span over FY20, FY21, and FY22 and will provide critical information for EMD.
- Mk21 Test & Evaluation: Air Force and NNSA Demonstrator Initiative (ANDI) is a former ICBM Demonstration/Validation study that was transitioned to the Mk21A program office beginning in FY20.

<b>Management Services (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Mk21A PMA	C/Various	Various : Various	1.870	0.159	Nov 2019	4.857	Nov 2020	3.613	Nov 2021	-		3.613	-	-	-
<b>Subtotal</b>			1.870	0.159		4.857		3.613		-		3.613	-	-	N/A

<b>Project Cost Totals</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
	13.747	63.484	112.547	96.313	-	96.313	-	-	N/A

**Remarks**

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**Exhibit R-4, RDT&E Schedule Profile:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101328F / ICBM Reentry Vehicles	<b>Project (Number/Name)</b> 674920 / W87-1/Mk21A
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>Mk21A Reentry Vehicle (RV)</b>	
TMRR Phase	
TMRR Option Year	
Preliminary Design Review (Mar 2021)	
Prototype RV flight test(s)	
Milestone B (Oct 2023)	
EMD Phase	
Critical Design Review (Jan 2026)	

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101328F / ICBM Reentry Vehicles	<b>Project (Number/Name)</b> 674920 / W87-1/Mk21A
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Mk21A Reentry Vehicle (RV)</i></b>				
TMRR Phase	1	2020	4	2022
TMRR Option Year	1	2023	4	2023
Preliminary Design Review (Mar 2021)	2	2021	2	2021
Prototype RV flight test(s)	2	2022	2	2023
Milestone B (Oct 2023)	1	2024	1	2024
EMD Phase	1	2024	4	2026
Critical Design Review (Jan 2026)	2	2026	2	2026

**Note**

- Prototype RV flight test(s) window expanded for aeroshell heatshield testing
- EMD Phase continues beyond FY2026 to FY2027
- MS B and EMD Phase could be as early as FY23 if TMRR Option Year not executed

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0102110F / <i>UH-1N Replacement Program</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	381.577	165.844	41.388	16.132	0.000	16.132	-	-	-	-	-	-
672021: <i>MH-139A</i>	381.577	165.844	41.388	16.132	0.000	16.132	-	-	-	-	-	-
Quantity of RDT&E Articles	4	2	-	-	-	-	-	-	-	-	-	-

**Program MDAP/MAIS Code:** 562

**A. Mission Description and Budget Item Justification**

The MH-139A program will replace the Air Force fleet of UH-1N aircraft with modern helicopters that will close significant mission capability gaps associated with the current fleet of UH-1N aircraft. The replacement aircraft will provide vertical airlift and support the requirements of four Air Force major commands and operating agencies: Air Force Global Strike Command (AFGSC), Air Force District of Washington (AFDW), Air Education and Training Command (AETC), and Air Force Materiel Command (AFMC). AFGSC is the Air Force lead command and operational capability requirements sponsor. This program is an element of the Air Force's nuclear enterprise reform initiatives.

Program includes, but is not limited to, continued funding for four test aircraft and two System Demonstration Test Article (SDTA) aircraft, support equipment, Interim Contractor Support (ICS), training system devices, Type I training and courseware, non-developmental item (NDI) integration, cyber test articles, associated Government support activities, remedy of Demonstration Test (DT) deficiencies, and permits the initiation of activities to support rapid requirement development.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver the MH-139A weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY 2020 \$3.892 million was expended for civilian pay expenses in this program element, and in FY 2021 \$4.789 million is forecasted for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0102110F / <i>UH-1N Replacement Program</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	170.975	44.464	16.375	0.000	16.375
Current President's Budget	165.844	41.388	16.132	0.000	16.132
Total Adjustments	-5.131	-3.076	-0.243	0.000	-0.243
• Congressional General Reductions	0.000	-0.076			
• Congressional Directed Reductions	0.000	-3.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-5.131	0.000			
• Other Adjustments	0.000	0.000	-0.243	0.000	-0.243

**Change Summary Explanation**

FY 2020 funding reduced by \$5.131 million for Small Business Innovation Research.  
 FY 2021 funding reduced by \$3.0 million due to Congressional Directed Reductions for A&AS unjustified growth.  
 FY 2022 funding reduced by \$0.243 million to account for the availability of prior year execution balances.

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> MH-139 Development	145.274	31.685	8.308
<b>Description:</b> Development of MH-139A helicopter and integration of non-developmental item (NDI) hardware, software, and other capabilities into aircraft system, training systems, support elements and technical/manufacturing baselines to achieve MH-139A operational capability requirements.			
<b>FY 2021 Plans:</b> Continue systems engineering efforts, government oversight, contractor and government systems engineering tasks and management services.			
<b>FY 2022 Plans:</b> Continue systems engineering efforts, government oversight, contractor and government systems engineering tasks and management services.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreased due to anticipated completion of MH-139A research and development phase and entry into Milestone C and Full-Rate Production.			
<b>Title:</b> MH-139 Government Test and Evaluation	20.570	9.703	7.824

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0102110F / <i>UH-1N Replacement Program</i>	

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Description:</b> System and subsystem test and evaluation and remedy of DT deficiencies of the MH-139 solution.			
<b>FY 2021 Plans:</b> Continue LFT&E, DT and OA, and OT support execution.			
<b>FY 2022 Plans:</b> Continue LFT&E, DT and OA, and OT support execution.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreased due to anticipated completion of LFT&E of test articles in last quarter of FY 2022 prior to Milestone C entry.			
<b>Accomplishments/Planned Programs Subtotals</b>	165.844	41.388	16.132

<b>D. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• APAF 04 Line Item H0106O: <i>UH-1N Replacement</i>	0.000	194.016	0.000	-	0.000	-	-	-	-	-	-
• APAF 06 Line Item H0106O: <i>UH-1N Replacement Initial Spares/Repair Parts</i>	0.000	18.389	0.000	-	0.000	-	-	-	-	-	-
• MILCON 0: <i>UH-1N Replacement - Primary Facility</i>	46.000	0.000	0.000	-	0.000	-	-	-	-	-	-

**Remarks**

**E. Acquisition Strategy**  
The Air Force intends to procure an airworthiness-certified baseline helicopter that requires non-developmental item integration (e.g. Electro-Optical/Infrared Sensor, personnel recovery hoists, cockpit/cabin armor, etc.) and training systems to meet all operational capability requirements. Specific acquisition and contracting strategies for RDT&E funded integration tasks and the test and evaluation program will be determined as part of the overall program strategy.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0102110F / UH-1N Replacement Program	<b>Project (Number/Name)</b> 672021 / MH-139A
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<b>Product Development (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
MH-139 weapon system integration and type/airworthiness certification	C/FFP	Boeing : Philadelphia, PA	352.439	115.726	Dec 2019	11.831	Dec 2020	1.207	Dec 2021	-		1.207	-	-	-
<b>Subtotal</b>			352.439	115.726		11.831		1.207		-		1.207	-	-	N/A

<b>Support (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
MH-139 Other Government Costs	C/Various	Various : TBD	2.355	8.948	Jan 2020	2.145		1.401		-		1.401	-	-	-
MH-139 Direct Cite Authority CIV Pay	C/Various	Various : TBD	0.890	3.892	Jan 2020	4.789		-		-		-	-	-	-
<b>Subtotal</b>			3.245	12.840		6.934		1.401		-		1.401	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
MH-139 live fire, developmental, and operational test and evaluation, planning and technical support	Various	Various : TBD	11.589	20.570	Dec 2019	9.703		7.824		-		7.824	-	-	-
<b>Subtotal</b>			11.589	20.570		9.703		7.824		-		7.824	-	-	N/A





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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0102110F / UH-1N Replacement Program	<b>Project (Number/Name)</b> 672021 / MH-139A

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>MH-139A Program</b>	
MH-139A NDI Contract	
Test and Evaluation	
System/Subsystem Test and Integration	
Weapon System Integration	
Milestone C	
Required Assets Available for Initial Operational Capability	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0102110F / UH-1N Replacement Program	<b>Project (Number/Name)</b> 672021 / MH-139A

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>MH-139A Program</i></b>				
MH-139A NDI Contract	1	2020	4	2023
Test and Evaluation	1	2020	4	2023
System/Subsystem Test and Integration	1	2020	4	2022
Weapon System Integration	1	2020	4	2022
Milestone C	1	2023	1	2023
Required Assets Available for Initial Operational Capability	3	2025	3	2025

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0102326F / <i>Region/Sector Operation Control Center Modernization Program</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	0.000	10.704	0.771	0.000	0.771	-	-	-	-	-	-
674592: <i>R/SAOC MODERNIZATION</i>	-	0.000	10.704	0.771	0.000	0.771	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

The Regional/Sector Operation Center Modernization program supports the NORAD/NORTHCOM homeland defense and air sovereignty mission for fixed Air Defense Sectors.

BATTLE CONTROL SYSTEM-FIXED (BCS-F): BCS-F is a bi-national development program with Canada. The BCS-F Program is an AF Homeland Defense battle management command and control system with the capability to integrate data from existing and future civil and military defense surveillance systems into a comprehensive air picture. BCS-F provides tactical communications and data link capabilities with other military and civil systems responsible for planning, directing, coordinating and controlling forces for air surveillance, air defense, and control of sovereign US air space. This integrated air picture enhances the capability to conduct peacetime air sovereignty operations and transition to active air defense operations in the event of aggression.

BATTLE CONTROL SYSTEM-FIXED MODIFICATION ONE (BCS-F Modification 1): BCS-F Modification 1 effort will support the implementation of Automatic Dependent Surveillance-Broadcast (ADS-B) data feeds and Earth Center Earth Fixed (ECEF). The BCS-F Modification 1 effort will be executed as a Cooperative Development Program between the US and Canada.

BATTLE CONTROL SYSTEM MODERNIZATION: BCS Modernization will support NORAD/NORTHCOM Pathfinder Initiative development to include sensor integration, Integrated Fire Control (IFC), Agile Development, and system visualization for the Battle Control Center (BCC).

NATIONAL CAPITAL REGION-INTEGRATED AIR DEFENSE SYSTEM (NCR-IADS): NCR-IADS is a post-September 11, 2001 rapidly fielded capability that improves low altitude detection capability in order to prosecute airborne threats to the NCR. NCR-IADS provides ground-based air defense of the National Capitol Region airspace, and provides an integrated air picture, ground air defense weapons, enhanced regional situational awareness and forensic data collection capabilities for the warfighter mission to protect the NCR. Efforts may include but are not limited to, studies, system engineering, development, integration, and test & evaluation required to prevent system obsolescence and evolving cyber security requirements and evolving mission requirements.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver AF Homeland Defense battle management command and control system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0.000M and in FY21 \$0.000M was expended for civilian pay expenses in this program element.

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0102326F / <i>Region/Sector Operation Control Center Modernization Program</i>
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This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	0.000	5.929	0.782	0.000	0.782
Current President's Budget	0.000	10.704	0.771	0.000	0.771
Total Adjustments	0.000	4.775	-0.011	0.000	-0.011
• Congressional General Reductions	0.000	-0.020			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	4.795			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-0.011	0.000	-0.011

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>Title:</b> Battle Control System-Fixed Modification 1</p> <p><b>Description:</b> Continue systems engineering, development, risk reduction, integration, test &amp; evaluation and fielding of the BCS-F Modification 1 effort. The BCS-F Modification 1 effort will be executed as a Cooperative Program between the US and Canada.</p> <p><b>FY 2021 Plans:</b> Activities include, but are not limited to: - Continue BCS-F Modification 1 ADS-B and ECEF development, integration, test and evaluation, and documentation</p> <p><b>FY 2022 Plans:</b> Activities include, but are not limited to: - Continue BCS-F Modification 1 ADS-B and ECEF test and evaluation, documentation, fielding and training at operational sites</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY 2022 decrease due to completion of software integration by the OEM and the program focus on finalizing test and fielding and training at operational sites.</p>	0.000	4.382	0.100
<p><b>Title:</b> Battle Control System Modernization</p> <p><b>Description:</b> BCS Modernization will support NORAD/NORTHCOM Pathfinder Initiative development to include sensor integration, Integrated Fire Control (IFC), Agile development, and system virtualization for the BCC.</p>	0.000	1.527	0.671

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0102326F / <i>Region/Sector Operation Control Center Modernization Program</i>		
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b><i>FY 2021 Plans:</i></b> Activities include, but are not limited to:</p> <ul style="list-style-type: none"> <li>- Development and integration of the Homeland Defense Ecosystem (HDE) and Intelligent Homeland Defense Application (IHDA)</li> <li>- Development of open architecture supporting incorporation of machine learning entity classification, artificial intelligence, and cloud-based operations improving defense sector ability to respond to emerging threats</li> <li>- Implementation of Air Combat Command's (ACC) Combat Identification capability and continued foundation development for continuity of operations (COOP) between defense sectors</li> </ul> <p><b><i>FY 2022 Plans:</i></b> Activities include, but are not limited to:</p> <ul style="list-style-type: none"> <li>- Continued development and integration of the HDE, IHDA and open architecture supporting incorporation of machine learning entity classification, artificial intelligence, and cloud-based operations</li> <li>- Continued implementation of ACC's Combat Identification capability and continued foundation development for continuity of operations (COOP) between defense sectors</li> </ul> <p><b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> FY 2022 funding requirements increase due to maturation of the NORAD/NORTHCOM Pathfinder development and follow on testing and certification requirements. FY 2022 modernization funding decreases and will impact NORAD/NORTHCOM Pathfinder testing and certification.</p>				
<p><b><i>Title:</i></b> National Capital Region - Integrated Air Defense System Camera Modernization</p> <p><b><i>Description:</i></b> NCR-IADS Camera System Tech Refresh of legacy camera system to address mission critical component DMSMS issues.</p> <p><b><i>FY 2021 Plans:</i></b> Activities include, but are not limited to:</p> <ul style="list-style-type: none"> <li>- NCR-IADS studies, system engineering, development, integration of software platforms, and test &amp; evaluation of a prototype camera sensor system</li> </ul> <p><b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> Program transitions to production in FY22 and will utilize OPAF funds.</p>		-	4.795	-
<b>Accomplishments/Planned Programs Subtotals</b>		0.000	10.704	0.771

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0102326F / <i>Region/Sector Operation Control Center Modernization Program</i>
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**D. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• OPAF 03 080330: <i>Battle Control System - Fixed</i>	3.063	7.909	2.951	-	2.951	-	-	-	-	-	-

**Remarks**

**E. Acquisition Strategy**

Acquisition Strategy: The Program Management Office (PMO) completed a full and open competition for BCS-F Modification 1 efforts. The BCS-F PMO has finalized a Project Arrangement (PA) to establish a cooperative development program with Canada. These efforts will conclude with development and releases to the Air Defense Sectors.

Management Strategy: Efforts will be managed by BCS-F PMO in conjunction with Canada PMO and are under the purview of the Air Force Program Executive Officer for Battle Management (AFPEO BM). Air Force Life Cycle Management Center (AFLCMC) is the Contracting Authority.

Contracting Strategy: The BCS-F PMO utilized a full and open competition to complete the development and integration of MOD 1 capabilities. Cost Plus contract with some Fixed Price and Time & Material CLINs will be utilized where possible and appropriate. The Agile Development Modernization work is done under an Other Transaction Authority contract that was completed in the prototype phase with a strategy approve to award a follow-on production OT contract.

NCR-IADS is using a Middle Tier Acquisition (MTA) Rapid Prototyping strategy and leveraging an Other Transaction Authority (OTA) expedited contracting vehicle for the ERSA camera replacement. The laser warning system component of the camera tech refresh is using a Small Business Administration HUBZone approved vendor, which allows the government to execute a sole source contract.



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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0102326F / Region/Sector Operation Control Center Modernization Program	<b>Project (Number/Name)</b> 674592 / R/SAOC MODERNIZATION
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
BCS-F Modification 1	Various	Various : Various	-	-		2.613	Jun 2021	0.100	Dec 2021	-		0.100	-	-	0.000
BCS Modernization	Various	Various : Various	-	-		1.487	Feb 2021	0.538	Dec 2021	-		0.538	-	-	-
NCR-IADS Camera Modernization	Various	Various : Various	-	-		4.795	Jun 2021	-		-		-	-	-	-
<b>Subtotal</b>			-	-		8.895		0.638		-		0.638	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
46th Test Wing/Other Test Act	Various	Various : Various	-	-		0.656	Apr 2021	-		-		-	-	-	0.000
<b>Subtotal</b>			-	-		0.656		-		-		-	-	-	N/A

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
A&AS	Various	Various : Hanscom AFB, MA	-	-		0.250	Jul 2021	0.133	Dec 2021	-		0.133	-	-	-
FFRDC	Various	Various : Hanscom AFB, MA	-	-		0.590	Jan 2021	-		-		-	-	-	-
Other	Various	Various : Hanscom AFB, MA	-	-		0.313	May 2021	-		-		-	-	-	-
<b>Subtotal</b>			-	-		1.153		0.133		-		0.133	-	-	N/A

			Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>			-	-	10.704	0.771	-	0.771	-	-	N/A



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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0102326F / <i>Region/Sector Operation Control Center Modernization Program</i>	<b>Project (Number/Name)</b> 674592 / <i>R/SAOC MODERNIZATION</i>

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>Battle Control System Fixed Modification 1</b>	
Complete Development	
System Acceptance Test (SAT)	
Developmental Test (DT)	
AF System Interoperability Test (AFSIT)	
Operational Test and Fielding	
<b>Battle Control System Modernization</b>	
Agile Capabilities Development	
<b>NCR-IADS Camera Modernization</b>	
Contract Award	
Camera Prototype Demo	
Software/Laser Integration	
Operational Test and Evaluation	
Camera Selection and Fielding	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0102326F / <i>Region/Sector Operation Control Center Modernization Program</i>	<b>Project (Number/Name)</b> 674592 / <i>R/SAOC MODERNIZATION</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Battle Control System Fixed Modification 1</i></b>				
Complete Development	1	2021	1	2022
System Acceptance Test (SAT)	1	2021	2	2022
Developmental Test (DT)	3	2021	4	2022
AF System Interoperability Test (AFSIT)	4	2021	1	2022
Operational Test and Fielding	2	2022	2	2023
<b><i>Battle Control System Modernization</i></b>				
Agile Capabilities Development	2	2021	4	2026
<b><i>NCR-IADS Camera Modernization</i></b>				
Contract Award	3	2021	3	2021
Camera Prototype Demo	3	2021	1	2022
Software/Laser Integration	2	2022	3	2022
Operational Test and Evaluation	3	2022	3	2022
Camera Selection and Fielding	3	2022	3	2022

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development	<b>R-1 Program Element (Number/Name)</b> PE 0102412F I North Warning System (NWS)
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.100	0.099	0.000	0.099	-	-	-	-	-	-
674592: Region/Sector Operations Modernization Center (R/SAOC)	-	0.000	0.100	0.099	0.000	0.099	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The details of this requirement are classified. Additional information is available upon request.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

**B. Program Change Summary (\$ in Millions)**

	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>
Previous President's Budget	0.000	0.100	0.100	0.000	0.100
Current President's Budget	0.000	0.100	0.099	0.000	0.099
Total Adjustments	0.000	0.000	-0.001	0.000	-0.001
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-0.001	0.000	-0.001

**C. Accomplishments/Planned Programs (\$ in Millions)**

	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>
<b>Title:</b> North Warning System (NWS)	0.000	0.100	0.099
<b>Description:</b> The details of this program are classified. Details are available upon request.			
<b>FY 2021 Plans:</b> N/A			
<b>FY 2022 Plans:</b>			

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0102412F / <i>North Warning System (NWS)</i>		
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
N/A				
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Insignificant decrease				
<b>Accomplishments/Planned Programs Subtotals</b>		0.000	0.100	0.099
<b>D. Other Program Funding Summary (\$ in Millions)</b>				
N/A				
<b>Remarks</b>				
<b>E. Acquisition Strategy</b>				
N/A				



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Air Force</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0102412F / <i>North Warning System (NWS)</i>	<b>Project (Number/Name)</b> 674592 / <i>Region/Sector Operations Modernization Center (R/SAOC)</i>

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
N/A																												



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0102412F / <i>North Warning System (NWS)</i>	<b>Project (Number/Name)</b> 674592 / <i>Region/Sector Operations Modernization Center (R/SAOC)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
N/A	1	2021	4	2026

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0102417F / <i>Over-the-Horizon Backscatter Radar</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	42.300	0.000	42.300	-	-	-	-	-	-
674865: <i>TACMOR Development</i>	-	0.000	0.000	42.300	0.000	42.300	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Note**

This program, BA 7, PE 0102417F, project 674865, TACMOR Development, is a new start.

**A. Mission Description and Budget Item Justification**

The Tactical Multi-Mission Over the Horizon Radar (TACMOR) is a compact Over the Horizon Radar (OTHR) in the Republic of Palau to provide enhanced Air Domain Awareness in the INDOPACOM area of responsibility. TACMOR will be operated by the United States and located in the Republic of Palau, with the agreement of the government of Palau. Development, test and evaluation, and acquisition of the system and associated components will provide warfighters with the capability to close gaps in surveillance coverage in key regions of the Pacific area of interest to the United States and our Allies.

TACMOR will transition to a production ready system after the successful completion of a Military Utility Assessment (MUA) and system-level Production Readiness Review (PRR). The initial prototype system is executing with oversight from the Office of the Secretary of Defense Research and & Engineering Advanced Concepts Prototyping and Experimentation Joint Capability Technology Demonstration (JCTD) office. At the completion of the MUA, the USAF will assume responsibility for the production, shipment, installation, operational test and evaluation, and initial operational capability at its theater operating locations.

TACMOR efforts funded in this Program Element include but are not limited to:

A remote, unattended Transmit site consisting of ten elements and high power amplifiers transmitting High Frequency (HF) Skywave Over-The-Horizon Radar (OTHR) waveforms. The transmit site will also consists of a HF vertical sounder antenna and a HF backscatter sounder providing ionogram information for optimizing frequency selection.

A remote, unattended Receive site consisting of 128 dual-monopole antenna elements receiving the over-the-horizon reflected energy from the transmit site. The receive site also contains the secure facilities for signal processing of the received data and real-time target extraction information.

This effort will also fund the communications infrastructure necessary to enable the data flow from the Transmit and Receive sites to an off-site operations control center. The operations control center plans and executes missions in support of the Combatant Command (CCMD) and provides real-time, target tracking information to all-source information fusion and dissemination systems. TACMOR data will also be accessible to and exploited by the National Air and Space Intelligence Center (NASIC) for detailed, post-event analysis.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY19 0.0M and in FY20 0.0M was expended for civilian pay expenses in this program element.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0102417F / <i>Over-the-Horizon Backscatter Radar</i>
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This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	0.000	0.000	42.935	0.000	42.935
Current President's Budget	0.000	0.000	42.300	0.000	42.300
Total Adjustments	0.000	0.000	-0.635	0.000	-0.635
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-0.635	0.000	-0.635

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> TACMOR Development	-	0.000	42.300
<b>Description:</b> Will establish initial TACMOR prototype transition and development activities necessary to accept post production readiness system components and sub-components.			
<b>FY 2021 Plans:</b> - None, funding begins in FY22			
<b>FY 2022 Plans:</b> - Will develop and implement full-scale production and factory acceptance test (FAT) capabilities for major sub-system components such as digital receivers and receiver optical control (ROC) units  - Will procure long-lead items for full-scale production such as secure containers, transmit and receive elements, high-density multilayered printed circuit boards (PCBs), high power amplifiers, servers, and network switches  - Will begin the assembly of major subsystem components such as the digital receivers, ROCs, transmit optical control (TOC) units, and direct digital drive chain			

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0102417F / <i>Over-the-Horizon Backscatter Radar</i>
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022
<p>- Will assemble and integrate the major subsystems: receive subsystem, transmit subsystem, operations control center subsystems that include integration of the major subsystems within their appropriate containers and establishment of network connections necessary to enable Factory Acceptance Testing (FAT).</p> <p>- Will execute test plans, procedures, and procure FAT-unique test equipment necessary to collect data at multiple points within the TACMOR system to confirm subsystem components meet performance specifications</p> <p>- Will execute FAT according to test plan, collect and analyze test data, and report on subsystem and component level successes and failures based on specifications and overall TACMOR system requirements flow down</p> <p>- Will begin development and installation of communication infrastructure in support of offsite data transmission and dissemination. This includes associated authority to operate and cyber hardening</p> <p><b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> Funding increase due to the fact TACMOR is a New Start.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	-	0.000	42.300

**D. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

**E. Acquisition Strategy**

TACMOR will be executed out of the PEO Digital portfolio and Air Force Life Cycle Management Center Command and Control, Intelligence, Surveillance and Reconnaissance Division. For contracting efforts, a Single Award IDIQ contract with multiple task orders will be competitively awarded.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
3600 / 7				PE 0102417F / Over-the-Horizon Backscatterer Radar				674865 / TACMOR Development							
<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Long Lead Items; Prototype Production Readiness Review and Component Integration activities	C/FFP	AFLCMC/HBG : Warner-Robins, AFB, GA	-	-		-		39.960	Feb 2022	-		39.960	-	-	-
<b>Subtotal</b>			-	-		-		39.960		-		39.960	-	-	N/A
<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Travel	MIPR	DIA & HAF/A2 : Patrick/AFB, FL	-	-		-		1.000	Nov 2021	-		1.000	-	-	-
<b>Subtotal</b>			-	-		-		1.000		-		1.000	-	-	N/A
<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Integration Validation and Verification	Various	AFLCMC/HBG : Warner-Robins, AFB, GA	-	-		-		0.150	Mar 2022	-		0.150	-	-	-
<b>Subtotal</b>			-	-		-		0.150		-		0.150	-	-	N/A
<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering and Program Office Management	Various	AFLCMC/HBG : Warner-Robins, AFB, GA	-	-		-		1.190	Nov 2021	-		1.190	-	-	-



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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0102417F / <i>Over-the-Horizon Backscatter Radar</i>	<b>Project (Number/Name)</b> 674865 / <i>TACMOR Development</i>

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b><i>TACMOR Development</i></b>																												
Full-scale production and FAT capability development																												
Long lead item procurement																												
Assembly and integration activities for major components and subsystems																												
Test plan and test procedure development and data collection																												
FAT test plan execution																												
Communication infrastructure development																												



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0102417F / <i>Over-the-Horizon Backscatter Radar</i>	<b>Project (Number/Name)</b> 674865 / <i>TACMOR Development</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>TACMOR Development</i></b>				
Full-scale production and FAT capability development	2	2022	4	2022
Long lead item procurement	2	2022	2	2022
Assembly and integration activities for major components and subsystems	2	2022	4	2022
Test plan and test procedure development and data collection	2	2022	3	2022
FAT test plan execution	4	2022	4	2022
Communication infrastructure development	1	2022	4	2022

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0202834F / <i>Vehicles and Support Equipment - General</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	5.889	0.000	5.889	-	-	-	-	-	-
672800: <i>AVIATION SUPPORT EQUIPMENT MODERNIZATION</i>	-	0.000	0.000	5.889	0.000	5.889	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Note**

This program, BA 7, PE 0202834F, project 672800, Powered Age Systems Modernization, is a new start.  
 This program, BA 7, PE 0202834F, project 672800, Munitions Materiel Handling Equipment (MMHE) Modernization, is a new start.  
 This program, BA 7, PE 0202834F, project 672800, Tow Systems Modernization, is a new start.

FY22 represents the first year of funding for PEC 0202834F

**A. Mission Description and Budget Item Justification**

Aviation Support Equipment Modernization provides funding for the modernization of organizational and intermediate level support equipment for out-of-production and emerging aircraft, munitions and external stowage to maximize commonality of equipment, improve aircraft readiness/availability and to reduce life cycle sustainment costs. These items, common (used on more than one weapon system) and peculiar (unique to one weapon system), directly support aircraft maintenance, servicing, and sortie generation requirements.

To support aircraft generation requirements, support equipment may be studied, reviewed, modified and/or re-developed in order to maintain operational readiness. Examples of equipment under review and/or modernization includes, but not limited to, power generation, heating, ventilation, and air conditioning (HVAC), munition trailers/accessories, munition lifts/accessories, tow vehicles, munition test/maintenance stands, hydraulic equipment, and engine test stands. Any identified capability gaps may result in the design of new system.

This program element may include necessary emergent or unanticipated civilian pay expenses required to manage, execute, and deliver Aviation Support Modernization for emergent or unanticipated weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605831F.

This program element also includes program administrative cost for the Support Equipment and Vehicles program office and funds the cost of studies and research to support the aviation support equipment fleet.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0202834F / <i>Vehicles and Support Equipment - General</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>
Previous President's Budget	0.000	0.000	0.000	0.000	0.000
Current President's Budget	0.000	0.000	5.889	0.000	5.889
Total Adjustments	0.000	0.000	5.889	0.000	5.889
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	5.889	0.000	5.889

**Change Summary Explanation**

FY22 represents the first year of funding for 0202834F for 3600 Appropriations

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>
<b>Title:</b> Powered Age Systems Modernization	0.000	0.000	1.805	0.000	1.805
<b>Description:</b> Ensures powered aerospace ground equipment (AGE) remains available and suitable to meet the requirements of 5th generation aircraft and force employment/basing strategies while providing reduced lifecycle sustainment costs, reduce operational footprint in support of agile combat operations, and providing improved user safety by reducing system emissions and noise. Powered AGE includes hydraulic, generators, lighting, heating/air conditioning, compressors/bleed-air, aerial stores lift trucks and other electrically driven systems used in and around the flight line for the generation and maintenance of aircraft.					
<b>FY 2021 Plans:</b> N/A					
<b>FY 2022 Base Plans:</b> Efforts include the study, research, development, and operational feasibility testing of emerging technologies/ systems to provide reliable clean power such as, but not limited to, hybrid, fuel cell, power grid, and battery systems. One or more contracts may be awarded to support efforts such as the design and test of a new large aircraft generator system, battery "powerhead" systems to reduce diesel consumption and replace aging/unsupportable fleet, as well a combined aircraft power/flight line lighting system to support agile basing applications for remotely piloted aircraft. Small business innovative research (SBIR) contract may be awarded					

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0202834F / <i>Vehicles and Support Equipment - General</i>
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
to mature technology. Budget includes funds for Program Support Costs, A&AS, travel and other equipment required to execute program activities as well as develop Air Force-wide system requirements.  <b>FY 2022 OCO Plans:</b> N/A  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY22 is the first year for the program element code.					
<b>Title:</b> Munitions Materiel Handling Equipment (MMHE) Modernization  <b>Description:</b> Ensures aerial lift trucks (jammers) and munitions trailers continue to safely meet lift & carry requirements as well as fill capability gaps resulting from new/emerging weapons and aircraft stowage, and new force employment/ basing strategies. RDT&E supports emerging opportunities, such as but not limited to, development of semi-autonomous loading systems, alternative electrical power/drive systems and exploring & implementing a Family-of-Jammers concept to address low observable aircraft loading challenges, agile operations in contested environment, and heavy-weight lift capabilities resulting from emerging weapons. Equipment may be studied, reviewed, modified and/or re-developed in order to maintain operational readiness  <b>FY 2021 Plans:</b> N/A  <b>FY 2022 Base Plans:</b> Efforts include the study, research, development, and operational feasibility testing of emerging technologies/ systems to ensure MMHE equipment continue to meet current and future requirements. One or more contracts may be awarded to develop a Family-of-Jammer(s) to meet AF lift requirements across all weight classes and/ or development of a semi-autonomous/autonomous loading system to improve user safety and generation timelines. Small business innovative research (SBIR) contract may be awarded to mature technology. Budget includes funds for Program Support Costs, A&AS, travel and other equipment required to execute program activities as well as develop Air Force-wide system requirements.  <b>FY 2022 OCO Plans:</b> N/A  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY22 is the first year for the program element code.	0.000	0.000	2.894	0.000	2.894
<b>Title:</b> Tow Systems Modernization	0.000	0.000	1.190	0.000	1.190

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0202834F / <i>Vehicles and Support Equipment - General</i>
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p><b>Description:</b> New Common Tow Systems Modernization across the aircraft fleet. RDT&amp;E efforts support development, testing, and producibility of Tow Bar and Tow Systems.</p> <p><b>FY 2021 Plans:</b> N/A</p> <p><b>FY 2022 Base Plans:</b> To support mission generation Tow Systems Modernization requirements, support equipment may be studied, reviewed, modified and/or re-developed in order to maintain operational readiness. Examples of equipment under review include, but not limited to development of a Family-of-Tow Systems, "universal tow bar", aircraft positioners, emerging load limits, replace legacy (1955) tow systems, increase AGILE operations, reduction of deployment footprint and to reduce human and aircraft safety mishaps. Budget includes funds for Program Support Costs, A&amp;AS, travel and other equipment required to execute program activities as well as develop Air Force-wide system requirements.</p> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY22 is the first year for the program element code.</p>					
<b>Accomplishments/Planned Programs Subtotals</b>	0.000	0.000	5.889	0.000	5.889

**D. Other Program Funding Summary (\$ in Millions)**  
N/A

**Remarks**  
The Support Equipment and Vehicles program office is responsible for developing, acquiring and sustaining common aircraft generation support equipment for the United States Air Force (USAF).

**E. Acquisition Strategy**  
The acquisition strategy for the Munitions Materiel Handling Equipment (MMHE) Modernization project is expected to be open competition and may award to multiple vendors.

The acquisition strategy for the Powered Aerospace Ground Equipment (AGE) Modernization project is expected to be open competition and may award to multiple vendors.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0202834F / <i>Vehicles and Support Equipment - General</i>	

The acquisition strategy for Tow Systems Modernization project is expected to be open competition.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0202834F / Vehicles and Support Equipment - General	<b>Project (Number/Name)</b> 672800 / AVIATION SUPPORT EQUIPMENT MODERNIZATION
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
MMHE Contract	C/TBD	Not specified. : TBD	-	-		-		2.164	Mar 2022	-		2.164	-	-	-
Powered AGE Contract	C/TBD	Not specified. : TBD	-	-		-		1.385	Feb 2022	-		1.385	-	-	-
Tow Systems Contract	C/TBD	Not specified. : TBD	-	-		-		1.080	Feb 2022	-		1.080	-	-	-
<b>Subtotal</b>			-	-		-		4.629		-		4.629	-	-	N/A

<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Contractor Support	PO	Not specified. : TBD	-	-		-		1.200	Mar 2022	-		1.200	-	-	-
<b>Subtotal</b>			-	-		-		1.200		-		1.200	-	-	N/A

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Office Management/Government Services	TBD	Not specified. : TBD	-	-		-		0.060	Feb 2022	-		0.060	-	-	-
<b>Subtotal</b>			-	-		-		0.060		-		0.060	-	-	N/A

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract	
	<b>Project Cost Totals</b>		-	-	0.000	5.889	-	5.889	-	-

**Remarks**



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Air Force</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0202834F / <i>Vehicles and Support Equipment - General</i>	<b>Project (Number/Name)</b> 672800 / AVIATION SUPPORT EQUIPMENT MODERNIZATION

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b><i>Aviation Support Equipment Mod</i></b>																												
Powered AGE Development																												
MMHE Development																												
Tow Systems Development																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0202834F / <i>Vehicles and Support Equipment - General</i>	<b>Project (Number/Name)</b> 672800 / AVIATION SUPPORT EQUIPMENT MODERNIZATION

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Aviation Support Equipment Mod</i></b>				
Powered AGE Development	3	2022	3	2025
MMHE Development	3	2022	3	2026
Tow Systems Development	2	2022	2	2023

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force / BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0205219F / MQ-9 UAV
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	0.000	122.919	106.885	85.135	0.000	85.135	-	-	-	-	-	-
675212: <i>MQ-9 SLAM</i>	0.000	6.290	16.607	38.327	0.000	38.327	-	-	-	-	-	-
675246: <i>MQ-9 Development and Fielding</i>	0.000	50.931	32.334	2.694	0.000	2.694	-	-	-	-	-	-
675247: <i>Squadron Operations Centers (SOC)</i>	0.000	0.000	0.000	0.251	0.000	0.251	-	-	-	-	-	-
675249: <i>MQ-9 Upgrade</i>	0.000	65.698	57.944	43.863	0.000	43.863	-	-	-	-	-	-

**Program MDAP/MAIS Code:** 424

**Note**  
 This program, BA 7, PE 0205219F, project 675247, Squadron Operations Center, is a new start.

**A. Mission Description and Budget Item Justification**

The basic MQ-9 Reaper system consists of the aircraft, sensors, Ground Control Station (GCS), communications equipment, weapon kits, support equipment, simulator and training devices, Readiness Spares Packages (RSP), technical data/training, and personnel required to operate, maintain, and sustain the system. The system is designed to be modular and open-ended. Mission-specific equipment is employed in a plug-and-play mission kit concept allowing specific aircraft and GCS configurations to be tailored to fit mission needs.

- The MQ-9 Reaper system has four separate development programs. This PE includes:
1. MQ-9 System Lifecycle Agile Modernization (SLAM). This effort is to develop improvements for existing systems and to field new capabilities for the baseline MQ-9 fleet using an Agile Acquisition Strategy to include concept exploration for an MQ-9 follow-on.
  2. MQ-9 Development and Fielding. This effort is for development and fielding of the baseline MQ-9 aircraft and GCSs and associated communications systems, sensors, payloads, simulators, support equipment, and resolving Diminishing Manufacturing Sources (DMS) issues.
  3. Squadron Operations Centers (SOC). This effort is for development and fielding of standardized operations centers. SOC's contain the equipment necessary for remote split operations, to provide mission data and tasking information to aircrew, and to disseminate and/or exchange mission data with decision-makers and the intelligence community.
  4. MQ-9 Upgrade. This effort is to develop improvements for existing systems and to field new capabilities for the baseline MQ-9 fleet using an Agile Acquisition Strategy.

The Air Force has established the MQ-9 Multi-Domain Operation (M2DO) aircraft configuration which consists of multiple projects intended to keep the platform viable in the wide-spectrum of armed conflict in the near term. These efforts include, but are not limited to, Anti-Jam Global Positioning System, Enhanced Power, Link 16,

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0205219F / MQ-9 UAV
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Open Mission System/Stellar Relay, Signal Excision, Digital Spread Spectrum Signal, Enhanced Line of Site, Enhanced Auto-Takeoff and Landing, Enhanced Autonomy (including Intelligence Electronic Units). The number of M2DO aircraft, and final capabilities within this configuration, are subject to change as requirements evolve.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver MQ-9 WEAPON SYSTEM capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 0.179M and in FY21 1.336M is forecasted for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	127.296	162.080	168.160	0.000	168.160
Current President's Budget	122.919	106.885	85.135	0.000	85.135
Total Adjustments	-4.377	-55.195	-83.025	0.000	-83.025
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	-55.195			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-4.377	0.000			
• Other Adjustments	0.000	0.000	-83.025	0.000	-83.025

**Change Summary Explanation**

FY20 Base

- 4.377M Small Business Innovation Research (SBIR) transfer

FY21 Base

- \$55.195M Congressional Appropriation Conference rescission

FY22 Base

- \$83.025M reduction identified for higher AF prioritization

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0205219F / MQ-9 UAV				<b>Project (Number/Name)</b> 675212 / MQ-9 SLAM			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
675212: MQ-9 SLAM	0.000	6.290	16.607	38.327	0.000	38.327	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The MQ-9 System Lifecycle Agile Modernization (SLAM) Program develops and integrates improvements for existing systems and fields new capabilities for the MQ-9 fleet through an Agile Acquisition Strategy to meet evolving mission needs. SLAM includes concept exploration for MQ-9 follow-on effort.

The objective is to enable rapid fielding of new software, hardware, and sustainability for integration into the MQ-9 fleet with requirements from the Candidate Capability List (CCL) that may include, but are not limited to, efforts to reduce system configurations; perform technology upgrades; increase pilot awareness and usability; improve reconnaissance targeting and exploitation; expand weapons system selection and lethality; enlarge suitability to varying operational theaters; improve security and self-protection; reduce logistics footprint; train the warfighter, and prototype.

Activities also include, but are not limited to, studies, analysis, simulations, demonstrations, prototyping and testing, use of subject matter experts agencies to develop and test all current and follow-on MQ-9 system capabilities which include, but are not limited to System Integration Laboratory (SIL)/ Hardware in the Loop Laboratory (HILL) and Detachment 3 (Det 3) improvements.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver MQ-9 WEAPON SYSTEM capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

Funding may be used to address Diminishing Manufacturing Source (DMS) and Non-Recurring Engineering issues.

Where appropriate, the MQ-9 Program of Record (PoR) and Air Force Special Operations Command (AFSOC) will cost share on joint efforts that are required by both programs to support new capabilities.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<b>Title:</b> MQ-9 SLAM	6.290	14.723	32.238	-	32.238
<p><b>Description:</b> Develops and integrates upgrade capabilities to support of the MQ-9 modernization strategy. Development combines the rigor of an event driven development process (referred to as Technology Maturation Effort (TME)) with the expedited delivery of a schedule driven integration and fielding process. New capabilities include, but are not be limited to, upgrades of existing aircraft, Ground Control Station (GCS), communication, payload systems, and software updates. MQ-9 SLAM also addresses and resolves Diminishing Manufacturing Sources (DMS) issues.</p>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205219F / MQ-9 UAV	<b>Project (Number/Name)</b> 675212 / MQ-9 SLAM

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<p>Candidate Capabilities are determined by ACC and AFSOC direction and inputs that include Joint Urgent Operational Need (JUON) and Urgent Operational Need (UON) requests.</p> <p>Activities also include, but are not limited to, operator simulators, reliability and maintainability, test support, communications, and urgent services.</p> <p>During development MQ-9 PoR and AFSOC will cost share on joint efforts that are required by both programs to support the new capabilities.</p> <p><b>FY 2021 Plans:</b> TME developing upgrade capabilities in conjunction with the CCL to include, but not limited to:</p> <ul style="list-style-type: none"> <li>• Weapons usability improvements</li> <li>• Unified Tactical Situational Awareness</li> <li>• Mode 5</li> <li>• Ku or Global Positioning System (GPS) jamming</li> <li>• Data encryption, Identification Friend or Foe (IFF), electronic warfare, and signature reduction</li> <li>• Link-16 (Airborne Mission Networking) capability, (e.g., developmental testing, software updates, documentation and training)</li> </ul> <p><b>FY 2022 Base Plans:</b> Continue TME developing upgrade capabilities in conjunction with the CCL to include, but not limited to:</p> <ul style="list-style-type: none"> <li>• Weapons usability improvements</li> <li>• Unified Tactical Situational Awareness</li> <li>• Mode 5</li> <li>• Ku or Global Positioning System (GPS) jamming</li> <li>• Data encryption, Identification Friend or Foe (IFF), electronic warfare, and signature reduction</li> <li>• Link-16 (Airborne Mission Networking) capability, (e.g., developmental testing, software updates, documentation and training)</li> </ul> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increase as the MQ-9 SLAM program continues to on-board modernization strategy requirements and implement Technology Maturation Efforts (TME).</p> <p><b>Title:</b> Reliability and Maintainability</p>	0.000	0.000	0.251	-	0.251

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205219F / MQ-9 UAV	<b>Project (Number/Name)</b> 675212 / MQ-9 SLAM

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<p><b>Description:</b> Develops MQ-9 Reliability and Maintainability (R&amp;M) improvements for aircraft and ground based infrastructure. Includes engineering change orders, studies, and general research. Addresses and resolves DMS issues.</p> <p>Funding was approved for this R&amp;M effort in the FY20 appropriation--this effort is not a New Start.</p> <p><b>FY 2021 Plans:</b> N/A</p> <p><b>FY 2022 Base Plans:</b> Develop aircraft and ground based infrastructure to improve mission capable rates and reduce reliability and maintainability costs. Includes addressing and resolving DMS issues.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increased as MQ-9 SLAM Reliability and Maintainability ramps up.</p>					
<p><b>Title:</b> Test Support</p> <p><b>Description:</b> Provides support for, but is not limited to, activities for MQ-9 testing of weapon system hardware/software testing in accordance with (IAW) contract standards, developmental testing of new capabilities, and R&amp;M upgrades.</p> <p><b>FY 2021 Plans:</b> Provide government agencies support for MQ-9 testing to include continued acceptance testing of weapon system hardware/software IAW with contract standards, developmental testing of new capabilities, and R&amp;M improvements.</p> <p><b>FY 2022 Base Plans:</b> Continues to provide government agencies support for MQ-9 testing to include continued acceptance testing of weapon system hardware/software IAW with contract standards, developmental testing of new capabilities, and R&amp;M improvements.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increased slightly. MQ-9 SLAM will continue weapon system hardware/software testing.</p>	0.000	0.000	0.200	-	0.200
<p><b>Title:</b> Communications</p>	0.000	0.043	0.138	-	0.138

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205219F / MQ-9 UAV	<b>Project (Number/Name)</b> 675212 / MQ-9 SLAM

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<p><b>Description:</b> Develops communications capabilities such as, but not limited to, network systems managers, SATCOM, and relay site upgrades. Includes drafting technical orders and support documentation, training materials, production drawings, and retrofit acceptance plans (e.g., Bandwidth Efficient Common Data Link (BE-CDL) Secure Voice Multi Level Security (MLS), ARC-210 Guard Squelch, and Secure Communications).</p> <p><b>FY 2021 Plans:</b> Continue to develop communications capabilities on encrypted data links, terminal, command and control, ISR transmission, GCS communications, SATCOM, integrated IP-based network interfaces, primary data links, network system managers, operational durability, remote split operations, and support equipment. Also includes associated technical orders and flight manuals.</p> <p><b>FY 2022 Base Plans:</b> Continue to develop communications capabilities on encrypted data links, terminal, command and control, ISR transmission, GCS communications, SATCOM, integrated IP-based network interfaces, primary data links, network system managers, operational durability, remote split operations, and support equipment. Also includes associated technical orders and flight manuals.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increased slightly with FY22 for MQ-9 SLAM Communications.</p>					
<p><b>Title:</b> Concept Exploration for follow-on to MQ-9</p> <p><b>Description:</b> Includes but is not limited to, program planning for the follow-on MQ-9 effort which explores capabilities in a contested environment.</p> <p><b>FY 2021 Plans:</b> Development activities, which include but are not limited to, studies, analysis, and prototyping RPA operations in a contested environment.</p> <p><b>FY 2022 Base Plans:</b> Continue development activities, which include but are not limited to, studies, analysis, and prototyping RPA operations in a contested environment.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increase as SLAM Concept Exploration program requirements increase.</p>	-	1.841	5.500	-	5.500
<b>Accomplishments/Planned Programs Subtotals</b>	6.290	16.607	38.327	-	38.327



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205219F / MQ-9 UAV	<b>Project (Number/Name)</b> 675212 / MQ-9 SLAM
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 06 PRDTB1: MQ-9	0.000	0.000	0.000	-	0.000	-	-	-	-	-	-
• APAF 05 PRDTB2: MQ-9 Mods	0.000	0.000	0.000	-	0.000	-	-	-	-	-	-

**Remarks**

PMA costs are included in Other Government Costs.

**D. Acquisition Strategy**

Acquisition of MQ-9 SLAM is accomplished via sole-source contracts with General Atomics-ASI, Raytheon, and L-3 Communications, prime contractors, and United States Government (USG) Labs. Management of development and fielding of new capabilities will be through an Agile Acquisition Strategy that combines the rigor of an event driven development process (referred to as a Technology Maturation Effort (TME)) with the expedited delivery of a schedule driven integration and fielding process. This will allow continued baseline improvements while rapidly integrating limited urgent needs.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205219F / MQ-9 UAV	<b>Project (Number/Name)</b> 675212 / MQ-9 SLAM
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<b>Product Development (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
MQ-9 SLAM	SS/CPAF	GA-ASI : Poway, CA	0.000	5.649	Jul 2020	14.296	Nov 2020	26.013	Nov 2021	-		26.013	-	-	-
Reliability and Maintainability	SS/CPAF	GA-ASI : Poway, CA	0.000	-		-		0.251	Apr 2022	-		0.251	-	-	-
Communications	SS/CPAF	GA-ASI : Poway, CA	0.000	-		0.043	Jan 2021	0.138	Jan 2022	-		0.138	-	-	-
Concept Exploration for follow-on to MQ-9	Various	Various : Various	0.000	-		1.841	Jul 2021	5.500	Jul 2022	-		5.500	-	-	-
<b>Subtotal</b>			0.000	5.649		16.180		31.902		-		31.902	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Test and Evaluation	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	-	-	-
Test Support	Various	Various : Various	0.000	-		-		0.200	Nov 2021	-		0.200	-	-	-
<b>Subtotal</b>			0.000	-		-		0.200		-		0.200	-	-	N/A

<b>Management Services (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Other Government Costs	Various	Various : Various	0.000	0.641	Jul 2020	0.427	Apr 2021	6.225	Apr 2022	-		6.225	-	-	-
<b>Subtotal</b>			0.000	0.641		0.427		6.225		-		6.225	-	-	N/A

<b>Project Cost Totals</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
	0.000	6.290	16.607	38.327	-	38.327	-	-	N/A

**Remarks**

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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205219F / MQ-9 UAV	<b>Project (Number/Name)</b> 675212 / MQ-9 SLAM
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>MQ-9 SLAM</b>	
MQ-9 SLAM	
Reliability and Maintainability	
Communications	
Test Support	
Concept Exploration for follow-on to MQ-9	

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205219F / MQ-9 UAV	<b>Project (Number/Name)</b> 675212 / MQ-9 SLAM
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>MQ-9 SLAM</b>				
MQ-9 SLAM	4	2020	4	2022
Reliability and Maintainability	4	2022	4	2022
Communications	4	2021	4	2022
Test Support	4	2022	4	2022
Concept Exploration for follow-on to MQ-9	3	2021	4	2022

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205219F / MQ-9 UAV	<b>Project (Number/Name)</b> 675246 / MQ-9 Development and Fielding
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
675246: MQ-9 Development and Fielding	0.000	50.931	32.334	2.694	0.000	2.694	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Quantity of RDT&E Articles refers only to test aircraft.

**A. Mission Description and Budget Item Justification**

The basic MQ-9 Reaper system consists of the aircraft, sensors, Ground Control Station (GCS), communications equipment, weapon kits, support equipment, simulator and training devices, Readiness Spares Packages (RSP), technical data/training, and personnel required to operate, maintain, and sustain the system. The system is designed to be modular and open-ended. Mission-specific equipment is employed in a plug-and-play mission kit concept allowing specific aircraft and GCS configurations to be tailored to fit mission needs.

The MQ-9 Reaper aircraft is a single-engine, turbo-prop Remotely Piloted Aircraft (RPA) designed to operate over-the-horizon at medium-to-high altitude for long endurance sorties. The aircraft is designed to primarily prosecute critical emerging Time-Sensitive-Targets (TSTs) using a Synthetic Aperture Radar (SAR), Electro-optical/Infrared (EO/IR), and laser designator-based attack asset with on-board hard-kill weapon capability (hunter-killer). It also performs Intelligence, Surveillance, Reconnaissance, and Target Acquisition (ISR TA).

The MQ-9 system is continuing to develop and field capabilities to meet evolving mission needs through incremental upgrades, including but not limited to, increasing the maximum gross takeoff and landing weight; increasing operational range and endurance; propulsion system improvements; integrated redundant avionics; incorporating provisions for a Foreign Military Sales (FMS) exportable version of the weapon system; communications upgrades to include but not limited to datalink encryption, Internet Protocol (IP) networking, secure voice and data communications; navigation system upgrades; electrical system upgrades; sensor/stores management computer improvement; MIL STD-1760 advanced weapons data bus; advanced sensor and weapon payloads; improved human-machine interface (HMI); software updates needed to support new configurations and development; integrating additional precision weapons; and hardware and software upgrades to the GCS. The program will also complete airworthiness and weapon system certification and accreditation; produce applicable training for payloads funded in other program elements (e.g. SIGINT, communications, Wide Area Motion Imagery (WAMI), Near Vertical Direction Finding (NVDF), Gorgon Stare Quick Reaction Capability, advanced Counter-Improvised Explosive Device (C-IED), missile defense, hyperspectral, and other sensors and weapons). Development efforts will address reliability, maintainability, sustainability, Diminishing Manufacturing Sources (DMS), and safety issues. Activities also include, but are not limited to, trade studies, analyses, preliminary systems engineering, system and subsystem level testing in accordance with DoD and military standards, and specification development in support of both current program planning and execution, and studies supporting analysis and investment in future MQ-9 program planning.

The GCS functions as the aircraft cockpit and can control the aircraft either within Line-of-Sight (LOS) or Beyond Line-of-Sight (BLOS) via a combination of satellite relay and terrestrial communication architectures. The GCS is either mobile to support forward operating locations or fixed at a facility to support reach back Remote Split Operations (RSO). The GCS has the capability to perform mission planning; provide a means for manual control; and enable personnel to launch, recover, and monitor

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205219F / MQ-9 UAV	<b>Project (Number/Name)</b> 675246 / MQ-9 Development and Fielding
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aircraft, payloads, and system communications status. It incorporates secure data links to send aircraft and payload commands and receive system telemetry and payload data; monitors threats to the aircraft; displays the common operational picture; and provides support functions. Launch and Recovery GCS (LRGCS) is used for servicing, systems checks, maintenance, launch and recovery of aircraft under LOS control for hand-off to a mobile or fixed facility GCS, and conducting operations within LOS range of the LRGCS. GCS upgrades will be developed and fielded in coordination with improvements to other MQ-9 system capabilities and in response to evolving operational and information assurance/certification and accreditation requirements.

This project will also increase interoperability among developed systems by developing common standards and tools.

MQ-9 Program of Record (PoR) and Air Force Special Operations Command (AFSOC) will cost share during development, where appropriate, on joint efforts that are required by both programs to support the new capabilities.

Funding may be used to address DMS and Non-Recurring Engineering (NRE) issues.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver MQ-9 WEAPON SYSTEM capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

This program is Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p><b>Title:</b> Ground Control Station (GCS) Development</p> <p><b>Description:</b> Develop GCS capabilities. Major capabilities include, but are not limited to, flight payload separation, open system architecture, processors, multi-level security, ergonomic cockpit design, single seat operations, reducing or eliminating known deficiencies in legacy GCS, and updates to facilitate single software.</p> <p><b>FY 2021 Plans:</b> Continue GCS design/development, manufacturing and testing to include, but not limited to:</p> <ul style="list-style-type: none"> <li>• Hardware/Software Development</li> <li>• Integration and test</li> <li>• Continue GCS Development Test assets</li> <li>• Continue Contractor test build</li> <li>• Maintenance evaluation team event</li> <li>• Military Flight Release</li> <li>• Resolution of DMS issues</li> <li>• Field Service Representative (FSR) support during IOT&amp;E</li> </ul>	20.641	8.666	0.350	-	0.350

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205219F / MQ-9 UAV	<b>Project (Number/Name)</b> 675246 / MQ-9 Development and Fielding
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
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<ul style="list-style-type: none"> <li>• Block 30 Articulating Arm</li> <li>• Block 30 Monitor</li> <li>• Processor(s)</li> </ul> <p><b>FY 2022 Base Plans:</b> Will continue GCS design/development, manufacturing and testing to include, but not limited to:</p> <ul style="list-style-type: none"> <li>• Hardware/Software Development</li> <li>• Integration and test</li> <li>• Continue GCS Development Test assets</li> <li>• Continue Contractor test build</li> <li>• Maintenance evaluation team event</li> <li>• Military Flight Release</li> <li>• Resolution of DMS issues</li> <li>• Field Service Representative (FSR) support during IOT&amp;E</li> <li>• Block 30 Articulating Arm</li> <li>• Block 30 Monitor</li> <li>• Processor(s)</li> </ul> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreased for GCS development as effort ramps down.</p>					
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<p><b>Title:</b> Operator Simulator</p> <p><b>Description:</b> Develop Operator Simulators for training, updates to keep Operator Simulators concurrent with the aircraft and GCS to include Joint Urgent Operational Need (JUON) support emerging AFSOC configurations. MQ-9 PoR and AFSOC will cost share development, where appropriate, on joint efforts that are required by both programs to support the new capabilities.</p> <p><b>FY 2021 Plans:</b> Continue to implement updates which will keep the Operator Simulator current with the aircraft and GCS including, but not limited to:</p> <ul style="list-style-type: none"> <li>• Sensors and Sensor Integration - The Air Force continues to evaluate options to reduce lifecycle costs for the EO/IR sensor for the MQ-9A platform which could include development and/or integration efforts to support dual sourcing an alternative material EO/IR solution</li> <li>• Databases</li> <li>• Weapons upgrades</li> </ul>	1.925	2.273	0.000	-	0.000
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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205219F / MQ-9 UAV	<b>Project (Number/Name)</b> 675246 / MQ-9 Development and Fielding

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<p>• Resolution of DMS issues</p> <p><b>FY 2022 Base Plans:</b> Will continue to implement updates which will keep the Operator Simulator current with the aircraft and GCS including, but not limited to:</p> <ul style="list-style-type: none"> <li>• Sensors</li> <li>• Databases</li> <li>• Weapons upgrades</li> <li>• Resolution of DMS issues</li> </ul> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreased as Operator Simulator development effort ramps down.</p>					
<p><b>Title:</b> Release 1 and Release 2</p> <p><b>Description:</b> Release 1 and Release 2 continue execution of a subset of work previously performed under the System Development and Demonstration (SDD) effort, while rapidly integrating upgrades or improvements (including limited urgent needs) fleet-wide. Development will combine the rigor of an event driven development process (referred to as a Technology Maturation Effort (TME)) with the expeditious delivery of a schedule driven integration and fielding process (referred to as a Release). These efforts may include, but are not limited to: Cryptographic Core Module (CCM), MTS-B Integration, Ground Control Station (GCS), Internet Protocol (IP) Migration, Synthetic Aperture Radar (SAR) Development, Extended Range, Station 1 &amp; 7, Enablers Development, Multi Transit Ops, weapons integration, and testing on MQ-9 platform for capabilities such as rockets, missiles, bombs, guns and direct energy weapons, as well as software development required to support new capabilities. MQ-9 PoR and AFSOC will cost share during development, where appropriate, on joint efforts that are required by both programs to support the new capabilities.</p> <p><b>FY 2021 Plans:</b> Developing and integrating the software and data to update the MQ-9 Block 5 UAS capabilities including, but not limited to:</p> <ul style="list-style-type: none"> <li>• Resolution of DMS issues</li> <li>• Cryptographic Core Module (CCM)</li> <li>• System supportability analysis</li> <li>• Evaluation of design code software</li> </ul> <p><b>FY 2022 Base Plans:</b></p>	8.500	11.903	0.200	-	0.200



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205219F / MQ-9 UAV	<b>Project (Number/Name)</b> 675246 / MQ-9 Development and Fielding

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<p>Continue developing and integrating the software and data to update the MQ-9 Block 5 UAS capabilities including, but not limited to:</p> <ul style="list-style-type: none"> <li>• Resolution of DMS issues</li> <li>• Cryptographic Core Module (CCM)</li> <li>• Emergency Line of Sight (E-LoS) System</li> <li>• System supportability analysis</li> <li>• Evaluation of design code software</li> </ul> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreased for Cryptographic Core Module (CCM) and the Emergency Line of Sight (E-LoS) System, as program ramps down.</p>					
<p><b>Title:</b> Test Support</p> <p><b>Description:</b> Provides Other Government Agency support for MQ-9 testing to include, but not limited to, continued acceptance testing of weapon system hardware and software in accordance with contract standards, developmental testing of new capabilities, and Reliability and Maintainability (R&amp;M) upgrades. MQ-9 PoR and Air Force Special Operations Command (AFSOC) will cost share development, where appropriate, on joint efforts that are required by both programs to support the new capabilities.</p> <p><b>FY 2021 Plans:</b> Will continue test support.</p> <p><b>FY 2022 Base Plans:</b> Will continue test support.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreased as the Test Support development efforts ramp down support of software updates to include but not limited to LoS data links, ATLC, and open system architecture.</p>	0.143	0.332	0.088	-	0.088
<p><b>Title:</b> Communications</p> <p><b>Description:</b> Develop MQ-9 communications capabilities including, but not limited to, encrypted and improved LoS data links to ROVER/Video Data Link terminals (VORTEX/Airborne Platform Video Data Link), Bandwidth Efficient (BE) Common Data Link (CDL) for Command and Control (C2) and ISR transmission to GCS, improved (including BE) Beyond LOS (BLOS) military Satellite Communications (SATCOM) usage, control module, and secure triple link modem. Development and integration of an IP-based remote split operations (RSO) network/ infrastructure to include: Improvements to Ground Data Terminals (GDT), Design, development, and test of IP-</p>	3.434	6.653	0.550	-	0.550

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205219F / MQ-9 UAV	<b>Project (Number/Name)</b> 675246 / MQ-9 Development and Fielding

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<p>based network interfaces, Improved Predator Primary Data Link (PPDL) capabilities, reduction of legacy C-band signal blockages, network systems managers, SATCOM and relay site capabilities upgrades, drafting Technical Orders (TOs) and support documentation, training materials, production drawings, and retrofit acceptance plans. MQ-9 PoR and AFSOC will cost share development, where appropriate, on joint efforts that are required by both programs to support the new capabilities.</p> <p><b>FY 2021 Plans:</b> Continue to develop and enhance MQ-9 communications capabilities, to include but not limited to, solutions of various DMS issues.</p> <p><b>FY 2022 Base Plans:</b> Continue to develop and enhance MQ-9 communications capabilities, to include but not limited to, solutions of various DMS issues.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreased as communications development ramps down.</p>					
<p><b>Title:</b> MQ-9 Technology Insertion</p> <p><b>Description:</b> Develop program protection Technology Insertion capabilities and functionality for the MQ-9 Weapon System. MQ-9 PoR and AFSOC will cost share during development, where appropriate, on joint efforts that are required by both programs to support the new capabilities.</p> <p><b>FY 2021 Plans:</b> MQ-9 Technology Insertion efforts will continue during FY21.</p> <p><b>FY 2022 Base Plans:</b> MQ-9 Technology Insertion efforts will continue during FY22.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreased as the Communications security control module of the MQ-9 Technology Insertion effort ramps down.</p>	16.288	2.507	1.506	-	1.506
<b>Accomplishments/Planned Programs Subtotals</b>	50.931	32.334	2.694	-	2.694

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205219F / MQ-9 UAV	<b>Project (Number/Name)</b> 675246 / MQ-9 Development and Fielding
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 04 Line Item PRDTB1: MQ-9	308.600	343.600	3.288	-	3.288	-	-	-	-	-	-
• APAF 06 Line Item PRDTB1: MQ-9 Spares	55.943	33.128	14.387	-	14.387	-	-	-	-	-	-
• APAF 05 Line Item PRDTB2: MQ-9 Mods	110.437	108.230	13.769	-	13.769	-	-	-	-	-	-
• APAF 07 Line Item PRDTB1: MQ-9	22.107	26.585	26.596	-	26.596	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

The MQ-9 Reaper system will be acquired via sole-source contracts with General Atomics Aeronautical Systems Inc. (GA-ASI), L3Comm, and Raytheon as the prime contractors. GA-ASI is the prime contractor for aircraft and ground control stations. GA-Mission Systems (GA-MS) is the prime contractor for Lynx SAR. L3Comm is the prime contractor for the Predator Satellite Link. Raytheon is the prime contractor for the MTS-B EO/IR sensor system. Management of development and fielding of new capabilities will be through an acquisition strategy that combines the rigor of an event driven development process (referred to as a Technology Maturation Effort (TME)) with the expeditious delivery of a schedule driven integration and fielding process. This will allow continued baseline improvements while rapidly integrating limited urgent needs fleet-wide.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205219F / MQ-9 UAV	<b>Project (Number/Name)</b> 675246 / MQ-9 Development and Fielding
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Ground Control Station (GCS) Development	SS/CPFF	GA-ASI : Poway, CA	0.000	20.641	Mar 2020	7.143	Mar 2021	0.350	Mar 2022	-		0.350	-	-	349.818
Multi-Spectral Targeting System (MTS)-B EO/IR Sensor	SS/CPFF	Raytheon : McKinney, TX	0.000	-		-		-		-		-	-	-	112.944
Operator Simulator	TBD	TBD : TBD	0.000	1.925	Mar 2020	2.273	Mar 2021	-		-		-	-	-	56.512
Release1 and Release 2	SS/CPFF	GA-ASI : Poway, CA	0.000	8.500	Feb 2020	11.903	Mar 2021	0.200	Mar 2022	-		0.200	-	-	161.096
Communications	SS/CPFF	GA-ASI : Poway, CA	0.000	3.434	Nov 2019	6.653	Nov 2020	0.550	Nov 2021	-		0.550	-	-	17.336
MQ-9 Program Protection Technology Insertion	SS/CPFF	GA-ASI : Poway, CA	0.000	14.586	Apr 2020	2.507	Nov 2021	1.014	Nov 2022	-		1.014	-	-	58.239
Completed Efforts	SS/ Various	Various : Various	0.000	-		-		-		-		-	-	-	77.805
<b>Subtotal</b>			0.000	49.086		30.479		2.114		-		2.114	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test and Evaluation	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	-	-	-
Test Support	Various	Various : Various, CA	0.000	0.143	Oct 2019	0.332	Oct 2020	0.088	Oct 2021	-		0.088	-	-	22.665
<b>Subtotal</b>			0.000	0.143		0.332		0.088		-		0.088	-	-	N/A

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Other Government Costs	Various	Various : Various	0.000	1.702	May 2020	1.523	Apr 2021	0.492	Apr 2022	-		0.492	-	-	119.924
<b>Subtotal</b>			0.000	1.702		1.523		0.492		-		0.492	-	-	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205219F / MQ-9 UAV	<b>Project (Number/Name)</b> 675246 / MQ-9 Development and Fielding
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	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	0.000	50.931	32.334	2.694	-	2.694	-	-	N/A

**Remarks**  
PMA costs are included in Other Government Costs.

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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205219F / MQ-9 UAV	<b>Project (Number/Name)</b> 675246 / MQ-9 Development and Fielding
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
<b>MQ-9 ACAT IC Development</b>																												
Ground Control Station (GCS) Development																												
MTS-B Updates (Electro-Optical/Infrared (EO/IR) Sensor)																												
Operator Simulator																												
Release 1 & Release 2																												
Test Support																												
Communications																												
MQ-9 Technology Insertion																												

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205219F / MQ-9 UAV	<b>Project (Number/Name)</b> 675246 / MQ-9 Development and Fielding
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>MQ-9 ACAT IC Development</i></b>				
Ground Control Station (GCS) Development	1	2020	4	2022
MTS-B Updates (Electro-Optical/Infrared (EO/IR) Sensor)	1	2020	1	2020
Operator Simulator	1	2020	4	2022
Release 1 & Release 2	1	2020	4	2022
Test Support	1	2020	4	2022
Communications	1	2020	4	2022
MQ-9 Technology Insertion	1	2020	4	2022

**Note**

PMA costs are included in Other Government Costs.

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205219F / MQ-9 UAV	<b>Project (Number/Name)</b> 675247 / Squadron Operations Centers (SOC)
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
675247: Squadron Operations Centers (SOC)	0.000	0.000	0.000	0.251	0.000	0.251	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**  
This program, BA 7, PE 0205219F, project 675247, Squadron Operations Center, is a new start.

FY22 3600 for SOC is a New Start as the last year of funding appropriated was FY19. Requirement remains valid in order to support the DT/OT SOC efforts to develop and test new technological and platform advancements.

**A. Mission Description and Budget Item Justification**

The SOC is required to employ Remote Split Operations (RSO). It provides the communications, network, aircraft control and sensor distribution circuits to effectively execute RSO missions. The SOC provides CONUS-based aircrews mission data, tasking, and ability to disseminate and exchange mission data with decision-makers and intelligence entities. This effort defines component standards, develops and stands up a SOC Systems Integration Lab (SIL), and integrates new technologies to maintain currency with technological and platform advancements.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver MQ-9 WEAPON SYSTEM capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<b>Title:</b> Squadron Operations Center	0.000	0.000	0.251	0.000	0.251
<b>Description:</b> Development of a SOC common to Air Combat Command (ACC), Air Force Special Operations Command (AFSOC), and Air National Guard (ANG). Major capabilities include secure mission communications; data reception, recording, editing, analysis, dissemination, and exchange; mission planning, preparation, and support; mission execution (e.g., updates to threat tracking and targeting, weather tracking, mission status and capability; tactical situational awareness; etc.); and mission reconstruction and debriefing.					
<b>FY 2021 Plans:</b> No Funding					
<b>FY 2022 Base Plans:</b>					



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205219F / MQ-9 UAV	<b>Project (Number/Name)</b> 675247 / Squadron Operations Centers (SOC)

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Necessary for Developmental/Operational Testing of DT/OT SOC which is required to develop and test new technologies to remain up to date with technological and platform advancements.					
<b>FY 2022 OCO Plans:</b> n/a					
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Requirement remains valid and the increase reflects the need of the RPA-SOC project					
<b>Accomplishments/Planned Programs Subtotals</b>	0.000	0.000	0.251	0.000	0.251

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• OPAF 03 Line Item 837300: <i>Base Communications Infrastructure</i>	7.898	82.160	70.370	-	70.370	-	-	-	-	-	-

**Remarks**  
 Since 2004, MQ-1/MQ-9 squadrons have acquired equipment, on an ad hoc basis, to provide the communications, network, aircraft control, and sensor distribution circuits needed to execute RSO missions. OPAF funding will be used to standardize and modernize existing RPA SOC capability, which is required to reduce security vulnerabilities, as well as address end of life/end of support issues of existing RPA SOC equipment. The Developmental Testing (DT) SOC will be used to further enhance the program's ability to update future RPA-SOC modernization efforts.

**D. Acquisition Strategy**  
 AFLCMC/WII manages the SOC Program for ACC, AFSOC, and ANG through organic development at the 402 SMXG, and hardware/software procurement utilizing the Air Force NETCENTS contract vehicle, as well as other Air Force and General Service Administration (GSA) contracts.



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Air Force</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205219F / MQ-9 UAV	<b>Project (Number/Name)</b> 675247 / Squadron Operations Centers (SOC)

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>RPA SOC SIL</b>																												
DT SOC Software upgrade and installation																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205219F / MQ-9 UAV	<b>Project (Number/Name)</b> 675247 / Squadron Operations Centers (SOC)

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>RPA SOC SIL</i></b>				
DT SOC Software upgrade and installation	2	2022	4	2022

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0205219F / MQ-9 UAV				<b>Project (Number/Name)</b> 675249 / MQ-9 Upgrade			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
675249: MQ-9 Upgrade	0.000	65.698	57.944	43.863	0.000	43.863	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

The MQ-9 Upgrade Program develops and integrates improvements for existing systems and fields new capabilities for the MQ-9 fleet through an Agile Acquisition Strategy.

The objective is to enable rapid fielding of new software, hardware, and sustainability measures for integration into the MQ-9 fleet. Per the Candidate Capability List (CCL) signed on 01 November 2019, capabilities may include, but are not limited to, efforts to reduce system configurations; enable battlespace integration; implement open architecture; enable mission resiliency; mitigate Diminishing Manufacturing Sources and Material Shortages (DMSMS) through planned technology upgrades; enable airspace integration; increase weather tolerance; enable airborne situational awareness; enable operations in a contested environment; build open architecture; improve cybersecurity resilience; improve reliability and maintainability; increase lethality; improve the human machine interface to enhance the user experience; and improve readiness.

Activities also include studies, analysis, simulations, demonstrations, prototyping, and testing. The Upgrade Program may use subject matter experts and agencies to develop and test MQ-9 system capabilities and make improvements to System Integration Laboratory (SIL)/ Hardware in the Loop Laboratory (HILL) and Detachment 3 (Det 3).

This program element may include necessary civilian pay expenses required to manage, execute, and deliver MQ-9 WEAPON SYSTEM capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

Funding may be used to address Diminishing Manufacturing Source (DMS) and Non-Recurring Engineering issues.

MQ-9 Program of Record (PoR) and Air Force Special Operations Command (AFSOC) will cost share on joint efforts that are required by both programs to support the new capabilities.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<b>Title:</b> MQ-9 Upgrade	60.988	50.469	41.263	-	41.263
<b>Description:</b> Develop and integrate upgrade capabilities in support of the MQ-9 Upgrade Strategy. Development will combine the rigor of an event driven development process (referred to as Technology Maturation Effort (TME)) with the expeditious delivery of a schedule driven integration and fielding process. New capabilities include, but are not limited to, upgrades of existing aircraft, Ground Control Stations (GCSs),					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205219F / MQ-9 UAV	<b>Project (Number/Name)</b> 675249 / MQ-9 Upgrade

**B. Accomplishments/Planned Programs (\$ in Millions)**

communication capabilities, payload systems, and the Multi-Spectral Targeting System (MTS-B). Upgrade capabilities also include software updates, the addition of new capabilities and subsystems, and the resolution of DMS issues.

Candidate capabilities are determined by Major Command (Air Combat Command (ACC), Air Force Special Operations Command (AFSOC)) direction and inputs that included Joint Urgent Operational Need (JUON) and Urgent Operational Need (UON) requests.

Activities also include, but are not limited to, operator simulators, reliability and maintainability, test support, communications, and urgent services.

MQ-9 PoR and AFSOC will cost share development, where appropriate, on joint efforts that are required by both programs to support the new capabilities.

***FY 2021 Plans:***

- TME to develop upgrade capabilities in conjunction with the CCL to include, but not limited to:
- Unified Tactical Situational Awareness
  - Design, development, and integration of Moving Target Indicator (MTI) capability on medium altitude air vehicles
  - Automated Takeoff and Landing Capability (ATLC)
  - Weapons usability improvements (i.e., auto-lockout, JAGM, and four rail)
  - Reconnaissance, targeting, and technology improvements in MTS-B, Synthetic Aperture Radar, sensors, sensor upgrades, and GPS
  - System corrections, technology upgrades within the GCS, Unmanned Aerial Vehicle communications, and ground support (i.e., batteries, engine, BE-CDL, and Beyond Line of Sight (BLOS))
  - Expansion of theater capabilities with Mode 5
  - MTS-B High-Definition Short Wave Infrared/Pulse Repetition Frequency, two-color laser system, inertial measurement unit/autoloader
  - Secure communications
  - Improvements to system security and the ability to self-protect through Ku or GPS jamming, data encryption, IFF, electronic warfare, and signature reduction
  - Link-16 (Airborne Mission Networking) capability

FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205219F / MQ-9 UAV	<b>Project (Number/Name)</b> 675249 / MQ-9 Upgrade
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
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<ul style="list-style-type: none"> <li>• Gorgon Stare</li> </ul> <p><b>FY 2022 Base Plans:</b> Continue TME developing upgrade capabilities in conjunction with the CCL to include, but not limited to:</p> <ul style="list-style-type: none"> <li>• Unified Tactical Situational Awareness</li> <li>• Design, development, and integration of Moving Target Indicator (MTI) capability on medium altitude air vehicles</li> <li>• Automated Takeoff and Landing Capability (ATLC)</li> <li>• Weapons usability improvements (i.e., auto-lockout, JAGM, and four rail)</li> <li>• Reconnaissance, targeting, and technology improvements in MTS-B, Synthetic Aperture Radar, sensors, sensor upgrades, and GPS</li> <li>• System corrections, technology upgrades within the GCS, Unmanned Aerial Vehicle communications, and ground support (i.e., batteries, engine, BE-CDL, and Beyond Line of Sight (BLOS))</li> <li>• Expansion of theater capabilities with Mode 5</li> <li>• MTS-B High-Definition Short Wave Infrared/Pulse Repetition Frequency, two-color laser system, inertial measurement unit/autoloader</li> <li>• Secure communications</li> <li>• Improvements to system security and the ability to self-protect through Ku or GPS jamming, data encryption, IFF, electronic warfare, and signature reduction</li> <li>• Link-16 (Airborne Mission Networking) capability</li> <li>• Gorgon Stare</li> </ul> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreased as MQ-9 Upgrade efforts were rephased based upon program execution requirements.</p>					
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<p><b>Title:</b> Operator Simulator</p> <p><b>Description:</b> Develop operator simulators for training and perform updates to keep operator simulators current with the aircraft and GCSs. Operator Simulator also includes, but is not limited to: JUONs, UONs, and support for emerging AFSOC configurations.</p> <p><b>FY 2021 Plans:</b> Continue implementing updates to keep the operator simulator current with the aircraft and GCSs.</p> <p><b>FY 2022 Base Plans:</b></p>	4.048	3.635	1.100	-	1.100
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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205219F / MQ-9 UAV	<b>Project (Number/Name)</b> 675249 / MQ-9 Upgrade

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Continue implementing updates to keep the operator simulator current with the aircraft and GCSs. <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreased as MQ-9 Upgrade operator simulators ramps down.					
<b>Title:</b> Test Support <b>Description:</b> MQ-9 Upgrade testing provides support including, but not limited to: activities for MQ-9 testing of weapon system hardware and software IAW contract standards, developmental testing of new capabilities, and R&M upgrades. <b>FY 2021 Plans:</b> Continue providing government agencies support for MQ-9 testing to include continued acceptance testing of weapon system hardware and software IAW with contract standards, developmental testing of new capabilities, and R&M improvements. <b>FY 2022 Base Plans:</b> Continue providing government agencies support for MQ-9 testing to include continued acceptance testing of weapon system hardware and software IAW with contract standards, developmental testing of new capabilities, and R&M improvements. <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreased as the Test Support development efforts ramp down	0.662	3.766	1.500	-	1.500
<b>Title:</b> Communications <b>Description:</b> Develop MQ-9 communications capabilities including, but not limited to: network system managers, SATCOM, and relay site upgrades. MQ-9 Upgrade Communications also includes drafting technical orders, support documentation, training materials, production drawings, and retrofit acceptance plans (i.e., BE CDL, Secure Voice Multi-Level Security (MLS), ARC-210 Guard Squelch, and Secure Communications). <b>FY 2021 Plans:</b> MQ-9 Upgrade communications capabilities development will continue. <b>FY 2022 Base Plans:</b> MQ-9 Upgrade communications capabilities development will continue. <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b>	0.000	0.074	0.000	-	0.000



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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205219F / MQ-9 UAV	<b>Project (Number/Name)</b> 675249 / MQ-9 Upgrade
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Funding decreased slightly for MQ-9 Upgrade Communications.					
<b>Accomplishments/Planned Programs Subtotals</b>	65.698	57.944	43.863	-	43.863

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• APAF 06 PRDTB1: MQ-9 UAV	54.069	14.268	13.795	-	13.795	-	-	-	-	-	-
• APAF 05 PRDTB2: MQ-9 Mods	143.977	46.781	130.518	-	130.518	-	-	-	-	-	-

**Remarks**  
PMA costs are included in Other Government Costs.

**D. Acquisition Strategy**  
Acquisition of MQ-9 Upgrade is accomplished via sole-source contracts with General Atomics-ASI, Raytheon, and L-3 Communications, prime contractors, and Other Government Agencies. Management of development and fielding of new capabilities will be through an Agile Acquisition Strategy that combines the rigor of an event driven development process (referred to as a Technology Maturation Effort (TME)) with the expedited delivery of a schedule driven integration and fielding process. This will allow continued baseline improvements while rapidly integrating limited urgent needs fleet-wide.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205219F / MQ-9 UAV	<b>Project (Number/Name)</b> 675249 / MQ-9 Upgrade
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	-	-	-
MQ-9 Upgrade	SS/CPFF	GA-ASI : Poway, CA	0.000	59.069	Mar 2020	48.468	Jan 2021	41.263	Jan 2022	-		41.263	-	-	-
Operator Simulator	TBD	TBD : TBD	0.000	4.048	Mar 2020	3.635	Jan 2021	1.100	Jan 2022	-		1.100	-	-	-
Communications	SS/CPFF	GA-ASI : Poway, CA	0.000	-		0.074	Oct 2020	-		-		-	-	-	-
<b>Subtotal</b>			0.000	63.117		52.177		42.363		-		42.363	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test and Evaluation	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	-	-	-
Test Support	Various	Various : Various	0.000	0.662	Nov 2019	3.766	Nov 2020	1.500	Nov 2021	-		1.500	-	-	-
<b>Subtotal</b>			0.000	0.662		3.766		1.500		-		1.500	-	-	N/A

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Management Services	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	-	-	-
Other Government Costs	Various	Various : Various	0.000	1.919	May 2020	2.001	May 2021	-		-		-	-	-	-
<b>Subtotal</b>			0.000	1.919		2.001		-		-		-	-	-	N/A

			Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>			0.000	65.698	57.944	43.863	-	43.863	-	-	N/A

**Remarks**  
PMA costs are included in Other Government Costs.

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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205219F / MQ-9 UAV	<b>Project (Number/Name)</b> 675249 / MQ-9 Upgrade
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>MQ-9 ACAT II Development</b>	
MQ-9 Upgrade	
Operator Simulator	
Test Support	
Communications	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205219F / MQ-9 UAV	<b>Project (Number/Name)</b> 675249 / MQ-9 Upgrade

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>MQ-9 ACAT II Development</i></b>				
MQ-9 Upgrade	1	2020	4	2023
Operator Simulator	1	2020	4	2022
Test Support	1	2020	4	2022
Communications	1	2021	4	2022

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0205671F <i>Joint Counter RCIED Electronic Warfare</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	3.854	4.080	3.111	0.000	3.111	-	-	-	-	-	-
674518: <i>JCREW VEHICLE INTEGRATION</i>	-	3.854	4.080	3.111	0.000	3.111	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

Program funds Counter Radio-Controlled Improvised Explosive Device Electronic Warfare (CREW) Mounted, Dismounted, and Fixed systems. CREW devices are self-protection systems critical to Mine Resistant, Ambush Protected (MRAP) vehicle mounted, Explosive Ordinance Disposal dismounted and Entry Control Point operations. Includes integration of the devices into currently fielded systems.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20, \$0 was expended for civilian pay expenses in this program element, and in FY21, \$0 is forecasted for civilian pay expenses in this program element.

The FY 2022 funding request was reduced by \$0.632 million to account for the availability of prior year execution balances.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	4.000	4.080	3.790	0.000	3.790
Current President's Budget	3.854	4.080	3.111	0.000	3.111
Total Adjustments	-0.146	0.000	-0.679	0.000	-0.679
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-0.146	0.000	-0.679	0.000	-0.679

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0205671F <i>I Joint Counter RCIED Electronic Warfare</i>
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**Change Summary Explanation**

The funding was changed from Base to OCO funds

**C. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<b>Title:</b> JCREW Vehicle Integration  <b>Description:</b> Program funds Counter Radio-Controlled Improvised Explosive Device Electronic Warfare (CREW) Mounted, Dismounted, and Fixed systems.  <b>FY 2021 Plans:</b> Program funds Counter Radio-Controlled Improvised Explosive Device Electronic Warfare (CREW) Mounted, Dismounted, and Fixed systems.  Funds changed from Base to OCO  <b>FY 2022 Base Plans:</b> Program funds Counter Radio-Controlled Improvised Explosive Device Electronic Warfare (CREW) Mounted, Dismounted, and Fixed systems.  <b>FY 2022 OCO Plans:</b> SAF/FM directed shift of tech insert dollars from OCO to baseline ISO worldwide capability provider  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Decrease of \$.029M expected	3.854	4.080	3.111	0.000	3.111
<b>Accomplishments/Planned Programs Subtotals</b>	3.854	4.080	3.111	0.000	3.111

**D. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• OPAF 04 Line Item 845100: <i>Engineering and EOD Equipment</i>	-	-	-	-	-	-	-	-	-	-	-

**Remarks**

Program funds Counter Radio-Controlled Improvised Explosive Device Electronic Warfare (CREW) Mounted, Dismounted, and Fixed systems. CREW devices are self-protection systems critical to Mine Resistant, Ambush Protected (MRAP)& Joint Light Tactical Vehicle (JLTV) mounted, Explosive Ordinance Disposal and Tactical Air Control Party dismounted and Entry Control Point operations. Includes software update integration into currently fielded systems.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0205671F <i>I Joint Counter RCIED Electronic Warfare</i>	
<b>E. Acquisition Strategy</b> n/a		

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205671F / Joint Counter RCIED Electronic Warfare	<b>Project (Number/Name)</b> 674518 / JCREW VEHICLE INTEGRATION
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Engineering Services	C/CPFF	NAVSEA PMS-408 : Washington, DC	-	3.854	Nov 2019	4.080	Nov 2020	3.111	Nov 2021	0.000		3.111	-	-	-
<b>Subtotal</b>			-	3.854		4.080		3.111		0.000		3.111	-	-	N/A
<b>Project Cost Totals</b>			-	3.854		4.080		3.111		0.000		3.111	-	-	N/A

**Remarks**  
 Funds Air Force fair share of research and development efforts to update software for fielded CREW systems, supporting EOD, Security Forces, and TACP Airmen. Software updates ensure mounted, dismounted, and fixed site CREW systems remain effective against evolving commercially available technologies.



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Air Force</b>		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205671F / <i>Joint Counter RCIED Electronic Warfare</i>	<b>Project (Number/Name)</b> 674518 / <i>JCREW VEHICLE INTEGRATION</i>

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b><i>J CREW Integration</i></b>	
JCREW Vehicle Integration	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205671F / <i>Joint Counter RCIED Electronic Warfare</i>	<b>Project (Number/Name)</b> 674518 / <i>JCREW VEHICLE INTEGRATION</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>J CREW Integration</i></b>				
JCREW Vehicle Integration	1	2020	4	2026

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207040F / <i>Multi-Platform Electronic Warfare Equipment</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	36.607	0.000	36.607	-	-	-	-	-	-
670400: <i>SPECTRUM WARFARE ATTACK CAPABILITY</i>	-	0.000	0.000	36.607	0.000	36.607	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Note**

This program, BA 7, PE 0207040F, project 670400, Spectrum Warfare Attack Capability, is a new start.

**A. Mission Description and Budget Item Justification**

Angry Kitten Combat Pod (AKCP) will rapidly prototype/field a suitable pod alternative to legacy ALQ-131/ALQ-184 combat pods. It will provide improved threat detection/response techniques and reprogramming capability to 4th generation combat aircraft/crews, enhancing survivability against specific legacy and emerging threat systems.

Existing legacy ALQ-131 Block II and ALQ-184 Electronic Warfare (EW) combat pods flown on 4th generation USAF fighter/attack aircraft are artifacts of the 1970s/1980s and suffer from substantial Diminishing Manufacturing Sources (DMS) issues. AFLCMC/WNY (EW Program Office) and ACC/A5L have initiated action to rapidly prototype/field the AKCP as a possible suitable alternative to the legacy ALQ-131 and ALQ-184 pods. AKCP will provide new capability for enhanced detection and EA against current/ emerging threats through: rapid reprogrammability, open system architectures, and software defined functionality. Current processes will also be evaluated to effectively respond to continuous integration of software-based systems and open architectures to address rapid development and deployment timelines.

Funds are required to modify the existing ALQ-167 training pod into a combat viable system. System requirements are derived from a MAJCOM 1067. The AKCP requirements are to develop threat technique software for the ALQ-167 Angry Kitten pod to counter a new classes of threat radars, and perform a military utility assessment/testing of combat capability for potential fielding as well as identify and adapt components within the ALQ-167 to satisfy military utility needs.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Spectrum Warfare Attack capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207040F / <i>Multi-Platform Electronic Warfare Equipment</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	0.000	0.000	0.000	0.000	0.000
Current President's Budget	0.000	0.000	36.607	0.000	36.607
Total Adjustments	0.000	0.000	36.607	0.000	36.607
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	36.607	0.000	36.607

**Change Summary Explanation**

N/A

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Spectrum Warfare Attack Capability	0.000	0.000	36.607
<b>Description:</b> Spectrum Warfare Attack Capability will rapidly develop and field an Electronic Warfare Pod with open system architecture capable of addressing 21st century threats.			
<b>FY 2021 Plans:</b> N/A			
<b>FY 2022 Plans:</b> Initiate Increment 3 of the Alpha Phase of the MTA to rapidly prototype the Angry Kitten Combat Pod aimed at transitioning to Air Force open system architecture programs and achieving the maximum capability possible from both the pod and integration with the aircraft platform.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increased to support the Alpha Phase of the MTA to rapidly prototype the Angry Kitten Combat Pod.			
<b>Accomplishments/Planned Programs Subtotals</b>			36.607

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207040F / <i>Multi-Platform Electronic Warfare Equipment</i>
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**D. Other Program Funding Summary (\$ in Millions)**

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• APAF 07 000075: <i>Other Production Charges</i>	-	-	7.421	-	7.421	-	-	-	-	-	-

**Remarks**

**E. Acquisition Strategy**

AKCP is a Middle Tier of Acquisition (MTA) program using Section 804 authority in accordance with AFGM2019-63-01, Air Force Guidance Memorandum for Rapid Acquisition Activities, 27 Jun 2019. Strategic goals of the program are to rapidly field an EW Pod with open system architectures capable of addressing 21st century threats. To achieve these goals, the program will accomplish the following objectives: initial fielding within 2 years; rapidly re-programmable; modular design maximizing use of COTS/GOTS; open architecture aligned system; minimize proprietary data rights on interfaces while allowing intellectual property within modules as appropriate; software defined functionality via Software Define Radios (SDRs).

Rapid Prototype Phase of the MTA involves rapid prototyping the Angry Kitten Combat Pod in three Increments. Increment 1 is an 18 month effort running from 2020 to 2022 to modify, test, and field a minimally acceptable combat capability. Increment 1 activity funded under Strategic Development Planning and Experimentation. Increment 2 is a 24 month effort running from 2021 to 2023 that will address unfunded and new limitations identified from Increment 1, increase combat capability with enhanced functionality/sustainability, and integration with the aircraft over Increment 1, and will forge the hardware/software architecture necessary to transition Air Force open architecture pathfinders. Increment 3 is a 36 month effort running from 2022 to 2025 aimed at transitioning to Air Force open system architecture programs and achieving the maximum capability possible from both the pod and integration with the aircraft platform. The Rapid Prototype Phase of the MTA (AKCP Increments 1, 2, and 3) will be completed within 5 years of the PEO approved acquisition strategy (approved March 2020). University Academic Research Center (UARC), Other Transaction Authorities (OTA) and industry consortiums are used to support the development and prototyping of the AKCP.

Rapid Fielding Phase of the MTA involves the rapid fielding of the Angry Kitten Combat Pod. The incremental acquisition strategy of the AKCP program enables a rapid fielding schedule by affording the MAJCOM a fielding decision upon completion of each increment. The program will enter Beta Phase following a MAJCOM approved fielding decision and approved PEO Beta Decision. Fielding will be completed within 5 years of Beta Phase start date. Other Transaction Authorities (OTA) and industry consortiums are used to support the production and fielding of the AKCP.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207040F / <i>Multi-Platform Electronic Warfare Equipment</i>	<b>Project (Number/Name)</b> 670400 / <i>SPECTRUM WARFARE ATTACK CAPABILITY</i>
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<b>Product Development (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
AKCP Increment 3	SS/CPFF	GTRI : Atlanta, GA	-	-		-		31.407	Jun 2022	-		31.407	-	-	-
<b>Subtotal</b>			-	-		-		31.407		-		31.407	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
AKCP Increment 3	TBD	Various: TBD : TBD	-	-		-		1.500	Jun 2022	-		1.500	-	-	-
<b>Subtotal</b>			-	-		-		1.500		-		1.500	-	-	N/A

<b>Management Services (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
AKCP/PMA	C/Various	Various: TBD : TBD	-	-		-		3.700	Jun 2022	-		3.700	-	-	-
<b>Subtotal</b>			-	-		-		3.700		-		3.700	-	-	N/A

<b>Prior Years</b>	<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>	-	-	-	0.000	36.607		-		36.607	-	-	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207040F / <i>Multi-Platform Electronic Warfare Equipment</i>	<b>Project (Number/Name)</b> 670400 / <i>SPECTRUM WARFARE ATTACK CAPABILITY</i>

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b><i>Angry Kitten Combat Pod Mods</i></b>	
Increment 3 modifications	████████████████████

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207040F / <i>Multi-Platform Electronic Warfare Equipment</i>	<b>Project (Number/Name)</b> 670400 / <i>SPECTRUM WARFARE ATTACK CAPABILITY</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Angry Kitten Combat Pod Mods</i></b>				
Increment 3 modifications	1	2022	1	2023



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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207131F / A-10 Squadrons
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	25.533	24.490	39.224	0.000	39.224	-	-	-	-	-	-
674809: <i>A-10 Squadrons</i>	-	25.533	24.490	39.224	0.000	39.224	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Note**  
 This program, BA 7, PE 0207131F, project 674809, Central Interface Control System (CICS), is a new start.

**A. Mission Description and Budget Item Justification**

A-10 concept of operations requires a flexible, adaptable and survivable weapon system to conduct close air support (CAS), combat search and rescue (CSAR) and special operations missions. The A-10 must conduct around-the-clock air operations under various weather conditions against numerous and varied enemy threats.

Funds may be used to resolve emerging safety of flight and diminishing manufacturing sources issues, accommodate technology insertion and fulfill Federal Aviation Administration or other mandates necessary to ensure continued aircrew safety and mission effectiveness.

Operational Flight Program (OFP) development addresses evolving and continuing user requirements that must be incorporated in the aircraft software in order to employ advanced weapons (SMART Triple Ejector Rack (TER)), increase situational awareness and enhance targeting capabilities as they become available. These computer processing and avionics upgrades are critical to building a modernized architecture that promotes current open, agile, and digital concepts to enable future technological growth of the A-10's capabilities well into the 2030s.

The RDT&E funds provide A-10 Developmental and Operational Testing ensuring all added capability meets safety and airworthiness criteria. Full Mission Trainers (FMT's) Data Management Switch (DMS) efforts to include removal of end-of-life software/hardware within simulators systems and move to a modular, common open system architecture that is sustainable and cyber-resilient. RDT&E funds also provide for the implementation of requirements and standards defined under the Simulator Common Architecture Requirements and Standards (SCARS) initiative.

The FY2022 funding request was reduced by \$8.243 million to account for the availability of prior year execution balances.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver A-10 weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605831F. In FY19 \$0.0M and in FY20 \$0.0M was expended for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207131F / A-10 Squadrons
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<b>B. Program Change Summary (\$ in Millions)</b>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>
Previous President's Budget	31.916	24.535	104.389	0.000	104.389
Current President's Budget	25.533	24.490	39.224	0.000	39.224
Total Adjustments	-6.383	-0.045	-65.165	0.000	-65.165
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-6.383	-0.045			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-65.165	0.000	-65.165

**Change Summary Explanation**

FY20 adjustment -\$3.499M BTR to F-22, -\$2.844M civ pay; FY21 no significant changes; FY22 adjustment for A-10 re-phase

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>
<b>Title:</b> SDB-I	3.800	0.000	0.000
<b>Description:</b> The A-10C Small Diameter Bomb Increment I (SDB-I) program is an Air Combat Command (ACC) requirement originating from the Combat Air Force (CAF) Operational Requirements Document (ORD) 304-97-C-A for Miniature Munitions and Carriage System. SDB-I integration is an integral part of keeping A-10C a flexible, adaptable and survivable weapon system. The SDB-I program requires software and hardware integration of the Bomb Rack Unit - 61 (BRU-61) and the SDB-I itself. Integration of the SDB-I program includes software updates to A-10C's Operational Flight Program (OFP), Air Force SEEK EAGLE (AFSEO) testing, developmental testing (DT), operational testing (OT) and the purchasing of Common System Integration Lab (SIL) Test Equipment (CSTE) and others as determined by A-10 SPO Engineering. The SDB-I program is expected to field with A-10C Operational Flight Program (OFP) 12/13.			
<b>FY 2021 Plans:</b> Continue integration efforts to complete integration with OFP Software			
<b>FY 2022 Plans:</b> Continue integration efforts to complete integration with OFP software			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Initial decrease due to contract amount			
<b>Title:</b> Operational Flight Program (OFP) Development	21.547	20.490	18.539

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0207131F / A-10 Squadrons		
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>Description:</b> M-Series and Software Capability Upgrade (SCU) programs enable the design and coding of software via an agile incremental cadence of 1-2 years and address efforts required to maintain current code, integrate new precision weapons, advanced targeting pods, and improved avionics to meet DoD mandates in order to modernize the A-10's architecture.</p> <p>Permit timely integration of new precision weapons, advanced pods, improved avionics and enhanced electronic warfare capabilities. These upgraded capabilities are in response to evolving operational requirements, including Urgent Operational Needs, generated by the ever-changing operational environment of air combat.</p> <p>RDT&amp;E funds provide updates and incorporation of capabilities for weapons integration, targeting pod updates, and communication/navigation/data link improvements. These funds will ensure concurrency with systems impacted by Operational Flight Program (OFP) development, including but not limited to the Full Mission Trainer (FMT), mission planning and support equipment, as well as required upgrades to the Software Integration Laboratory (SIL).</p> <p>This OFP effort also contains Program Management Administration (PMA) support activities to include travel, office supplies, training courses, Video Teleconferencing (VTC) and support contractors.</p> <p><b>FY 2021 Plans:</b> Continue Suite 10 Software development and integration for fielding, Start of Suite 11 Software development and integration.</p> <p><b>FY 2022 Plans:</b> Continuation of Suite 11 development while moving to an Agile Acquisition position to deliver EPICS (major software development or group of several small software developments) in shorter span to meet mission requirements.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Continuation of Suite 11 development while moving to an Agile Acquisition position to deliver EPICS (major software development or group of several small software developments) in shorter span to meet mission requirements.</p>				
<p><b>Title:</b> ARC-210 Gen 6</p> <p><b>Description:</b> The ARC-210 Gen 6 will provide the A-10 with numerous needed capabilities. The first of which is NSA crypto mandate compliant secure communications. The second is the Air Force mandate of all aircraft having Mobile User Objective System (MUOS) capability. The SATURN algorithm is also required for continued A-10 Combat Search and Rescue (CSAR) as well as Close Air Support with theater forces. The older Generation 4 radio does not currently have any of these capabilities.</p> <p><b>FY 2021 Plans:</b></p>		0.186	4.000	1.500

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0207131F / A-10 Squadrons		
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>Continue Non-recurring engineering (NRE) for System Integration Laboratory (SIL) Integration and Testing. This will ensure all required equipment and optimal configurations will be tested for fit and function within the A-10 aircraft. In addition, configurations will be flight tested to ensure capabilities are airworthy as well as functional.</p> <p><b>FY 2022 Plans:</b> Continue Non-recurring engineering (NRE) for System Integration Laboratory (SIL) Integration and Testing. This will ensure all required equipment and optimal configurations will be tested for fit and function within the A-10 aircraft. In addition, configurations will be flight tested to ensure capabilities are airworthy as well as functional.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Decrease in contract amount. Contract protest caused late award and late expensing.</p>				
<p><b>Title:</b> Central Interface Control System (CICS)</p> <p><b>Description:</b> A-10 Central Interface Control System (CICS) replaces the aging Central Interface Control Unit (CICU) that suffers from high failure rates, Diminishing Manufacturing Sources and Materiel Supply (DMSMS) issues, and insufficient data processing capacity. The RDT&amp;E effort encompasses software and hardware development, Software Integration Laboratory (SIL) test stand, support equipment and software, cyber security testing.</p> <p>The Operational Flight Program will need to be rewritten in a modular, containerized format so that it is easily modified, repaired and upgraded.</p> <p>The hardware will need to be updated to meet the environmental requirements of the A-10, manage numerous upgrades to the A-10 which include, but are not limited to: 3D Audio, HRDS, JRG, 2GES, HOBIT, Link 16, SDB 1 and 2, FliteScene, LITENING Digital Pod, MUOS, SATURN and ARC-210 Gen VI. The CICS will utilize modern single board computers that have increased computing capacity, operate in high temperature environments and are available to support timely repair and replacement. The CICS hardware will provide ample processing power to meet the current and future needs of the weapons platform for planned and future growth. Additionally, it will convert selected analog systems outputs on the aircraft to digital and meet USAF mandated upgrades.</p> <p>Testing will be a major component of the RDT&amp;E. Testing includes vendor testing, the A-10 SILs, Cyber Security, and use of A-10 Developmental and Operational Testing ensuring the system meets safety and airworthiness criteria. The OFP and CICS hardware implementation will require operational testing and certification to include weapons release and stores management.</p> <p>Finally, RDT&amp;E funds will be used to design a sustainable, repairable and supportable system for the A-10 out to 2040. RDT&amp;E funds will develop new test scripts for existing maintenance and repair testers. By designing a modular system that can be easily</p>		-	0.000	19.185

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207131F / A-10 Squadrons
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022
fault checked, replaceable and upgradeable, the CICS will be a system that can support the weapon system for the mid-term increasing the reliability and availability of the aircraft.  <b>FY 2021 Plans:</b> New Start in FY22.  <b>FY 2022 Plans:</b> Development of CICS unit to support additional MODs mandated for the A-10.  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> New start in FY22.			
<b>Accomplishments/Planned Programs Subtotals</b>	25.533	24.490	39.224

<b>D. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• APAF 05 Line Item A01000: <i>A-10 Squadrons, PE 0207131F</i>	125.825	135.793	85.249	-	85.249	-	-	-	-	-	-

**Remarks**

**E. Acquisition Strategy**  
 A-10 OFP development efforts will be conducted organically by the 309th Software Maintenance Group (309 SMXG) at Ogden Air Logistics Complex, Hill AFB UT. The ADS-B, ARC-210 radio Crypto Mandate, SMART Triple Ejector Rack (TER) development for the Small Diameter Bomb (SDB) missionization efforts will be conducted by the contractor and organically by the 309 SMXG. The A-10 FMT simulator OFP is managed by the Simulator Division at Wright-Patterson Air Force Base and is currently contractor-developed and integrated.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207131F / A-10 Squadrons	<b>Project (Number/Name)</b> 674809 / A-10 Squadrons
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	C/CPAF	Not specified. : TBD	-	0.000		0.000		0.000		0.000		0.000	-	-	-
OFP Development 1st Qtr FY18 (309 SMXG)	PO	309 SMXG : Hill AFB, UT	-	0.000		0.000		0.000		0.000		0.000	-	-	-
OFP Development 2nd Qtr FY18 (309 SMXG)	PO	309 SMXG : Hill AFB, UT	-	0.000		0.000		0.000		0.000		0.000	-	-	-
OFP Development 3rd Qtr FY18 (309 SMXG)	PO	309 SMXG : Hill AFB, UT	-	0.000		0.000		0.000		0.000		0.000	-	-	-
OFP Development 4th Qtr FY18 (309 SMXG)	PO	309 SMXG : Hill AFB, UT	-	0.000		0.000		0.000		0.000		0.000	-	-	-
OFP Development 1st Qtr FY19 (309 SMXG)	PO	309 SMXG : Hill AFB, UT	-	0.000		0.000		0.000		0.000		0.000	-	-	-
OFP Development 2nd Qtr FY19 (309 SMXG)	PO	309 SMXG : Hill AFB, UT	-	0.000		0.000		0.000		0.000		0.000	-	-	-
OFP Development 3rd Qtr FY19 (309 SMXG)	PO	309 SMXG : Hill AFB, UT	-	0.000		0.000		0.000		0.000		0.000	-	-	-
OFP Development 4th Qtr FY19 (309 SMXG)	PO	309 SMXG : Hill AFB, UT	-	0.000		0.000		0.000		0.000		0.000	-	-	-
OFP Development 1st Qtr FY20 (309 SMXG)	PO	309 SMXG : Hill AFB, UT	-	6.611	Nov 2019	0.000		0.000		0.000		0.000	-	-	-
OFP Development 2nd Qtr FY20 (309 SMXG)	PO	309 SMXG : Hill AFB, UT	-	1.251	Jan 2020	0.000		0.000		0.000		0.000	-	-	-
OFP Development 3rd Qtr FY20 (309 SMXG)	PO	309 SMXG : Hill AFB, UT	-	1.251	Apr 2020	0.000		0.000		0.000		0.000	-	-	-
OFP Development 4th Qtr FY20 (309 SMXG)	PO	309 SMXG : Hill AFB, UT	-	1.327	Jun 2020	0.000		0.000		0.000		0.000	-	-	-
OFP Development 1st Qtr FY21 (309 SMXG)	PO	309 SMXG : Hill AFB, UT	-	0.000		4.246	Nov 2020	0.000		0.000		0.000	-	-	-
OFP Development 2nd Qtr FY21 (309 SMXG)	PO	309 SMXG : Hill AFB, UT	-	0.000		2.718	Jan 2021	0.000		0.000		0.000	-	-	-
OFP Development 3rd Qtr FY21 (309 SMXG)	PO	309 SMXG : Hill AFB, UT	-	0.000		1.543	Apr 2021	0.000		0.000		0.000	-	-	-
OFP Development 4th Qtr FY21 (309 SMXG)	PO	309 SMXG : Hill AFB, UT	-	0.000		1.993	Jun 2021	0.000		0.000		0.000	-	-	-

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207131F / A-10 Squadrons	<b>Project (Number/Name)</b> 674809 / A-10 Squadrons
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<b>Product Development (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
OFP Development 1st Qtr FY22 (309 SWEG)	PO	309 SWEG : Hill AFB, UT	-	0.000		0.000		3.170	Oct 2021	0.000		3.170	-	-	-
OFP Development 2nd Qtr FY22 (309 SWEG)	PO	309 SWEG : Hill AFB, UT	-	0.000		0.000		1.110	Jan 2022	0.000		1.110	-	-	-
OFP Development 3rd Qtr FY22 (309 SWEG)	PO	309 SWEG : Hill AFB, UT	-	0.000		0.000		1.110	Apr 2022	0.000		1.110	-	-	-
OFP Development 4th Qtr FY22 (309 SWEG)	PO	309 SWEG : Hill AFB, UT	-	0.000		0.000		1.110	Jun 2022	0.000		1.110	-	-	-
Development Contract for CICS	C/CPAF	Not specified. : TBD	-	0.000		0.000		19.185		0.000		19.185	-	-	-
<b>Subtotal</b>			-	10.440		10.500		25.685		0.000		25.685	-	-	N/A

<b>Support (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Support	C/CPAF	Not specified. : TBD	-	0.000		0.000		0.000		0.000		0.000	-	-	-
USAF (Multiple)	Various	Various : Various	-	7.043		5.690		5.239		0.000		5.239	-	-	-
<b>Subtotal</b>			-	7.043		5.690		5.239		0.000		5.239	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Test and Evaluation	C/CPAF	Not specified. : TBD	-	0.000		0.000		0.000		0.000		0.000	-	-	-
USAF (OFP)	Various	Various : Various	-	3.250	Sep 2019	3.300	Oct 2020	3.300	Oct 2021	0.000		3.300	-	-	-
<b>Subtotal</b>			-	3.250		3.300		3.300		0.000		3.300	-	-	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date: May 2021**

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207131F / A-10 Squadrons	<b>Project (Number/Name)</b> 674809 / A-10 Squadrons
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<b>Management Services (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Management Services	C/CPAF	Not specified. : TBD	-	0.000		0.000		0.000		0.000		0.000	-	-	-
PMA	Various	Various : Various	-	4.800		5.000		5.000		0.000		5.000	-	-	-
<b>Subtotal</b>			-	4.800		5.000		5.000		0.000		5.000	-	-	N/A
			<b>Prior Years</b>	<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>			-	25.533		24.490		39.224		0.000		39.224	-	-	N/A

**Remarks**





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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207131F / A-10 Squadrons	<b>Project (Number/Name)</b> 674809 / A-10 Squadrons
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>OFP</b>				
Suite 10 Fields FY2021 Qtr 3	4	2021	4	2021
ARC - 210 Crypto Mandate	2	2020	4	2024
OFP 11 FTRR FY2021 Qtr 3	2	2021	2	2022
OFP 11 Fields FY2022 Qtr 2	2	2022	4	2022
OFP 12 FTRR FY2021 Qtr 4	2	2022	3	2023
OFP 12 Fields FY2023 Qtr 1	3	2023	3	2024
OFP 13 FTRR FY2022 Qtr 4	2	2024	3	2025
OFP 13 fields FY 2024 Qtr 1	3	2025	2	2026
OFP 14 FTRR FY2023 Qtr 4	2	2026	4	2026
<b>CICS</b>				
CICS	2	2022	4	2025

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207133F / <i>F-16 Squadrons</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	179.655	202.498	224.573	0.000	224.573	-	-	-	-	-	-
672671: <i>F-16 Squadrons</i>	-	179.655	202.498	224.573	0.000	224.573	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Note**  
This program, BA 7, PE 0207133F, project 672671, M Code, is a new start.

**A. Mission Description and Budget Item Justification**

The F-16 Fighting Falcon is the world's premier fixed-wing, high performance, single engine multi-mission fighter aircraft that comprises 45% of the AF fighter inventory. Operational since 1980, the F-16 has proven itself in combat in a variety of air-to-air and air-to-surface missions, such as, offensive and defensive counter-air, close air support, forward air control, air interdiction (day/night and all-weather) and Suppression of Enemy Air Defenses (SEAD)/destruction of enemy air defenses (DEAD). The F-16 remains the USAF's primary SEAD/DEAD platform. The aircraft has evolved its capabilities by capitalizing upon advancements made in computers, avionics systems, engines, and structures technologies to meet emerging warfighter requirements and combat current and evolving enemy threats. These computer processing and avionics upgrades are critical to building a modernized architecture that promotes current open, agile, and digital concepts to enable future technological growth of the F-16's capabilities well into the 2040s. Furthermore, the F-16 provides the capacity called for in the NDS (National Defense Strategy) by supplying the USAF the highest readiness rates at the lowest operating costs of any US fighter. The F-16 programs listed below support the NDS's call to strengthen alliances by being the DoD's largest Foreign Military Sales (FMS) program servicing over 26 countries and growing. The funding described in this document directly maps to the NDS as it provides upgrades to the F-16 platform to enable the delivery of joint lethality in contested environments throughout the coming decades. The specific modification programs listed below directly contribute to accomplishing the mission objectives as described in the NDS.

Modification programs include: Operational Flight Program (OFP) software (SW) development required to integrate new precision weapons, advanced targeting pods, improved avionics, and other hardware (HW) mods to meet the Home Land Defense (HLD) Mission, DoD mandates, and maintain updates on the respective F-16 training simulators, and other hardware subsystems; Engineering Manufacturing and Design (EMD) Hardware/Advanced capability improvements require funding to develop, test, and qualify, weapon systems, aircraft subsystems replaced or modified due to requirements changes, pre-planned product improvements (P3I), Diminishing Manufacturing Sources (DMS) and parts obsolescence; Modular Mission Computer (MMC) Upgrade/Display Generator Upgrade resolves shortfalls in mission computer memory and throughput brought on by the addition of incremental combat capability addresses cyber-security and includes Non-Recurring Engineering (NRE), design, development, integration, and ground/ flight test for fielding; F-16 Training Simulator updates enable the USAF to exercise/train using the most current F-16 OFP available to all block configurations, to include both aircrew and maintenance trainers; Joint Air-to-Surface Standoff Missile-Extended Range (JASSM-ER) on F-16 aircraft, and includes NRE, test assets, SEEK EAGLE, integration, and flight test; Comm Suite Radio Upgrade (CSU) improved satellite communication (SATCOM) radio upgrade with Mobile User Objective System (MUOS) capability to meet next-gen tactical narrow band SATCOM with better crypto capabilities; an Active Electronically Scanned Array (AESA) Radar capable on all blocks that offers enhanced lethality, advanced electronic protection capabilities, as well as, improved reliability and maintainability on F-16 aircraft; Multi-functional Information Distribution System-Joint Tactical Radio System (MIDS-JTRS) provides

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207133F / <i>F-16 Squadrons</i>
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a real-time, jam resistant and secure information system for the transfer of combat data, voice and navigation information between widely dispersed battle elements; Hybrid Flight Control Computer (HFLCC) Auto Ground Collision Avoidance System (AGCAS) development and integration prevents most controlled flight into terrain (CFIT) accidents using terrain database and prediction algorithms for aircraft trajectory recovery and executes an automated fly-up maneuver to avoid collision; Advanced Identification Friend or Foe (AIFF-Mode5) on F-16 aircraft provides improved airspeed and location info to ground stations and other aircraft in the vicinity; Digital Radar Warning Receiver (DRWR) improves existing radar warning receiver performance and Electronic Warfare (EW) threat detection range, azimuth, detection time, and allows reduction of radio frequency compatibility (RFC) issues with other on board transmitters. M Code improves existing Embedded GPS/INS (EGI), providing an upgradeable, resilient, and reliable Positioning Navigation and Timing (PNT) system.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$1.375M was expended for civilian pay expenses in this program element, and in FY21 \$2.490M is forecasted for civilian pay expenses in this program element

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	193.013	223.437	229.066	0.000	229.066
Current President's Budget	179.655	202.498	224.573	0.000	224.573
Total Adjustments	-13.358	-20.939	-4.493	0.000	-4.493
• Congressional General Reductions	0.000	-0.370			
• Congressional Directed Reductions	0.000	-30.437			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	9.868			
• Reprogrammings	-9.755	0.000			
• SBIR/STTR Transfer	-3.603	0.000			
• Other Adjustments	0.000	0.000	-4.493	0.000	-4.493

**Change Summary Explanation**

FY20 Reprogrammings: -9.755M reprogrammings to F-22(-6.500M), UPAD(-0.005M), and FY20 OMNIBUS (-3.250M)

FY20 SBIR/STTR Transfer: -3.603M SBIR

FY21 Congressional Directed Reductions: -30.437M reduction - DRWR forward financed (-22M), AESA JEON PY carryover (-8.437M)

FY21 Congressional Directed Transfer: +9.868M transfer from procurement for AIFF Mode 5

FY22 Other Adjustments: -4.493M reduction for rate adjustments

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0207133F / <i>F-16 Squadrons</i>		
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>Title:</b> OFP Updates on all F-16 aircraft (Increment 1)</p> <p><b>Description:</b> OFP versions are updated continually to integrate new weapons, targeting pods, and improved avionics. Increment 1 OFP is comprised of four separate OFPs (2 x pre-block called "SCU" and 2 x post-block called "M-Series").</p> <p>M-Series and Software Capability Upgrade (SCU) programs enable the design and coding of software via an agile incremental cadence of 1-2 years and address efforts required to maintain current code, integrate new precision weapons, advanced targeting pods, and improved avionics to meet DoD mandates in order to modernize the F-16's architecture. OFP increments are the key development and fielding mechanism that enables the F-16's ability to meet its NDS requirements to operate in contested environments and defend the homeland. Systems Integration Labs (SIL) are required to integrate software into the various hardware, validate user requirements and review system safety and security prior to release to flight test. These labs require annual upgrades to increase development and test efficiencies which also includes Development-Security-Operations (DevSecOps) technologies. F-16 OFPs are developed 100% organically by the 309th Software Engineering Group (SWEG) at Hill AFB, UT.</p> <p>The OFP effort also contains Program Management Administration (PMA) support activities to include travel, office supplies, training courses, Video Teleconferencing (VTC) and support contractors.</p> <p><b>FY 2021 Plans:</b> Develop and Field Increment 1 capability while maintaining and upgrading portions of the SIL.</p> <p><b>FY 2022 Plans:</b> Develop and Field Increment 1 capability while maintaining and upgrading portions of the SIL. Plan and develop requirements for Increment 2 (planned FY23 start).</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Decrease based on program phasing.</p>		64.500	85.852	72.484
<p><b>Title:</b> Flight Test</p> <p><b>Description:</b> The F-16's test fleet of 41 aircraft encompass Developmental Test and Evaluation (DT&amp;E) at Edwards AFB, combined Development Test/Operational Test (DT/OT) at Eglin AFB, and Nellis AFB, and the Air National Guard Air Force Reserve Test Center (AATC). This program accounts for the modification of test aircraft and the scheduling of flight test sorties to include integration tests of associated subsystems and weapons, OFPs, weapons integration, Radio Frequency compatibility (RFC), and avionic sub-systems to ensure capabilities meet user fielding schedules.</p> <p><b>FY 2021 Plans:</b></p>		13.235	15.925	17.767

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0207133F / <i>F-16 Squadrons</i>		
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>Increase support of DT&amp;E infrastructure to account for growing test requirements from new modification programs. Modification of initial DT/OT test aircraft with new hardware to support Increment 1 OFPs for FY2022 DT/OT testing. Initiate combined DT/OT flight test with pre-increment 1 (M7.2+) hardware (mission computer, AESA, MIDS-JTRS) and increment 1 software candidates which includes advanced AESA radar, SATCOM, RF compatibility upgrades and out-of-cycle regression testing.</p> <p><b>FY 2022 Plans:</b> Increase support of DT&amp;E infrastructure to account for growing test requirements from new modification programs. Modification of additional DT/OT test aircraft with new hardware to support Increment 1 OFPs for FY2023 DT/OT testing. Initiate combined DT/OT flight test supporting the upgraded MMC and display generator hardware programs along with new communication suite improvements, and support out-of-cycle regression testing.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase due to cost estimate/inflation.</p>				
<p><b>Title:</b> EMD HW/Advanced Capabilities Improvements</p> <p><b>Description:</b> Advanced Capability Improvements include, but not limited to sensor upgrades, radar updates and other self-protection/electronic protection (EP) enhancements, 4th/5th gen fighter network communications, Radio Frequency (RF) compatibility, requirements analysis and studies analysis, lab and/or on-aircraft evaluation of potential subsystem changes / capability improvements.</p> <p><b>FY 2021 Plans:</b> Continue support to develop, test, and qualify aircraft weapons systems including F-16 subsystems replaced or modified due to requirements changes, security updates, and parts obsolescence. Radio Frequency Compatibility (RFC) / sensor integration development efforts to minimize and understand the EMI on the F-16.</p> <p><b>FY 2022 Plans:</b> Continue support to develop, test, and qualify aircraft weapons systems including F-16 subsystems replaced or modified due to requirements changes, security updates, and parts obsolescence. Radio Frequency Compatibility (RFC) / sensor integration development efforts to minimize and understand the EMI on the F-16.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Steady-state requirement.</p>		0.008	0.200	0.200
<p><b>Title:</b> MMC Upgrade / Programmable Display Generator (PDG) Upgrade on F-16 aircraft</p> <p><b>Description:</b> The MMC upgrade on the F-16 post-block aircraft, (Blk 40, 42, 50, 52) resolves shortfalls in mission computer memory and throughput. Funding includes development, design, integration, and ground/flight test for fielding of improved MMC capabilities with the Increment 1 OFP. The PDG upgrade allows a fully integrated multifunction display solution including</p>		17.116	7.046	2.891

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0207133F / <i>F-16 Squadrons</i>		
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>Hands On Throttle and Stick (HOTAS) integration with Sensor of Interest (SOI), format swapping and high definition video on 4x4 displays; provides improved display formats during dynamic maneuvers; resolves symbol freezing issues due to throughput constraints; and provides a sustainable approach to address growing DMS concerns with the current PDG. Both programs require the addition of an Ethernet High Speed Data Network (HSDN) that facilitates future increments of combat capability with higher data bandwidth rates for system compatibility and interoperability. This program is a critical element to a modernized F-16 technology backbone and necessary to modernize the F-16 beyond its current computing capability. Additionally this effort enables the F-16 to effectively communicate with advanced platforms to improve battlefield situational awareness and to precisely employ and conduct air and ground operations while maintaining the highest level of survivability, without it, all current and future F-16 modernization efforts cannot be supported. Both the MMC and PDG directly map to the NDS as critical enabling technologies required for the F-16 to operate in contested environments and defend the homeland.</p> <p><b>FY 2021 Plans:</b> Continue development activities for HSDN, MMC Upgrade and PDG Upgrade for design, development, integration, deliver test assets for SIL and flight test for fielding with Increment 1 OFPs.</p> <p><b>FY 2022 Plans:</b> Continue development activities for HSDN, MMC Upgrade and PDG Upgrade for design, development, integration, deliver test assets for SIL and flight test for fielding with Increment 1 OFPs.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Decrease based on phasing of requirements.</p>				
<p><b>Title:</b> Simulator Trainers Program</p> <p><b>Description:</b> F-16 Simulator Training Programs (Simulators) supports the development, acquisition, fielding and integration of F-16 Simulators. Enables the USAF to exercise and train using the latest F-16 capabilities available to multiple aircraft configurations, while reducing the overall cost of maintenance and aircrew training. In order to maintain concurrency with the aircraft OFP, this funding support development, test and integration of simulator upgrades. Funds may be used to address emerging and short notice Diminishing Manufacturing and Material Shortage (DMSMS) issues. DMS efforts to include removal of end-of-life software/hardware within simulators systems and move to a modular, common open system architecture that is sustainable and cyber-resilient. Implement requirements and standards defined under the Simulator Common Architecture Requirements and Standards (SCARS) initiative. This program element may include necessary civilian pay expenses required to manage, execute, and deliver F-16 weapon system capability.</p> <p><b>FY 2021 Plans:</b></p>		15.420	4.469	15.777

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0207133F / <i>F-16 Squadrons</i>		
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>Continue contract efforts for managing and maintaining F-16 simulator trainers, to include tech order development. This funding also supports development test, and integration of simulator upgrades to include new aircraft OFPs. Supporting development efforts for the F-16 STP trainers.</p> <p><b>FY 2022 Plans:</b> Continue contract efforts for managing and maintaining F-16 simulator trainers, to include tech order development. This funding also supports development test, and integration of simulator upgrades to include new aircraft OFPs. Supporting development efforts for the F-16 STP trainers.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase due to cost estimate/phasing of program requirements.</p>				
<p><b>Title:</b> AIFF Mode 5</p> <p><b>Description:</b> Modify Pre-Block F-16's with Advanced Identification Friend or Foe (AIFF) to comply with DOD Mode 5 mandate. AIFF system provides positive identification for Air Traffic Control reporting, combat targeting, and fratricide prevention.</p> <p><b>FY 2021 Plans:</b> Continue APX-12X development and integration activities for Phase II Preliminary Design Review. Purchase of the VDATS Testers to meet APX-12X developmental needs of the USG.</p> <p><b>FY 2022 Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Program restructured to complete development of next generation APX-12X. Internal realignment for development efforts in FY20, transferred FY21 3010 funds to 3600 based on early to need 3010.</p>		4.322	9.868	0.000
<p><b>Title:</b> AESA Radar</p> <p><b>Description:</b> This is a continuation of the Active Electronically Scanned Array (AESA) Radar congressional add funding line in FY16 and FY17. The AESA Program provides an upgrade from the current APG-68 system to an AESA radar that offers advanced electronic protection capabilities as well as improved reliability and maintainability to support the Aerospace Control Alert (ACA) mission for Homeland Defense (HLD) and includes the Phase III development for full capability development document (CDD) implementation, as well as Radio Frequency (RF) compatibility with other systems. This program directly maps to the NDS as it provides the most critical upgrade to the F-16's ability to successfully defend the homeland against attack.</p> <p><b>FY 2021 Plans:</b></p>		46.258	30.405	41.962



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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0207133F / <i>F-16 Squadrons</i>		
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Conclude Phase II JEON testing and fielding support with increment 1 OFP development; continue Phase III development efforts for full CDD (advanced radar capabilities). <b>FY 2022 Plans:</b> Continue Phase III development and test efforts for full CDD radar capabilities. Support initial fielding of Phase III radars. <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase due to cost estimate/phasing of program requirements.				
<b>Title:</b> Comm Suite Radio Upgrade Aircraft <b>Description:</b> Provides mandatory CJCS updates to the ARC-210 satellite communication (SATCOM) radios on F-16 aircraft including Second Generation Anti-Jam Tactical radio for NATO (SATURN) with Mobile User Objective System (MUOS) and improved crypto capability with the addition of a Cockpit Communication Control Panel (C3PO), and Digital Comm Matrix (DCM). <b>FY 2021 Plans:</b> Continue development efforts for all aircraft configurations and procure Group B assets to facilitate installations in FY22. <b>FY 2022 Plans:</b> N/A <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Decrease due to transition to production.		3.899	0.607	0.000
<b>Title:</b> Digital Radar Warning Receiver <b>Description:</b> The F-16 Digital Radar Warning Receiver (DRWR) program replaces an existing analog radar warning receiver and improves Electronic Warfare (EW) threat protection. This program is pursuing a dual solution approach integrating a currently available ALR-69A for the Air National Guard and Reserve fleets while developing an advanced Next-Generation Electronic Warfare (NGEW) Suite for the Active Duty fleet. Installation of these DRWRs will improve threat detection fidelity resulting in increased F-16 aircraft survivability and integration with future F-16 modifications (e.g. Active Electronically Scanned Array (AESA)). The NGEW Suite is a competitive prototyping program evaluating future options (e.g. electronic countermeasures via an internal jammer and capability for future growth upgrades) to meet the DRWR program requirements while mitigating current DRWR performance issues. Both programs are necessary for the F-16 to meet the National Defense Strategy requirement of operating in current as well as future contested environments. The DRWR program also facilitates Sensor Integration Unit (SIU), also known as Radio Frequency Compatibility (RFC), with associated systems. <b>FY 2021 Plans:</b>		12.897	48.126	63.222

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0207133F / <i>F-16 Squadrons</i>		
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>Continue development efforts to complete remaining Group A (Block 40/42, 50/52) designs and finalize Group B Hardware. DRWR Software and associated OFPs to be released upon successful Force Development Evaluation (FDE). Blk 30/32C and Blk 50/52C Kit-proofs. Receive Milestone C approval. NGEW Suite will have prototype hardware available to complete a Chamber test and demonstrate capabilities to support continued prototyping or transition to fielding.</p> <p><b>FY 2022 Plans:</b> Continue development efforts to complete remaining Group A designs. Update/Finalize Blk 30/32C, 40C, 42C &amp; 50/52C baseline configurations (Engineering &amp; Technical Orders/Time Compliance Technical Orders). Blk 40C, 42C &amp; 50/52C Kit-proofs. NGEW Suite efforts includes Non-Recurring Engineering (NRE) activities, design, integration, demonstrations, and System Integration Lab (SIL) and Developmental and Operational (DT/OT) testing.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase based on phasing of requirements.</p>				
<p><b>Title:</b> Multifunctional Information Distribution System Joint Tactical Radio System (MIDS-JTRS)</p> <p><b>Description:</b> Multifunctional Information Distribution System Joint Tactical Radio System (MIDS-JTRS) provides real time, jam-resistant and secure information system for the transfer of combat data, voice and navigation information between widely dispersed battle elements. MIDS-JTRS enhances situational awareness by exchanging digital data over a common communication link that is continuously and automatically updated in real time. Additionally MIDS-JTRS's enhanced capabilities provide concurrent multi-netting which enables Link 16 by adding capability to receive four messages in a single time slot and allows for greater network design flexibility along with concurrent contention receive capabilities and J-voice. The F-16 MIDS-JTRS effort is developing Ethernet connectivity within the terminal. This program maps to the NDS by providing crypto modernization for tactical networks and more secure command and control, which enable increased interoperable communications across the joint force. This critical communications capability generates a more lethal force to defeat enemies and achieve sustainable outcomes that protect the American people and vital US interests.</p> <p><b>FY 2021 Plans:</b> N/A</p> <p><b>FY 2022 Plans:</b> N/A</p>		2.000	0.000	0.000
<p><b>Title:</b> M Code</p> <p><b>Description:</b> Modify all F-16 USAF with PNT and M Code capabilities. The current aircraft Embedded GPS/INS (EGI) system suffers from Diminishing Manufacturing Sources (DMS) shortfalls. New security requirements and mandated hardware support of</p>		-	0.000	10.270

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207133F / <i>F-16 Squadrons</i>
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022
items such as the M Code compliance on aircraft drive the need for a new EGI solution to enable F-16 to support modern resilient weaponry and mission systems.			
<b>FY 2021 Plans:</b> N/A			
<b>FY 2022 Plans:</b> Development activities for design, integration, deliver test assets for SIL and flight test.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> New Start/Increase based on cost estimate.			
<b>Accomplishments/Planned Programs Subtotals</b>	179.655	202.498	224.573

<b>D. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 05 Line Item F01600: <i>F-16 Aircraft Modifications</i>	252.109	622.593	613.166	-	613.166	-	-	-	-	-	-
• APAF 07 Line Item F0160P: <i>F-16 Post Production Support</i>	11.402	14.163	10.456	-	10.456	-	-	-	-	-	-
• APAF 06 Line Item <i>F01600: F-16 Initial Spares</i>	30.463	21.486	40.980	-	40.980	-	-	-	-	-	-

**Remarks**

**E. Acquisition Strategy**

The F-16 Program acquisition strategy is to improve capability, maintenance and safety mods through OFP development/flight test, enhanced weapons integration, structural upgrades, and simulator concurrency.

F-16 OFP SW updates will continually bring new capabilities to the warfighter. OFP SW development effort is now completely developed at Hill AFB (309 SWEG). Numerous Integration contracts (CPFF, FFP) are required to allow for Improved Avionics, Weapon, AIFF Mode 5, MIDS-JTRS integration to successfully field with each OFP.

The upgraded MMC is a critical foundational component that will be the processing workhorse for the post-block fleet, bringing modern networking capability via Ethernet, and providing the necessary architecture upgrades for the modernization of the F-16 post-block fleet. The PDG Upgrade will provide a platform for video enhancements, add Ethernet connectivity, increase high-speed data, memory, and throughput, and support OFP growth through the remaining service life of the F-16.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207133F / <i>F-16 Squadrons</i>	
<p>The EMD HW/Advanced capability improvements will develop, test, and qualify aircraft weapons systems, including subsystems and uses various contract types (Cost Plus and Fixed Price).</p> <p>The Active Electronically Scanned Array (AESA) Joint Emergent Operational Need (JEON) contract for development and production of the APG-83 radar awarded to Northrop Grumman on 31 May 2017. The US Government is the prime integrator and a separate contract is established for Lockheed Martin to provide integration support.</p> <p>AIFF Mode 5 program uses numerous contracts for DMS resolution, integration, production, support and installs. Funding will be awarded on the following contracts: Harness IDIQ, Bracket IDIQ, Falcon 2020, Mode 5 IDIQ, and SASSM/EGI IDIQ.</p> <p>Automatic Ground Collision Avoidance System (AGCAS) development will accomplish test and evaluation of the AGCAS system on F-16 Block 25/30/32 aircraft. Contracts with LM, flight test, and engineering contractor were awarded in 2018.</p> <p>DRWR is organically being integrated on the F-16 by F-16 System Program Office (AFLCMC/WWM) and the Electronic Warfare and Avionics (EW&amp;A) System Program Office (AFLCMC/ WNY) at Robins AFB, GA. The ALR-69A production contract (managed by AFLCMC/WNY) was awarded on 30 March 2018 to Raytheon, Goleta, CA (CAGE CD 06129). As part of the DRWR dual solution approach, the NGEW Suite prototyping Other Transaction Authority (OTA) contract was awarded on 25 September 2019.</p> <p>The ALR-69A software is organically managed by AFLCMC/WNY utilizing the 579 SWES (Software Maintenance) team and the OEM Raytheon, Goleta, CA. The ALR-69A hardware is sustained by the 408 SCMS (Supply Chain) and 402 AMXG (Hardware Maintenance) at Robins AFB, GA.</p> <p>Flight Test requires both organic test range support and various contract support for integration test of F-16 subsystems to ensure capabilities meet CAF fielding schedule, which includes Radio Frequency Compatibility (RFC).</p> <p>M Code is managed by AFLCMC/WNY the development is contracted to Integrated Solutions for Systems (IS4S). Contracts will be award to Harness IDIQ, Bracket IDIQ, Falcon 2020, and SAASM/EGI IDIQ.</p>		

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207133F / F-16 Squadrons	<b>Project (Number/Name)</b> 672671 / F-16 Squadrons
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<b>Product Development (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Product Development	C/CPAF	Not specified. : TBD	-	0.000		-		-		-		-	-	-	-
OFP Updates on F-16 aircraft	Various	309th SMG : Hill AFB, UT	-	51.604	Oct 2019	75.040	Oct 2020	62.302	Oct 2021	-		62.302	-	-	-
MMC Upgrade / Display Generator Upgrade	Various	Various : Various	-	17.116	Nov 2019	7.046	Nov 2020	2.891	Nov 2021	-		2.891	-	-	-
EMD HW / Advanced Capabilities	Various	Various : Various	-	0.008	Aug 2020	0.200	Aug 2021	0.200	Aug 2022	-		0.200	-	-	-
Simulator Trainers	Various	Various : Various	-	15.420	Nov 2019	4.469	Nov 2020	15.777	Nov 2021	-		15.777	-	-	-
AIFF Mode 5	Various	Various : Various	-	4.322	Nov 2019	9.868	Aug 2021	-		-		-	-	-	-
AESA Radars	Various	Various : Various	-	46.258	Nov 2019	30.405	Nov 2020	41.962	Nov 2021	-		41.962	-	-	-
Digital Radar Warning Receiver	Various	Various : Various	-	12.897	Mar 2020	48.126	Mar 2021	63.222	Mar 2022	-		63.222	-	-	-
Comm Suite Radio Upgrade	Various	Various : Various	-	3.899	Jan 2020	0.607	Jan 2021	-		-		-	-	-	-
MIDS JTRS	Various	Various : Various	-	2.000	Nov 2019	-		-		-		-	-	-	-
M Code	Various	Various : Various	-	-		-		10.270	Jan 2022	-		10.270	-	-	-
<b>Subtotal</b>			-	153.524		175.761		196.624		-		196.624	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Test and Evaluation	C/CPAF	Not specified. : TBD	-	0.000		-		-		-		-	-	-	-
Flight Tests	Various	Various : Various	-	13.235	Jan 2020	15.925	Jan 2021	17.767	Jan 2022	-		17.767	-	-	-
<b>Subtotal</b>			-	13.235		15.925		17.767		-		17.767	-	-	N/A

<b>Management Services (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Management Services	C/CPAF	Not specified. : TBD	-	0.000		-		-		-		-	-	-	-



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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date: May 2021**

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207133F / <i>F-16 Squadrons</i>	<b>Project (Number/Name)</b> 672671 / <i>F-16 Squadrons</i>
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b><i>F-16 Development Efforts</i></b>																												
MMC Upgrade Trial Vehicle Install C Model			■																									
M7.2 OFP Field	■																											
Communication Suite Upgrade Pre-block Fielding																												
AESA JEON Initial Fielding																												
Digital Radar Warning Receiver Flt Test Complete																												
SCU 11 OFP Fielding																												
Digital Radar Warning Receiver Fielding Recommendation																												
M7.3/8.03 OFP Fielding																												
M8.1 OFP Fielding																												
M8.2 OFP Fielding																												
M Code Fielding																												
M Code TVI Milestone																												

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207133F / <i>F-16 Squadrons</i>	<b>Project (Number/Name)</b> 672671 / <i>F-16 Squadrons</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>F-16 Development Efforts</i></b>				
MMC Upgrade Trial Vehicle Install C Model	3	2020	3	2020
M7.2 OFP Field	1	2020	1	2020
Communication Suite Upgrade Pre-block Fielding	1	2022	4	2025
AESA JEON Initial Fielding	1	2020	4	2026
Digital Radar Warning Receiver Flt Test Complete	3	2020	1	2021
SCU 11 OFP Fielding	1	2020	2	2023
Digital Radar Warning Receiver Fielding Recommendation	2	2022	2	2022
M7.3/8.03 OFP Fielding	1	2020	4	2021
M8.1 OFP Fielding	1	2020	4	2024
M8.2 OFP Fielding	1	2024	3	2026
M Code Fielding	4	2024	4	2026
M Code TVI Milestone	1	2023	1	2023



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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207134F / <i>F-15E Squadrons</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	0.000	640.124	288.381	239.616	0.000	239.616	-	-	-	-	-	-
670131: <i>F-15 Advanced Development</i>	0.000	53.400	0.000	0.000	0.000	0.000	-	-	-	-	-	-
676020: <i>F-15 Modernization</i>	0.000	586.724	288.381	239.616	0.000	239.616	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

The F-15 is the most versatile fighter in the world today. The F-15C/D continues to provide air superiority with an undefeated and unmatched aerial combat record. The F-15E retains this air superiority capability and adds systems, such as advanced imaging and targeting systems, to meet the requirement for all-weather, deep-penetration, and night/under-the-weather, air-to-surface attack. Configured with conformal fuel tanks (CFTs), the F-15E deploys worldwide with minimal tanker support and arrives combat-ready. A mainstay in operations both domestic and abroad, a refresh of older F-15C/D aircraft with the F-15EX and upgrades to newer F-15C/D aircraft and F-15E aircraft (avionics, armament, airframe, and engines) are critical to maintaining combat viability (lethality, survivability, and supportability) in support of the 2018 National Defense Strategy. With the F-15E projected to remain in service past 2040, avionics modernization is key to long-term weapon system viability. This modernization is built on a foundation of technical and acquisition support studies (both internal to the Air Force and through outside contractors), forestalling obsolescence, exploiting proven technological advances, and leveraging new technology. Major avionics upgrades center around radar modernization (both hardware and software upgrades) and the exploitation of enhanced capability via precision timing, data delivery and processing technology, precision registration systems, cockpit Heads Up Display (HUD) and Heads Down Display, instrumentation digitization and modernization, central computer processing power increases, digital mission event recording systems and an infrared (IR)-based fire control system. The proliferation of fourth-generation enemy aircraft and sophisticated "double-digit" anti-aircraft missile systems pose a significant threat to F-15 survivability. A fully integrated electronic warfare suite holds the promise of providing survivability as well as expanded electronic attack capability. Nearly all improvements are linked to an aircraft operational flight program update schedule that works to integrate new capabilities with the airframe. These updates are a responsive way to increase the offensive and defensive capability and survivability of the F-15. Incorporation of corresponding spiral and/or phased technology/equipment improvements that include support equipment, mission planning systems, and training device upgrades will improve performance, supportability, and aircrew training. Funds may be used to resolve emerging safety of flight and diminishing manufacturing sources issues, accommodate technology insertion, and fulfill FAA or other mandates necessary to ensure continued aircrew safety and mission effectiveness. This includes technical and acquisition-related studies to ensure F-15E lethality and survivability beyond 2040.

The total F-15EX RDT&E funding for FY20 in the amount of \$404.996M resides in Program 0207134F Project 670131 (\$53.400M) and Project 676020 (\$351.596M). FY21 and beyond RDT&E funding resides in Program 0207146F.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$6.031M was expended for civilian pay expenses in this program element, and in FY21 \$4.020M is forecasted for civilian pay expenses in this program element.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207134F / <i>F-15E Squadrons</i>
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This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	684.229	298.908	243.462	0.000	243.462
Current President's Budget	640.124	288.381	239.616	0.000	239.616
Total Adjustments	-44.105	-10.527	-3.846	0.000	-3.846
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-10.527			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-21.000	0.000			
• SBIR/STTR Transfer	-23.105	0.000			
• Other Adjustments	0.000	0.000	-3.846	0.000	-3.846

**Change Summary Explanation**

FY20 Congressional Directed Reduction to Mobile User Objective System (MUOS) for unjustified growth. FY20 Congressional Directed Transfer to F-15EX from APAF for two test aircraft and non-recurring engineering. FY21 change due to F-15E Re-phase of -\$41.200M; an increase of \$9.902M for F-15E Large Area Display; -\$51.426 reduction to account for the availability of prior year execution balances; and Inflation Rate adjustment of -\$0.572.

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0207134F / F-15E Squadrons				<b>Project (Number/Name)</b> 670131 / F-15 Advanced Development			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
670131: F-15 Advanced Development	0.000	53.400	0.000	0.000	0.000	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

A refresh of the F-15C/D fleet is critical to maintaining combat viability (lethality, survivability, and supportability) in support of the 2018 National Defense Strategy. Older F-15C/D aircraft will be replaced to maintain a viable mix of 4th and 5th-generation fighters for the next 20+ years. The F-15EX will be based on the 2-seat F-15QA (Qatar) configuration upgraded with USAF only capabilities, including the Eagle Passive Active Warning and Survivability System (EPAWSS) and the Suite 9.1 Operational Flight Program (OFP) software. With two seats, it will be multi-role-capable and operable by one or two aircrew. Many F-15C/Ds are beyond their service life and have SERIOUS structural risks, wire chafing issues, and obsolete parts. Readiness goals are unachievable due to continuous structural inspections, time consuming repairs, and on-going modernization efforts. The average F-15C/D is 36 years old with over 8,400 flight hours; the oldest F-15C was delivered in 1979. Logistics, maintenance, and training activities will heavily leverage the existing F-15 infrastructure.

Funds may be used to manufacture aircraft, support equipment, and initial spares to support test activities; integrate hardware and software subsystems; upgrade training systems and systems integration labs; develop training materials and technical manuals; pursue other non-recurring engineering activities to reduce integration and cybersecurity risks, ramp up the production line capacity, prepare for and conduct ground and flight testing, and pursue technology insertion opportunities; resolve Diminishing Manufacturing Sources/Material Shortages (DMSMS) and/or obsolescence issues; fulfill FAA or other mandates necessary to ensure continued aircrew safety and mission effectiveness; and cover other related requirements to manufacture and sustain the test aircraft.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$6.031M was expended for civilian pay expenses in this program element, and in FY21 \$4.020M is forecasted for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022
<b>Title:</b> F-15EX	53.400	0.000	0.000
<b>Description:</b> Additional F-15EX RDT&E FY20 funding in the amount of \$351.596M resides in Program 0207134F Project 676020. F-15EX will refresh the F-15C/D fleet with new aircraft based on the F-15QA Foreign Military Sales (FMS) configuration being sold to Qatar. The program will also incorporate USAF-only capabilities, including the Eagle Passive Active Warning and Survivability System (EPAWSS) and the Suite 9.1 Operational Flight Program (OFP) software.			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207134F / F-15E Squadrons	<b>Project (Number/Name)</b> 670131 / F-15 Advanced Development
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022
<b><i>FY 2021 Plans:</i></b> FY21 funding resides in PE 027146F BPAC 670131.			
<b><i>FY 2022 Plans:</i></b> FY22 funding resides in PE 027146F BPAC 670131.			
<b>Accomplishments/Planned Programs Subtotals</b>	53.400	0.000	0.000

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 01 F015E0: F-15EX	621.100	-	-	-	-	-	-	-	-	-	-
• APAF 05 F015EX: F-15EX	-	1,403.347	1,250.436	-	1,250.436	-	-	-	-	-	-
• RDTE 07 0207146F: F-15EX	-	159.761	119.239	-	119.239	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

The F-15EX design will be based on the F-15QA (Qatar) configuration upgraded with USAF-only capabilities like the Eagle Passive Active Warning and Survivability System (EPAWSS) and the Suite 9.1 Operational Flight Program (OFP) software. Since most subsystems are projected to be mature when required for integration into the F-15EX, the acquisition strategy is deemed low risk. To rapidly field the F-15EX, the USAF plans to focus engineering activities on integrating existing systems and ramping up the production line capacity. Test activities will likewise be tailored to focus on integration of F-15QA, EPAWSS, and the Suite 9.1 OFP, taking appropriate credit for previous USAF and FMS testing. Finally, logistics, maintenance, and training activities will heavily leverage existing the F-15 infrastructure.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207134F / F-15E Squadrons	<b>Project (Number/Name)</b> 670131 / F-15 Advanced Development
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
F-15EX	Various	Various : Various	0.000	43.700	Jul 2020	-		-		-		-	-	-	-
<b>Subtotal</b>			0.000	43.700		-		-		-		-	-	-	N/A

**Remarks**  
The individual program reference to "various" contract methods addresses other government costs for trainers, test, hardware, special studies, telemetry kits, etc. that are required to meet each program's objectives. The execution vehicles between these DoD entities vary by effort.

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Government Flight Test	Various	Eglin : Various	0.000	1.500	Apr 2020	-		-		-		-	-	-	-
<b>Subtotal</b>			0.000	1.500		-		-		-		-	-	-	N/A

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
AFLCMC CIV Pay	Various	AFLCMC CIV PAY : WPAFB & Robins AFBs	0.000	6.600	Oct 2019	-		-		-		-	-	-	-
Program Management Administration	Various	Various : Various	0.000	1.600	Oct 2019	-		-		-		-	-	-	-
<b>Subtotal</b>			0.000	8.200		-		-		-		-	-	-	N/A

			Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>			0.000	53.400	0.000	-	-	-	-	-	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Air Force</b>			<b>Date: May 2021</b>				
<b>Appropriation/Budget Activity</b> 3600 / 7		<b>R-1 Program Element (Number/Name)</b> PE 0207134F / <i>F-15E Squadrons</i>			<b>Project (Number/Name)</b> 670131 / <i>F-15 Advanced Development</i>		

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>F-15EX</b>																												
F-15EX NRE and Integration																												
F-15EX Test Aircraft																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207134F / <i>F-15E Squadrons</i>	<b>Project (Number/Name)</b> 670131 / <i>F-15 Advanced Development</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>F-15EX</i></b>				
F-15EX NRE and Integration	4	2020	1	2024
F-15EX Test Aircraft	4	2020	3	2021

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0207134F / F-15E Squadrons				<b>Project (Number/Name)</b> 676020 / F-15 Modernization			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
676020: F-15 Modernization	0.000	586.724	288.381	239.616	0.000	239.616	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Note**

Due to congressional language, two (2) F-15EX aircraft were moved from Procurement to RDT&E.

**A. Mission Description and Budget Item Justification**

These development efforts include F-15 Radar Enhancements Electronic Protection (EP) capabilities, Operational Flight Program (OFP) upgrades, Flight Testing, Infrared Search and Track (IRST), Multifunctional Information Distribution System-Joint Technical Radio System (MIDS-JTRS) and Mobile User Objective System (MUOS)/Second Generation Anti-jam Tactical UHF Radio for NATO (SATURN). Funds may be used to resolve emerging safety of flight and diminishing manufacturing sources issues, accommodate technology insertion and fulfill FAA or other mandates necessary to ensure continued aircrew safety and mission effectiveness.

The Radar Enhancements (EP) will upgrade the digital Active Electronic Scanned Array (AESA) radar capabilities to counter sophisticated electronic threats. Prior OFP's introduced EP into the C/D-model fleet. Initial EP capability for APG-82(V)1 equipped E model aircraft took place in Suite 8E. Suite 9 and beyond will add additional EP capability to both the F-15E and F-15C.

For the F-15 to maintain operational effectiveness, the program must continuously provide the platforms with improved capabilities. To accomplish this there is an on-going need to develop software and hardware upgrades and to flight test new capabilities and systems. The OFP funding line is transiting the Air Force to an annual software release to counter the speed of technology and maintain a competitive advantage. Additionally, the OFP provides the path for integration for other activities into operations. At any one time, there will normally be three OFP upgrades in work: one in requirements definition/pricing, one in code writing and test, and one in flight test and release preparation. The Flight Test funding line allows the Air Force to fund the on-going test effort.

Infrared Search and Track (IRST) system will provide air to air detection, tracking and ranging capability for F-15C/D in a radar-contested environment.

Mobile User Objective System (MUOS)/Second Generation Anti-jam Tactical UHF Radio for NATO (SATURN) will provide Satellite Communications (SATCOM) capable Air Force F-15C/D/E aircraft the ability to communicate on the Mobile User Objective System (MUOS) constellation in support of a NORTHCOM Airspace Control Alert (ACA) requirement. SATURN will replace the Have Quick II and comply with the NSA lease key mandated dates.

Automatic Dependent Surveillance-Broadcast (ADS-B) provides Air Traffic Control position and other secondary surveillance data and must be installed on all CONUS aircraft by 2020 IAW FAA mandate.

The Data Transfer Module II (DTM II) is an upgraded replacement to the current, low-memory data transfer system. Improves and supports mission planning capability and weapons employment, increases storage, replaces aging mapping system, updates interfaces, provides data encryption and delivers cyber security.



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207134F / F-15E Squadrons	<b>Project (Number/Name)</b> 676020 / F-15 Modernization
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Modern high resolution Digital Color Displays will replace the current antiquated monochrome displays. These upgraded displays enable accurate distinction and identification of targets, decrease risk of frat/missed targeting, and enable full utilization of radar capability that significantly enhances situational awareness.

ALQ-128a will replace the legacy ALQ-128 design and includes development and integration of a re-designed ALQ-128a Electronic Warfare Warning Set (EWWS).

A refresh of the F-15C/D fleet is critical to maintaining combat viability (lethality, survivability, and supportability) in support of the 2018 National Defense Strategy. Older F-15C/D aircraft will be replaced to maintain a viable mix of 4th and 5th generation fighters for the next 20+ years. The F-15EX will be based on the 2-seat F-15QA (Qatar) configuration upgraded with USAF only capabilities, including the Eagle Passive Active Warning and Survivability System (EPAWSS) and the Suite 9.1 Operational Flight Program (OFP) software. With two seats, it will be multirole-capable and operable by one or two aircrew. Many F-15C/Ds are beyond their service life and have SERIOUS structural risks, wire chafing issues, and obsolete parts. Readiness goals are unachievable due to continuous structural inspections, time consuming repairs, and on-going modernization efforts. The average F-15C/D is 36 years old with over 8,400 flight hours; the oldest F-15C was delivered in 1979. Logistics, maintenance, and training activities will heavily leverage existing the F-15 infrastructure. Funding supports procurement of two (2) F-15EX aircraft and associated support equipment, training system upgrades and materials, depot stand-up planning, initial spares, and other related items to manufacture the aircraft, provide operational conversion (from F-15C/D to F-15EX) support, and meet logistics and sustainment requirements.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$6.031M was expended for civilian pay expenses in this program element, and in FY21 \$4.020M is forecasted for civilian pay expenses in this program element.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022
<p><b>Title:</b> Operational Flight Program (OFP) Development Efforts</p> <p><b>Description:</b> Provides OFP program software and hardware updates to integrate new capabilities on all F-15 aircraft. This includes technical and acquisition related studies.</p> <p><b>FY 2021 Plans:</b> Continue Suite development and integration of major line items, such as Data Transfer Module (DTM) II, Passive Attack Display (PAD), Eagle Passive/Active Warning Survivability System (EPAWSS), Multi-functional Information Distribution System (MIDS) - Joint Tactical Radio System (JTRS) MIDS-JTRS, implementing B61-12LEP (Life Extension Program, F-15 EX, IRST (Infrared Search and track); all on the new Advanced Display Core Processor (ADCP) II mission computer. Continuation of radar updates being delivered along with continuation of organic software support and Special Projects development efforts. Continuation of funding support for all F-15 trainers and ongoing Problem Report (PR) and Deficiency Report (DR) fixes. Continue work on Future OFP's and award the Continuous Development &amp; Integration (CD&amp;I) contract to take advantage of industries cutting edge knowledge and providing greater flexibility and resilience to the F-15. Perform technical and acquisition related studies to ensure F-15 lethality and survivability beyond 2040. Continue integration efforts to ensure system wide acceptance of new hardware/ software and desired capabilities. Continue to support Program Management Activities in support of the OFP's and the F-15.</p> <p><b>FY 2022 Plans:</b></p>	70.476	88.655	96.888

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207134F / F-15E Squadrons	<b>Project (Number/Name)</b> 676020 / F-15 Modernization
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
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<p>Continue Suite development and integration of major line items, such as Data Transfer Module (DTM) II, Passive Attack Display (PAD), Eagle Passive/Active Warning Survivability System (EPAWSS), Multi-functional Information Distribution System (MIDS) - Joint Tactical Radio System (JTRS) MIDS-JTRS, implementing B61-12LEP (Life Extension Program, F-15 EX, IRST (Infrared Search and track); all on the new Advanced Display Core Processor (ADCP) II mission computer. Continuation of radar updates being delivered along with continuation of organic software support and Special Projects development efforts. Continuation of funding support for all F-15 trainers and ongoing Problem Report (PR) and Deficiency Report (DR) fixes. Continue work on Future OFP's and award the Continuous Development &amp; Integration (CD&amp;I) contract to take advantage of industries cutting edge knowledge and providing greater flexibility and resilience to the F-15. Perform technical and acquisition related studies to ensure F-15 lethality and survivability beyond 2040. Continue integration efforts to ensure system wide acceptance of new hardware/software and desired capabilities. Continue to support Program Management Activities in support of the OFP's and the F-15.</p>			
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<p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Continue integration of the Infrared Search and Track (IRST) system into existing 7.2 OFP and future 9.2 OFP planning, EMD asset building and qualification, integration testing and flight test, and delivering initial low-rate production (LRIP). Continue integration of IRST with other F-15 advanced sensors. Continue efforts and planning to integrate future IRST capability into the next major block upgrade to ensure system wide acceptance of new hardware/software and desired capabilities.</p>			
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<b>Title:</b> Flight Test	15.735	27.505	27.763
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<p><b>Description:</b> Flight test improvements. Baselined infrastructure and personnel support for F-15 Developmental Test (DT) and Operational Test (OT) operations. Purchased long-lead test support assets and unique aircraft test instrumentation. This included technical and acquisition related studies.</p>			
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<p><b>FY 2021 Plans:</b> F-15 Flight Test Support continues to provide contractor support cadre at Eglin and Nellis for DT/OT support, avionics integration, lab O&amp;M, CTF O&amp;M, and long-lead test unique equipment; i.e., program specific aircraft instrumentation, weapons instrumentation kits, data reduction/handling equipment. Repair test aircraft radar instrumentation. Continues design of replacement radar test aircraft obsolete instrumentation. Continue Richter Lab modernization and sustainment provisions, and acquisition of resources needed to maintain a robust test capability for the entire F-15 fleet going forward. Continue support to 896 TSS with additional manpower, to include prefabrication and surge capability, during increased F-15 modernization activity.</p>			
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<p><b>FY 2022 Plans:</b> F-15 Flight Test Support continues to provide contractor support cadre at Eglin and Nellis for DT/OT support, avionics integration, lab O&amp;M, CTF O&amp;M, and long-lead test unique equipment; i.e., program specific aircraft instrumentation, weapons instrumentation kits, data reduction/handling equipment. Repair test aircraft radar instrumentation. Continues design of replacement radar test aircraft obsolete instrumentation. Continue Richter Lab modernization and sustainment provisions, and acquisition of resources</p>			
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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207134F / F-15E Squadrons	<b>Project (Number/Name)</b> 676020 / F-15 Modernization		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
needed to maintain a robust test capability for the entire F-15 fleet going forward. Continue support to 896 TSS with additional manpower, to include prefabrication and surge capability, during increased F-15 modernization activity.  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increase driven by additional Flight Test efforts.				
<b>Title:</b> F-15 Radar Enhancements  <b>Description:</b> Improvements to F-15 Radar Enhancements (EP). This includes technical and acquisition related studies.  <b>FY 2021 Plans:</b> Continue implementation of EP/EW into OFF's. Continue Special Projects testing support. Continue EP/EW and Combat ID candidate risk reduction for future OFP integration. Continue to study and analyze F-15 radar performance and utilization against current and future threat baselines. Continue to develop and test radar technology candidates for future integration in accordance with ACC's F-15 roadmap and threat analysis. This includes technical and acquisition-related studies as well as EP/EW candidates (e.g. ALQ-128). Continue integration efforts to ensure system wide acceptance of new hardware/software and desired capabilities.  <b>FY 2022 Plans:</b> Continue implementation of EP/EW into OFF's. Continue Special Projects testing support. Continue EP/EW and Combat ID candidate risk reduction for future OFP integration. Continue to study and analyze F-15 radar performance and utilization against current and future threat baselines. Continue to develop and test radar technology candidates for future integration in accordance with ACC's F-15 roadmap and threat analysis. This includes technical and acquisition-related studies as well as EP/EW candidates (e.g. ALQ-128). Continue integration efforts to ensure system wide acceptance of new hardware/software and desired capabilities.  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase primarily driven by S9.2 efforts		73.874	69.728	72.291
<b>Title:</b> F-15 Infrared Search and Track (IRST)  <b>Description:</b> The Infrared Search and Track (IRST) system provides F-15C/D/E/EX's with the capability to detect and track objects by infrared radiation. This capability complements the radar to enhance survivability and lethality against air-to-air threats, air-to-ground targeting, provides a passive infrared sensor system that searches for and detects infrared radiation, and provides the aircraft mission computer track file data on infrared targets. The IRST system further adds capability for the F-15 as a 4th generation fighter by supporting 5th/6th generation fighters to increase their lethality and survivability.  <b>FY 2021 Plans:</b>		22.614	22.735	22.323

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207134F / F-15E Squadrons	<b>Project (Number/Name)</b> 676020 / F-15 Modernization
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>Continue integration of the Infrared Search and Track (IRST) system into the existing 7.2 OFP and future 9.2 OFP planning, EMD asset building and qualification, integration testing and flight test, and delivering low-rate initial production (LRIP). Continue integration of IRST with other F-15 advanced sensors. Continue efforts and planning to integrate future IRST capability into the next major block upgrade to ensure system wide acceptance of new hardware/software and desired capabilities.</p> <p><b>FY 2022 Plans:</b> Continue integration of the Infrared Search and Track (IRST) system into the existing 7.2 OFP and future 9.2 OFP planning, EMD asset building and qualification, integration testing and flight test, and delivering low-rate initial production (LRIP). Continue integration of IRST with other F-15 advanced sensors. Continue efforts and planning to integrate future IRST capability into the next major block upgrade to ensure system wide acceptance of new hardware/software and desired capabilities.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> No significant increase or decrease</p>			
<p><b>Title:</b> Mobile User Objective System (MUOS)/Second Generation Anti-jam Tactical UHF Radio for NATO(SATURN)</p> <p><b>Description:</b> Description: To enable F-15C/D/E's with MUOS/SATURN capability to replace the current UHF Follow-On (UFP) satellite system, the Have Quick II, and comply with the NSA Lease Key mandate dates.</p> <p><b>FY 2021 Plans:</b> Continue with the integration into the OFP's. Purchase of any additional test assets not yet acquired. Begin and/or continue all required testing. Begin and/or continue the development of all kitting. Continue integration efforts to ensure system wide acceptance of new hardware/software and desired capabilities. Begin/continue flight testing as necessary.</p> <p><b>FY 2022 Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Decrease due to the completion of RDTE efforts in FY21</p>	42.394	54.127	0.000
<p><b>Title:</b> F-15 Multifunctional Information Distribution System - Joint Tactical Radio System (MIDS JTRS)</p> <p><b>Description:</b> This upgrade integrates and installs a new Link 16 system on the F-15C &amp; F-15E that complies with an NSA mandate on cryptographic modernization and an FAA mandate on frequency remapping. The FAA mandate requires all fielded Link-16 terminals incorporate the frequency re-mapping capability by 2025.</p> <p><b>FY 2021 Plans:</b></p>	6.382	1.550	0.000

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207134F / F-15E Squadrons	<b>Project (Number/Name)</b> 676020 / F-15 Modernization		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>Continue ESIL and Boeing flight test program. This includes technical and acquisition-related studies. Continue integration efforts to ensure system wide acceptance of new hardware/software and desired capabilities. Includes platform integration and test for new MIDS JTRS terminal block upgrade baseline, and incorporates Ethernet capability to enable advanced capabilities. .</p> <p><b>FY 2022 Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> No Funding after FY21 due to completion of RDT&amp;E.</p>				
<p><b>Title:</b> F-15 Digital Color Displays</p> <p><b>Description:</b> Modern high resolution Digital Color Displays will replace the current antiquated monochrome displays. These upgraded displays enable accurate distinction and identification of targets, decrease risk of frat/misssed targeting, and enable full utilization of radar capability that significantly enhances situational awareness.</p> <p><b>FY 2021 Plans:</b> Continue activities for test facility LRUs, group A design, software updates, and purchasing long lead parts for test hardware. Continue integration efforts to ensure system wide acceptance of new hardware/software and desired capabilities.</p> <p><b>FY 2022 Plans:</b> Continue group A design, software updates, and purchasing long lead parts for test hardware. Continue integration efforts to ensure system wide acceptance of new hardware/software and desired capabilities.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Slight decrease due to reduced on-going efforts</p>		1.271	23.114	19.964
<p><b>Title:</b> F-15E Data Transfer Module II</p> <p><b>Description:</b> The Data Transfer Module II (DTM II) is an upgraded replacement to the current, low-memory data transfer system. Improves and supports mission planning capability and weapons employment, increases storage, replaces aging mapping system, updates interfaces, provides data encryption and delivers cyber security.</p> <p><b>FY 2021 Plans:</b> Installs on flight test aircraft and begin flight test. Integration with S9.2 continuing. Begin completion of system maturation efforts via a supplier support contract with each of the Group B OEMs. These contracts will provide the DTM II program with additional hardware units, MRA, LORA and FCA/PCA.</p> <p><b>FY 2022 Plans:</b></p>		2.382	0.967	0.387

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207134F / F-15E Squadrons	<b>Project (Number/Name)</b> 676020 / F-15 Modernization

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Integration with S9.2 continues.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increase for additional S9.2 integration costs.			
<b>Title:</b> F-15EX	351.596	0.000	0.000
<b>Description:</b> Additional F-15EX RDT&E FY20 funding in the amount of \$53.400M resides in Program 0207134F Project 670131. F-15EX will procure two (2) test aircraft to support the refresh of the F-15C/D fleet with new aircraft based on the F-15QA Foreign Military Sales (FMS) configuration being sold to Qatar. The program will also incorporate USAF-only capabilities, including the Eagle Passive Active Warning and Survivability System (EPAWSS) and the Suite 9.1 Operational Flight Program (OFP) software.			
<b>FY 2021 Plans:</b> FY21 funding resides in PE 027146F BPAC 670131.			
<b>FY 2022 Plans:</b> FY22 funding resides in PE 027146F BPAC 670131.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> EX funding moved from PE 27134F to PE 27146F.			
<b>Accomplishments/Planned Programs Subtotals</b>	586.724	288.381	239.616

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 01 F015E0: F-15EX	621.100	-	-	-	-	-	-	-	-	-	-
• APAF 05 F015EX: F-15EX	-	1,403.347	1,346.022	-	1,346.022	-	-	-	-	-	-
• RDTE 07 0207146F: F-15EX	-	159.761	-	-	-	-	-	-	-	-	-
• APAF 05 Line Item F01500: F-15 Modification of In- Service Aircraft, PEs 0207130, 0207134, 0207445, 0809731	311.873	516.771	199.348	-	199.348	-	-	-	-	-	-
• APAF 06 Line Item 000999: Initial Spares/Repair Parts (BP16)	34.718	39.173	12.048	-	12.048	-	-	-	-	-	-
• APAF 07 Line Item F0150P: F-15 Post Production Support	43.356	101.711	54.283	-	54.283	-	-	-	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207134F / F-15E Squadrons	<b>Project (Number/Name)</b> 676020 / F-15 Modernization
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 07 PE 0207040F: <i>Multi-Platform Electronic Warfare Equipment BPAC 190000</i>	-	-	-	-	-	-	-	-	-	-	-

**Remarks**

ALQ-128a is an FY2019 Congressional Add.

**D. Acquisition Strategy**

The F-15EX design will be based on the F-15QA (Qatar) configuration upgraded with USAF-only capabilities like the Eagle Passive Active Warning and Survivability System (EPAWSS) and the Suite 9.1 Operational Flight Program (OFP) software. Since most subsystems are projected to be mature when required for integration into the F-15EX, the acquisition strategy is deemed low risk. To rapidly field the F-15EX, the USAF plans to focus engineering activities on integrating existing systems and ramping up the production line capacity. Test activities will likewise be tailored to focus on integration of F-15QA, EPAWSS, and the Suite 9.1 OFP, taking appropriate credit for previous USAF and FMS testing. Finally, logistics, maintenance, and training activities will heavily leverage existing the F-15 infrastructure.

Program is a continuation of effort which includes the development of all F-15 models. Funds are executed organically in support of equipment improvement, study, analysis, and test. Acquisition and management strategies for each program are independently developed and use a variety of contract methods and types to accomplish program objectives.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207134F / F-15E Squadrons	<b>Project (Number/Name)</b> 676020 / F-15 Modernization
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
F-15EX	Various	Various : Various	0.000	351.596	Jul 2020	-		-		-		-	-	-	-
Product Development	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	-	-	-
OFP Suite 8/9/CD&I Development and Test	SS/ Various	Boeing : St. Louis, MO	0.000	70.476	Mar 2020	81.060	Jun 2021	96.888	Jun 2022	-		96.888	-	-	-
F-15 Radar Enhancement	SS/ Various	Boeing : St Louis, MO	0.000	70.124	Aug 2020	69.728	Aug 2021	72.291	Aug 2022	-		72.291	-	-	-
F-15 Infrared Search and Track	SS/ Various	Boeing : St Louis, MO	0.000	22.614	Feb 2020	22.735	Feb 2021	22.323	Feb 2022	-		22.323	-	-	-
Multifunctional Information Distribution System-Joint Technical Radio System (MIDS-JTRS)	SS/ Various	Boeing : St. Louis, MO	0.000	6.382	Feb 2020	1.550	Feb 2021	-		-		-	-	-	-
Service Life Extension Program (SLEP) Wing Replacement	TBD	Not specified. : NV	0.000	-		-		-		-		-	-	-	-
Cabin Pressure Indicator	TBD	TBD : Various	0.000	-		-		-		-		-	-	-	-
Mobile User Objective System (MUOS) /Second Generation Anti-jam Tactical UHF Radio for NATO (SATURN)	C/CPAF	Boeing : St. Louis	0.000	42.394	Oct 2020	54.127	Oct 2021	-		-		-	-	-	-
F-15E Advanced Crew Station	TBD	TBD : TBD	0.000	1.271	Feb 2020	23.114	Oct 2020	19.964	Feb 2022	-		19.964	-	-	-
F-15E Data Transfer Module II	TBD	TBD : TBD	0.000	2.382	Jan 2021	0.967	Jan 2021	0.387	Jan 2022	-		0.387	-	-	-
ALQ-128a	TBD	TBD : TBD	0.000	-		-		-		-		-	-	-	-
JASSM ER	TBD	TBD : TBD	0.000	-		-		-		-		-	-	-	-
<b>Subtotal</b>			0.000	567.239		253.281		211.853		-		211.853	-	-	N/A

**Remarks**  
 The individual program reference to "various" contract methods addresses other government costs for trainers, test, hardware, special studies, telemetry kits, etc. that are required to meet each program's objectives. The execution vehicles between these DoD entities vary by effort.



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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207134F / F-15E Squadrons	<b>Project (Number/Name)</b> 676020 / F-15 Modernization
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<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test and Evaluation	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	-	-	-
Boeing (Contractor Test Support)	SS/CPFF	Boeing : St. Louis, MO	0.000	15.735	Aug 2020	27.505	Aug 2021	27.763	Aug 2022	-		27.763	-	-	-
<b>Subtotal</b>			0.000	15.735		27.505		27.763		-		27.763	-	-	N/A

**Remarks**  
The individual program reference to "various" contract methods addresses other government costs for trainers, test, hardware, special studies, telemetry kits, etc. that are required to meet each program's objectives. The execution vehicles between these DoD entities vary by effort.

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Management Services	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	-	-	-
Program Mgt Support Costs	Various	Various : Various	0.000	3.750	Sep 2020	7.595	Sep 2021	-		-		-	-	-	-
<b>Subtotal</b>			0.000	3.750		7.595		-		-		-	-	-	N/A

**Remarks**  
The individual program reference to "various" contract methods addresses other government costs for trainers, test, hardware, special studies, telemetry kits, etc. that are required to meet each program's objectives. The execution vehicles between these DoD entities vary by effort.

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	0.000	586.724	288.381	239.616	-	239.616	-	-	N/A

**Remarks**

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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207134F / F-15E Squadrons	<b>Project (Number/Name)</b> 676020 / F-15 Modernization
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FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
<b>F-15</b>																												
F-15EX NRE and Integration																												
OFP Continuous Development																												
OFP Integration and Test																												
OFP Suite 9 Fielding																												
OFP Suite 9.2 Fielding																												
OFP CD&I Development																												
OFP CD&I Release 1																												
OFP CD&I Release 2																												
OFP CD&I Release 3																												
Radar Enhancements Fielding (with OFP)																												
Infrared Search and Track Integration and Test																												
Multifunctional Information Distribution System-Joint Technical Radio System (MIDS-JTRS) Development																												
Mobile User Objective System (MUOS) Second Generation Anti-jam Tactical UUF Radio for NATO (SATURN) Study																												
Digital Color Display (formerly Advanced Crew Station)																												
Data Transfer Module II																												

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207134F / <i>F-15E Squadrons</i>	<b>Project (Number/Name)</b> 676020 / <i>F-15 Modernization</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>F-15</b>				
F-15EX NRE and Integration	4	2020	1	2024
OFP Continuous Development	3	2021	4	2026
OFP Integration and Test	3	2021	4	2026
OFP Suite 9 Fielding	4	2020	3	2021
OFP Suite 9.2 Fielding	4	2023	4	2024
OFP CD&I Development	3	2021	4	2026
OFP CD&I Release 1	3	2024	3	2025
OFP CD&I Release 2	3	2025	3	2026
OFP CD&I Release 3	3	2026	3	2026
Radar Enhancements Fielding (with OFP)	4	2020	3	2026
Infrared Search and Track Integration and Test	1	2020	4	2023
Multifunctional Information Distribution System-Joint Technical Radio System (MIDS-JTRS) Development	1	2020	2	2021
Mobile User Objective System (MUOS) Second Generation Anti-jam Tactical UUF Radio for NATO (SATURN) Study	1	2020	4	2021
Digital Color Display (formerly Advanced Crew Station)	2	2021	4	2025
Data Transfer Module II	2	2020	4	2022

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207136F / <i>Manned Destructive Suppression</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	15.044	14.933	15.855	0.000	15.855	-	-	-	-	-	-
674595: <i>F-16 HARM Targeting Sys</i>	-	15.044	14.933	15.855	0.000	15.855	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

The Manned Destructive Suppression (MDS) program funds the development and sustainment of the Air Force's Suppression of Enemy Air Defenses (SEAD) and Destruction of Enemy Air Defenses (DEAD) capabilities. The F-16 HARM Targeting System (HTS) is currently the only programmed reactive SEAD/DEAD capability and enables targeting the HARM missile in its most lethal 'range known' mode. The program provides F-16 Block 50/52 and Block 40/42 aircraft with the ability to employ the AN/ASQ-213 Pod. With the introduction of Pre-Planned Product Improvement (P3I) HTS Revision 7 in 2007, the AN/ASQ-213 Pod now has a precision geo-location capability to target Precision Guided Munitions (PGMs) to destroy fixed and mobile enemy air defense elements. Additionally, by relocating the AN/ASQ-213 HTS R7 Pod to the aircraft's left inlet hard point, the F-16 can simultaneously carry the HTS R7 Pod and an Advanced Targeting Pod (ATP). HTS R7 fielding is complete and represents the Air Force's near-term solution for reactive time-critical targeting for DEAD until this mission can be transferred to the F-35. HTS R7 derived precision targeting data can be provided to all Joint Forces via Link-16. This effort continues upgrades for the HTS and applies technologies similar to those demonstrated in the Advanced Tactical Targeting Technologies (AT3) program and HTS R7 development.

Funds may be used to address emerging and short-notice Diminishing Manufacturing Sources and Material Shortage (DMSMS) issues.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0M was expended for civilian pay expenses in this program element, and in FY21 \$0M is forecasted for civilian pay expenses in this program element

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development	<b>R-1 Program Element (Number/Name)</b> PE 0207136F I Manned Destructive Suppression
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	15.521	14.960	16.094	0.000	16.094
Current President's Budget	15.044	14.933	15.855	0.000	15.855
Total Adjustments	-0.477	-0.027	-0.239	0.000	-0.239
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.477	0.000			
• Other Adjustments	0.000	-0.027	-0.239	0.000	-0.239

**Change Summary Explanation**

No Significant Changes

**C. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<b>Title:</b> P3I R7 Software Upgrade (SWUP)	14.144	14.033	14.055	0.000	14.055
<b>Description:</b> HTS SWUP risk reduction and software development Engineering and Manufacturing Development(EMD) efforts include software updates in support of F-16 OFP releases. These releases improve the capability of the pod in an evolving threat environment.					
<b>FY 2021 Plans:</b> Begin fielding first increment of SWUP 3 and prepare for operational testing for second increment of SWUP 3. HTS SWUP 4 continues from risk reduction to iterative software development and preparation for flight testing. Mission support (i.e., program management for administrative and technical support) will continue. Future software upgrades will continue. Continue Commercial Off The Shelf (COTS) studies to demonstrate COTS hardware analysis and experimentation.					
<b>FY 2022 Base Plans:</b> Continue SWUP 3 fielding activities and SWUP 4 risk reduction, iterative software development, and preparation for SWUP 4 flight testing. Mission support (i.e., program management for administrative and technical support) will continue. Begin risk reduction activities for subsequent SWUP 5 upgrades and transition to EMD efforts.					
<b>FY 2022 OCO Plans:</b>					

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207136F / <i>Manned Destructive Suppression</i>
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
N/A					
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increased due to more planned SWUP activity in FY22.					
<b>Title:</b> Flight Test  <b>Description:</b> Conducts test planning, requirements derivation, and post-test data analysis and reporting. Provides test organization support to include test aircraft operations, threat/test range control and associated support, air refueling, and post-mission support. Ground testing, such as anechoic chamber testing, will also be accomplished as necessary.  <b>FY 2021 Plans:</b> Government flight test operations will continue for SWUP 3 and SWUP 4. This funding also includes baselining requirements from actual test data during recent flight testing.  <b>FY 2022 Base Plans:</b> Government flight test operations will continue for SWUP 3 and SWUP 4 activities. This funding also includes baselining requirements from actual test data during recent flight testing.  <b>FY 2022 OCO Plans:</b> N/A  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> N/A	0.900	0.900	0.900	0.000	0.900
<b>Title:</b> Mission Planning  <b>Description:</b> Joint Mission Planning System (JMPS). This effort includes continued development and testing of candidate upgrades and incremental engineering releases in support of HTS SWUP fielding. Mission planning is a continuation of FY20 activity.  <b>FY 2021 Plans:</b> N/A  <b>FY 2022 Base Plans:</b> Continue mission planning in support of future SWUP 3 and SWUP 4 requirements and upgrades.  <b>FY 2022 OCO Plans:</b>	0.000	0.000	0.900	0.000	0.900

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207136F / <i>Manned Destructive Suppression</i>
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
N/A					
<b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> Funding increased due to needed mission planning upgrades for SWUP 3 and SWUP 4.					
<b>Accomplishments/Planned Programs Subtotals</b>	15.044	14.933	15.855	0.000	15.855

**D. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

**E. Acquisition Strategy**

The HTS R7 Software Update Program (SWUP) is underway to keep the HTS pod capable in a growing threat environment. The SWUP 3 Risk Reduction (RR) contract was awarded in December 2015 as a Cost-Plus-Fixed-Fee (CPFF) contract type. The SWUP 3 RR development effort completed in March 2019.

The SWUP 3 Engineering & Manufacturing Development (EMD) and SWUP 4 RR contract awarded in April 2019 as a CPFF contract type and is a 36 month effort. Both the SWUP 3 and SWUP 4 EMD portions include plans for two releases to the field, Builds A and B. The SWUP 5 RR portion will mature candidates for future software builds by addressing findings from the field, incorporating requested improvements from the warfighter, and implementing other software changes to keep the HTS pod updated and mission capable.

The SWUP 4 EMD contract is planned for award in May 2021. This contract plans for multiple releases to the field.



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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207136F / Manned Destructive Suppression	<b>Project (Number/Name)</b> 674595 / F-16 HARM Targeting Sys
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
HTS R7 SWUP/P3I	SS/CPFF	Raytheon Systems Co. : Tucson, AZ	-	13.779	Feb 2020	12.283	May 2021	12.282	Oct 2021	-		12.282	-	-	-
JMPS	SS/CPIF	Multiple : Multiple	-	0.000		0.000		0.900	May 2022	-		0.900	-	-	-
<b>Subtotal</b>			-	13.779		12.283		13.182		-		13.182	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Government Test	PO	412 and 96 TW, NAWCWD : Edwards, Eglin, CLake	-	0.900	May 2020	0.900	Nov 2020	0.900	Nov 2021	-		0.900	-	-	-
<b>Subtotal</b>			-	0.900		0.900		0.900		-		0.900	-	-	N/A

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management Administration	C/Various	Multiple : Eglin AFB, FL	-	0.365	Jul 2020	1.750	Dec 2020	1.773	Apr 2022	-		1.773	-	-	-
<b>Subtotal</b>			-	0.365		1.750		1.773		-		1.773	-	-	N/A

			Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>			-	15.044	14.933	15.855	-	15.855	-	-	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207136F / <i>Manned Destructive Suppression</i>	<b>Project (Number/Name)</b> 674595 / <i>F-16 HARM Targeting Sys</i>

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b><i>Manned Destructive Suppression</i></b>																												
SWUP 3 Risk Reduction																												
SWUP 3 Build A																												
SWUP 3 Build B																												
SWUP 4 Risk Reduction																												
SWUP 4 Build A																												
SWUP 4 Build B																												
SWUP 5 Risk Reduction																												
COTS Hardware																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207136F / <i>Manned Destructive Suppression</i>	<b>Project (Number/Name)</b> 674595 / <i>F-16 HARM Targeting Sys</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Manned Destructive Suppression</i></b>				
SWUP 3 Risk Reduction	1	2020	3	2020
SWUP 3 Build A	1	2020	1	2021
SWUP 3 Build B	1	2020	4	2022
SWUP 4 Risk Reduction	1	2020	2	2022
SWUP 4 Build A	3	2021	3	2023
SWUP 4 Build B	2	2022	3	2024
SWUP 5 Risk Reduction	2	2022	2	2024
COTS Hardware	2	2020	3	2021

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207138F / <i>F-22A Squadrons</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	0.000	537.232	663.825	647.296	0.000	647.296	-	-	-	-	-	-
674785: <i>F-22</i>	0.000	334.748	513.216	647.224	0.000	647.224	-	-	-	-	-	-
674788: <i>F-22 Tactical Mandates</i>	0.000	202.484	150.609	0.072	0.000	0.072	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

The F-22 Raptor provides air superiority to the Joint Force, access in the highly contested operational environment, as well as homeland and cruise missile defense for the next 25+ years (2045+). The F-22 is a multi-mission fighter aircraft that combines low observability, supercruise, maneuverability and integrated avionics to make it the world's most capable air superiority aircraft. The program is continuing planned, incremental modernization development that enhances both F-22 Air Superiority and Global Strike capabilities. The F-22 modernization program upgrades the air vehicle, engine, and training systems to improve F-22 weapons, communications, navigations, pilot systems, and electronic warfare.

The F-22 Raptor's modernization development is conducted using a rapid acquisition construct leveraging commercial best practices such as agile and lean. This allows the F-22 Raptor enterprise to develop, test, and field software/hardware from multiple programs (product lines) using a scheduled cadence for capabilities as they mature.

Determined attempts to deny US air superiority from peer threats within the Indo-Pacific region have driven a Congressional Interest Item (CII), Emergency and Special Program (ESP) Code G3, to highlight investments and activities that will build forces that are lethal, resilient, ready, and postured to respond quickly and effectively against aggression. The F-22 Raptor is a key component of the Pacific Deterrence Initiative (PDI) for increasing joint force lethality and maintaining a credible deterrent in theater.

Funds may be used to resolve emerging safety of flight and diminishing manufacturing sources issues, accommodate technology insertion and fulfill Federal Aviation Administration or other mandates necessary to ensure continued aircrew safety and mission effectiveness.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0.736M was expended for civilian pay expenses in this program element, and in FY21 \$2.064M is forecasted for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207138F / <i>F-22A Squadrons</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	546.298	665.038	597.965	0.000	597.965
Current President's Budget	537.232	663.825	647.296	0.000	647.296
Total Adjustments	-9.066	-1.213	49.331	0.000	49.331
• Congressional General Reductions	0.000	-1.213			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	9.999	0.000			
• SBIR/STTR Transfer	-18.595	0.000			
• Other Adjustments	-0.470	0.000	49.331	0.000	49.331

**Change Summary Explanation**

FY20: -\$18.595M Small Business Innovation Research (SBIR) reduction; +\$9.999M Below Threshold Reprogramming (BTR) for F-22 Modernization; -\$0.470M Other Adjustments

FY21: -\$1.213M Congressional General Reduction

FY22: +\$49.331M Increase for F-22 Sensor Enhancements and Communication Systems

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0207138F / F-22A Squadrons				<b>Project (Number/Name)</b> 674785 / F-22			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
674785: F-22	0.000	334.748	513.216	647.224	0.000	647.224	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

The F-22 Raptor provides air superiority to the Joint Force, access in the highly contested operational environment, as well as homeland and cruise missile defense for the next 25+ years (2045+). The F-22 is a multi-mission fighter aircraft that combines low observability, supercruise, maneuverability and integrated avionics to make it the world's most capable air superiority aircraft. The program is continuing planned, incremental modernization development that enhances both F-22 Air Superiority and Global Strike capabilities. The F-22 modernization program upgrades the air vehicle, engine, and training systems to improve F-22 weapons, communications, navigation, pilot systems, and electronic warfare.

The F-22 Raptor's modernization development is conducted using a rapid acquisition construct leveraging commercial best practices such as agile and lean. This allows the F-22 Raptor enterprise to develop, test, and field software/hardware from multiple programs (product lines) using a scheduled cadence for capabilities as they mature.

Actual and planned execution within Communication Systems and Sensor Systems for FY20 and FY21 will differ from totals shown in each Major Thrust due to balancing program funding at the Budget Program Activity Code (BPAC) level. All content under BPAC 674788 F-22 Tactical Mandates will be consolidated into BPAC 674785 F-22 Squadrons beginning in FY22. This facilitates budget execution by aligning all F-22 modernization efforts under the same BPAC and eliminates references to F-22 Tactical Mandates beyond FY21.

The Sensor Systems Major Thrust is executing \$82.4M of FY20 funds in BPAC 674785, to include a \$50.0M Congressional Add; Communication Systems is executing \$236.3M of FY20 funds in BPAC 674788. Sensor Systems is executing \$258.4M of FY21 funds in BPAC 674785, while Communication Systems is executing \$153.1M of FY21 funds BPAC 674788.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0.736M was expended for civilian pay expenses in this program element, and in FY21 \$2.064M is forecasted for civilian pay expenses in this program element.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Update 6	5.616	0.000	0.000
<b>Description:</b> Update 6 (U6) Interoperability, is an Operational Flight Program (OFP) update providing cryptographic updates required by the National Security Agency (NSA) to maintain interoperability with Link-16 and secure voice networks. The U6 Interoperability program builds upon the development work already accomplished in the KOV-20 cryptographic modernization program and integrates that development into a single OFP for fleet release. In addition, U6 Interoperability will correct other			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207138F / F-22A Squadrons	<b>Project (Number/Name)</b> 674785 / F-22		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>software deficiencies identified during operations. The F-22 Update 6 program is conducted using a rapid acquisition construct leveraging commercial best practices such as agile and lean. This allows the F-22 Raptor enterprise to develop, test, and field software/hardware from multiple programs (product lines) using a scheduled cadence for capabilities as they mature.</p> <p><b>FY 2021 Plans:</b> U6 development program ended in 2020.</p> <p><b>FY 2022 Plans:</b> U6 development program ended in 2020; no FY22 funds requested.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> N/A</p>				
<p><b>Title:</b> Infrastructure</p> <p><b>Description:</b> This major thrust is comprised of: Combined Test Force (CTF), Laboratory Test and Operations (LTO), Operational Software Development, F-22 Small Projects, and Reliability and Maintainability Program (RAMP) projects.</p> <p>Labs and CTF are continuous activities that plan and conduct development, integration, test, and verification of Operational Flight Programs (OFPs) and other software and hardware in support of the F-22 Raptor. Labs provide maintenance, staffing, and operation of sixteen (16) development labs including four unique major System Integration Laboratories (SILs): Agile Integration Lab (AIL) with the Flying Test Bed (FTB), Ogden Test Enterprise (OTE) Lab, Air Combat Simulation (ACS) Lab, and the Vehicle System Simulator (VSS) Lab. The F-22 CTF located at Edwards Air Force Base conducts full-up weapons system testing to assess the effect of the F-22 combined characteristics of stealth, speed, maneuverability, and integrated avionics upon mission accomplishment. The CTF uses operationally significant ground and flight test scenarios to identify system performance deficiencies early before they are more difficult and costly to resolve. It also maintains six installed production engines and two spares, as well as two installed Engineering, Manufacturing and Development (EMD) engines, supporting all F-22 CTF requirements. F-22 Infrastructure efforts include the technical refresh of F-22 test equipment for both the F-22 CTF and the F-22 labs. This major thrust also covers efforts relating to Virtual Next Gen Labs and Joint Simulated Environment (JSE) / F-22 In a Box.</p> <p>F-22 Small Projects provides technology studies, demonstrations and integration of capabilities to include, but not limited to, Low Observable (LO) signature management, threat modeling support, Developmental Test (DT) weapon assets, Pilot Training (PT), future crypto upgrades, dynamic Synthetic Aperture Radar (SAR), cyber security, flight test engine refurbishment, support equipment development, Government Furnished Equipment (GFE), Engine Enhancements (or similar), and Electronic Warfare (EW) system enhancements to counter evolving threats.</p>		168.347	186.165	198.912



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207138F / <i>F-22A Squadrons</i>	<b>Project (Number/Name)</b> 674785 / <i>F-22</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>Operational Software Development utilizes commercially available agile and lean best practices to transform and accelerate the F-22 Raptor's modernization processes to develop, test, and field new capability enhancements. This includes, but is not limited to, the expansion of a cloud-based software development environment and partnering with commercial companies to adopt industry product development best practices.</p> <p>The Reliability and Maintainability Program provides for solution identification and integration of modifications to improve reliability, availability and maintainability for F-22 test aircraft, located at Edwards AFB and the sixteen (16) F-22 labs. RAMP includes modifications to address corrosion, reduce maintenance hours, increase safety, and provide urgent response requirements to the F-22 CTF.</p> <p>F-22 Infrastructure efforts are conducted using a rapid acquisition construct leveraging commercial best practices such as agile and lean. This allows the F-22 Raptor enterprise to develop, test, and field software/hardware from multiple programs (product lines) using a scheduled cadence for capabilities as they mature.</p> <p>Program mission support costs are included in this major thrust.</p> <p><b><i>FY 2021 Plans:</i></b> LTO plans to incorporate support of F-22 In a Box / JSE which is scheduled to deliver in 2021. Provide support to the SILs for faster testing and assessment of F-22 enhancements. Continue to update critical systems required to support new aircraft configurations and capabilities. Further continue Lab test planning using agile methods for the following programs: Mode 5 IFF, Link 16, OFP releases, Sensor Systems and ATD to hand off to the CTF for testing.</p> <p>Small projects continues technology planning studies and demonstrations for DT weapon assets, threat modeling support, test support, test aircraft modifications, Common Range Integrated Instrumentation System (CRIIS) development, cyber security, dynamic SAR, GFE, PT, and EW enhancements.</p> <p>Operational Software Development continues maturing and scaling cloud-based computing environment to leverage commercially-based agile software and hardware development best practices and tools to increase the speed and quality of product delivery to the warfighter.</p> <p>RAMP continues retrofit modifications on F-22 test aircraft in order to improve system/component reliability, maintainability and reduce F-22 weapon system life cycle costs.</p>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207138F / F-22A Squadrons	<b>Project (Number/Name)</b> 674785 / F-22		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>FY21 total includes \$22M for estimated SBIR/STTR transfer.</p> <p><b>FY 2022 Plans:</b> Provide support to the SILs for faster testing and assessment of F-22 enhancements. Continue to update critical systems required to support new aircraft configurations and capabilities. Further continue Lab test planning using agile methods for the following programs: Mode 5 IFF, Link 16, OFP releases, Sensor Systems and ATD to hand off to the CTF for testing. Continue to update critical systems to include technology refresh and laboratory improvements (including Virtual Next Gen Labs components) required to support new aircraft configurations and capabilities. Continued development of F-22 In-a-Box / JSE.</p> <p>Small projects continues technology planning studies and demonstrations for DT weapon assets, threat modeling support, test support, test aircraft modifications, CRIIS development, cyber security, engine enhancements, crypto, dynamic SAR, GFE, PT, and EW enhancements.</p> <p>Operational Software Development continues maturing and scaling cloud-based computing environment to leverage commercially-based agile software and hardware development best practices and tools to increase the speed and quality of product delivery to the warfighter.</p> <p>RAMP continues retrofit modifications on F-22 test aircraft in order to improve system/component reliability, maintainability and reduce F-22 weapon system life cycle costs.</p> <p>FY22 total includes \$22M for estimated SBIR/STTR transfer.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase of \$12.747M from FY21 to FY22 reflects the continuation of Labs and CTF efforts, small projects, and other development/test efforts to support F-22 planned development, testing, and integration efforts.</p>				
<p><b>Title:</b> Advanced Technology Development (ATD)</p> <p><b>Description:</b> Technology maturation, risk reduction, studies, demonstrations and prototypes of classified F-22 development efforts. The F-22 Advanced Technology Development (ATD) program is conducted using a rapid acquisition construct leveraging commercial best practices such as agile and lean. This allows the F-22 Raptor enterprise to develop, test, and field software/ hardware from multiple programs (product lines) using a scheduled cadence for capabilities as they mature.</p> <p>The F-22 program may incorporate technologies developed by NGAD based on emerging threats, AF priorities, and development pipeline capacity. Incorporating NGAD developed technologies will include developing, integrating, and testing capabilities on the F-22 weapon system.</p>		79.876	57.130	28.080

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207138F / F-22A Squadrons	<b>Project (Number/Name)</b> 674785 / F-22
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b><i>FY 2021 Plans:</i></b> Continue technology maturation and risk reduction projects in support of various classified F-22 development efforts. Continue technology maturation and acquisition planning for the F-22 Sensor Systems program. Additionally, continue to mature the Low Drag Pylon and Tank capabilities as part of its risk reduction activities.</p> <p><b><i>FY 2022 Plans:</i></b> Continue technology maturation and risk reduction projects in support of various classified F-22 development efforts. Continue technology maturation and acquisition planning for the F-22 Sensor Systems program. Additionally, continue to mature the Low Drag Pylon and Tank capabilities as part of its risk reduction activities.</p> <p><b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> Decrease of \$29.050M from FY21 to FY22 is due to the planned completion of the Sensor Systems ATD effort in FY22.</p>			
<p><b><i>Title:</i></b> Sensor Systems</p> <p><b><i>Description:</i></b> As part of the F-22 Rapid Prototyping Middle Tier Acquisition (MTA) program, previously known as the Capability Pipeline, Sensor Systems improves sensor capabilities to maintain air dominance and preserve first look, first shot, and first kill capability. The F-22 Sensor System programs are conducted using a rapid acquisition construct leveraging commercial best practices such as agile and lean. This allows the F-22 Raptor enterprise to develop, test, and field software/hardware from multiple programs (product lines) using a scheduled cadence for capabilities as they mature.</p> <p><b><i>FY 2021 Plans:</i></b> Continue Sensor Enhancements software and hardware development for future fleet release. Purchase of test assets.</p> <p><b><i>FY 2022 Plans:</i></b> Continue Sensor Enhancements software and hardware development for future fleet release. Complete purchase of test assets, continue development environment standup, lab/system/airframe integration, and logistics planning. Continue technology maturation and risk reduction efforts for multiple development activities.</p> <p><b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> Marginal increase from FY21 to FY22 attributable to the completion of test asset purchases.</p>	75.685	260.921	262.972
<p><b><i>Title:</i></b> Navigation Systems</p> <p><b><i>Description:</i></b> The Navigation Systems product line consists of the software and hardware development, integration, test, and fielding necessary to ensure the F-22's ability to maintain Precision, Navigation and Timing (PNT) capabilities, particularly in Global Positioning System (GPS) degraded environments. As part of the F-22 Rapid Prototyping Middle Tier Acquisition (MTA) program, previously known as the Capability Pipeline, this effort will include the integration of Embedded GPS/Inertial Navigation System (INS) Modernization (EGI-M) for M-Code, replacement of the legacy GPS antenna with a robust Controlled Reception</p>	5.224	9.000	25.540

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207138F / F-22A Squadrons	<b>Project (Number/Name)</b> 674785 / F-22		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>Pattern Antenna (CRPA), as well as other capabilities, all working together to prevent exploitation of the weapon system by adversaries and to provide an anti-jam PNT solution. F-22 Navigation Systems is conducted using a rapid acquisition construct leveraging commercial best practices such as Agile and Lean. This allows the F-22 Raptor enterprise to develop, test, and field software/hardware from multiple programs (product lines) using a scheduled cadence for matured capabilities.</p> <p><b>FY 2021 Plans:</b> Continue to work development activities for F-22 GPS CRPA. FY21 activities will include system level testing of the CRPA, design and purchase of retrofit kits, and integration of the antenna with existing navigation system software. EGI-M work will include continued refinement of Requirements and Engineering deliverables, initial development of EGI-M software, and integration for ongoing development of the new hardware.</p> <p><b>FY 2022 Plans:</b> Continue with CRPA retrofit kit manufacturing and purchase, begin actual retrofits to support Developmental and Operational testing. Work towards completing the next series of Engineering milestones. Ongoing development and integration of new EGI-M hardware. Delivery of the updated software to support EGI-M integration.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase of \$16.540M from FY21 to FY22 reflects the continuance of kit manufacturing, testing, and integration.</p>				
<p><b>Title:</b> Communication Systems</p> <p><b>Description:</b> As part of the F-22 Rapid Prototyping Middle Tier Acquisition (MTA) program, previously known as the Capability Pipeline, Link 16 and Mode 5 IFF consists of software and hardware development necessary to field both the Link 16 Transmit capability, and tactical Mode 5 IFF Transpond and Interrogate on the F-22. Link 16 Transmit will be accomplished via an Open System Architecture (OSA) integrated with F-22 legacy avionics. The OSA implementation will provide a pathway to more competitive and open F-22 modernization. Mode 5 IFF provides an opportunity to incorporate other updates to Link 16 capabilities into the Raptor. This major thrust also captures F-22 program activities related to integrating the advanced Talon SPITBALL Link 16 antenna onto the F-22. Includes mission support requirements for the F-22 Program Office including, but not limited to: travel, computer costs, cost estimating data, strategic analysis and support, systems engineering process management and other miscellaneous contract support. The F-22 Link 16 and Mode 5 IFF product lines are conducted using a rapid acquisition construct leveraging commercial best practices such as agile and lean. This allows the F-22 Raptor enterprise to develop, test, and field software/hardware from multiple programs (product lines) using a cadence approach as capabilities mature.</p> <p><b>FY 2021 Plans:</b> FY21 plans can be found under BPAC 674788 F-22 Tactical Mandates.</p> <p><b>FY 2022 Plans:</b></p>		0.000	0.000	131.720

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207138F / F-22A Squadrons	<b>Project (Number/Name)</b> 674785 / F-22

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Continue software development for additional Link 16 and Mode 5 IFF Transpond capabilities for fielding with subsequent releases. Mode 5 IFF Interrogate capabilities will continue development and system lab test of hardware and software.			
<b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> Planned FY22 execution in communication systems in BPAC 674785 is \$131.792M.			
<b>Accomplishments/Planned Programs Subtotals</b>	334.748	513.216	647.224

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• APAF 05 Line Item F02200: <i>F-22A Squadrons, PE 0207138F*</i>	219.447	522.595	467.702	-	467.702	-	-	-	-	-	-
• APAF 05 F2232B: <i>Increment 3.2b</i>	20.213	5.889	-	-	-	-	-	-	-	-	-
• RDTE 07 PE 0207138F: <i>F-22 Tactical Mandates</i>	202.484	150.609	-	-	-	-	-	-	-	-	-

**Remarks**

NOTES:

\*F-22A Squadrons, APAF/PE 0207138F, includes funding for F-22A Squadrons BPs 11 (Aircraft Modifications), 13 (Post-Production Support), 16 (Initial Spares), and 19 (Depot Activation) only.

F-22 Increment 3.2B, APAF/PE 0207138F includes funding for associated Increment 3.2B BPs 11 (Aircraft Modifications) and 16 (Initial Spares) only.

F-22 Tactical Mandates, RDT&E/PE 0207138F, includes funding for F-22A Tactical Mandates modernization and development BPAC 674788. Communication Systems major thrust will be captured under BPAC 674785 beginning in FY22 as a result of the BPAC consolidation.

**D. Acquisition Strategy**

In conjunction with the Raptor Enhancement Development & Integration II (REDI II) Indefinite Delivery/Indefinite Quantity (ID/IQ) ordering contract, the new Advanced Raptor Enhancement and Sustainment (ARES) ID/IQ will begin to be utilized in FY22 as well. The ARES contract is a follow-on to the REDI II contract. Both ID/IQ contracts maximize flexibility to start, stop, accelerate and decelerate projects as required and ARES provides maximum flexibility to manage various modernization projects. The REDI II and ARES contracts allow for the issuance of orders for efforts associated with the planning, analysis, design, development, qualification, test and documentation of F-22 weapon system performance enhancements, life-cycle improvements, Operational Flight Program (OFF) upgrades, and associated efforts essential to accomplishing the F-22 mission.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207138F / F-22A Squadrons	<b>Project (Number/Name)</b> 674785 / F-22
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<b>Product Development (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Update 6	SS/ Various	Lockheed Martin : Fort Worth, TX	0.000	5.616	Dec 2019	-		-		-		-	-	-	-
Infrastructure	Various	Various : Various	0.000	167.611	Nov 2019	184.101	Oct 2020	198.912	Oct 2021	-		198.912	-	-	-
Advanced Technology Development	Various	Various : Various	0.000	79.876	Nov 2019	57.130	Nov 2020	28.080	Nov 2021	-		28.080	-	-	-
Sensor Systems	SS/ Various	Lockheed Martin : Fort Worth, TX	0.000	75.685	Dec 2019	260.921	Feb 2021	262.972	Nov 2021	-		262.972	-	-	-
Navigation Systems	SS/ Various	Lockheed Martin : Fort Worth, TX	0.000	5.224	Nov 2019	9.000	Oct 2020	25.540	Nov 2021	-		25.540	-	-	-
Communication Systems	SS/ Various	Lockheed Martin : Fort Worth, TX	0.000	-		-		131.720	Nov 2021	-		131.720	-	-	-
<b>Subtotal</b>			0.000	334.012		511.152		647.224		-		647.224	-	-	N/A

<b>Support (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Direct Cite Civilian Pay	Various	Not specified : TBD	0.000	0.736	Oct 2019	2.064	Oct 2020	-		-		-	-	-	-
<b>Subtotal</b>			0.000	0.736		2.064		-		-		-	-	-	N/A

<b>Project Cost Totals</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
	0.000	334.748	513.216	647.224	-	647.224	-	-	N/A

**Remarks**  
FY21 and prior execution under Communication Systems is captured in BPAC 674788 F-22 Tactical Mandates exhibits.







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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207138F / F-22A Squadrons	<b>Project (Number/Name)</b> 674785 / F-22

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>F-22 Squadrons</b>				
Update 6 Interoperability Flight Test	1	2020	3	2020
Update 6 Interoperability Deployment Decision Review	2	2020	4	2020
Update 6 Interoperability Full Deployment (Fleet Release)	3	2020	1	2021
Advanced Technology Development Demonstrations	1	2020	4	2026
Advanced Technology Development Studies & Analysis	1	2020	4	2026
Navigation Systems CRPA Development, Integration, and Test	1	2020	4	2023
Navigation Systems EGI-M Development, Integration, and Test	1	2020	4	2026
Sensor Systems - Technical Demo/Group B Production Decision	3	2022	3	2022
Sensor Systems - DT/OT	1	2023	3	2025
Sensor Systems - Fleet Authorization	3	2025	3	2025
Sensor Systems - RAA	1	2026	1	2026
Communication Systems - Release 1 (initial Link 16 Transmit & IFF Transpond (IFFT) capability) Development, Integration, & Test	1	2020	4	2021
Communication Systems - Release 1 CAF Installs	1	2022	1	2025
Communication Systems - Release 2 (additional Link 16 capability) Development, Integration, & Test	1	2020	4	2022
Communication Systems - Release 3 (additional Link 16 & IFFT capability) Development, Integration, & Test	1	2022	4	2023
Communication Systems - Release 4 (Mode 5 IFF Interrogate (IFFI)) Development, Integration, & Test	1	2020	4	2024
Communication Systems - Release 4 CAF Installs	1	2025	4	2026

**Note**

FY21 and prior execution under Communication Systems is captured in BPAC 674788 F-22 Tactical Mandates exhibits.

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0207138F / F-22A Squadrons				Project (Number/Name) 674788 / F-22 Tactical Mandates			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
674788: F-22 Tactical Mandates	0.000	202.484	150.609	0.072	0.000	0.072	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

This Budget Program Activity Code (BPAC) is being consolidated into BPAC 674785 F-22A Squadrons starting in FY22. This facilitates budget execution by aligning all F-22 modernization efforts under the same BPAC and eliminates references to F-22 Tactical Mandates beyond FY21. The following remains for reference to current year and prior year budget activity.

This BPAC focuses on delivering Link 16 and Mode 5 Identification Friend or Foe (IFF) capabilities to the F-22 Raptor.

Link 16 will deliver Link 16 Transmit and enhance existing receive capabilities. Link 16 capabilities will be enabled by Open System Architecture (OSA) and enables 5th generation F-22 fighter aircraft to transmit tactical information through datalink to the 5th generation F-35 (a.k.a. 5th-to-5th), as well as to 4th generation aircraft (a.k.a. 5th-to-4th). Transmitting tactical data to other aircraft types via datalink is a top Air Force priority. With Link 16 Transmit, the F-22's superior 5th Generation sensor suite will critically support the situational awareness of all participants in the operational environment. Mode 5 IFF will deliver IFF Transpond and Interrogate capabilities. Mode 5 IFF is a Joint Requirements Oversight Council-mandated Blue Force identification capability that improves Raptor survivability and reduces fratricide risk DoD-wide. Mode 5 IFF brings significantly enhanced combat identification in both quality and security. All capabilities will be fielded on the F-22 Block 30/35 combat coded F-22 fleet.

The F-22's Link 16 and Mode 5 IFF developments are conducted using a rapid acquisition construct leveraging commercial best practices such as agile and lean. This allows the F-22 Raptor enterprise to develop, test, and field software/hardware from multiple programs (product lines) using a scheduled cadence for capabilities as they mature.

Actual and planned execution within Communication Systems and Sensor Systems for FY20 and FY21 will differ from totals shown in each Major Thrust due to balancing program funding at the BPAC level.

The Sensor Systems Major Thrust is executing \$82.4M of FY20 funds in BPAC 674785, to include a \$50.0M Congressional Add; Communication Systems is executing \$236.3M of FY20 funds in BPAC 674788. Sensor Systems is executing \$258.4M of FY21 funds in BPAC 674785, while Communication Systems is executing \$153.1M of FY21 funds BPAC 674788.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022
<b>Title:</b> Communication Systems	202.484	150.609	0.072
<b>Description:</b> As part of the F-22 Rapid Prototyping Middle Tier Acquisition (MTA) program, previously known as the Capability Pipeline, Link 16 and Mode 5 IFF consists of software and hardware development necessary to field both the Link 16 Transmit			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207138F / <i>F-22A Squadrons</i>	<b>Project (Number/Name)</b> 674788 / <i>F-22 Tactical Mandates</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>capability, and tactical Mode 5 IFF Transpond and Interrogate on the F-22. Link 16 Transmit will be accomplished via an Open System Architecture (OSA) integrated with F-22 legacy avionics. The OSA implementation will provide a pathway to more competitive and open F-22 modernization. Mode 5 IFF provides an opportunity to incorporate other updates to Link 16 capabilities into the Raptor. This major thrust also captures F-22 program activities related to integrating the advanced Talon SPITBALL Link 16 antenna onto the F-22. Includes mission support requirements for the F-22 Program Office including, but not limited to: travel, computer costs, cost estimating data, strategic analysis and support, systems engineering process management and other miscellaneous contract support. The F-22 Link 16 and Mode 5 IFF product lines are conducted using a rapid acquisition construct leveraging commercial best practices such as agile and lean. This allows the F-22 Raptor enterprise to develop, test, and field software/hardware from multiple programs (product lines) using a cadence approach as capabilities mature.</p> <p><b>FY 2021 Plans:</b> Initial Link 16 transmit and Mode 5 IFF Transpond capabilities will complete Developmental Test (DT) and Operational Test (OT) in preparation for release to the F-22 combat fleet. Continue software development for additional Link 16 and Mode 5 IFF Transpond capabilities for fielding with subsequent releases. Mode 5 IFF Interrogate capabilities will continue development and system lab test of hardware and software. Pre-EMD work on TALON SPITBALL completed in FY20. TALON SPITBALL activities from the Air Force Tactical Exploitation of National Capabilities (TENCAP) office will transition EMD to F-22 Program Office. Planning for TALON SPITBALL EMD activities to continue development and integration activities for the F-22 Raptor.</p> <p><b>FY 2022 Plans:</b> This BPAC is being consolidated into BPAC 674785 F-22 Squadrons. FY22 plans for Communication Systems can be found in the F-22 Squadrons R-2A exhibit.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Planned FY22 execution in Communication Systems is \$131.792M and is documented in the F-22 Squadrons R-2A exhibit.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	202.484	150.609	0.072

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• RDTE 07 PE 0207138F: <i>F-22A Squadrons*</i>	334.748	488.055	647.296	-	647.296	-	-	-	-	-	-
• APAF 05 Line Item F02200: <i>F-22A Squadrons, PE 0207138F**</i>	219.447	522.595	467.702	-	467.702	-	-	-	-	-	-
• APAF 05 Line Item F2232B: <i>F-22A Increment 3.2B, PE 0207138F****</i>	20.213	5.889	-	-	-	-	-	-	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207138F / <i>F-22A Squadrons</i>	<b>Project (Number/Name)</b> 674788 / <i>F-22 Tactical Mandates</i>
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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**Remarks**

NOTES:

\*F-22 Squadrons, RDT&E/PE 0207138F, includes funding for F-22A Squadrons modernization and development BPAC 674785. Communication Systems major thrust will be captured under BPAC 674785 in FY22 as a result of the BPAC consolidation.

\*\*F-22A Squadrons, APAF/PE 0207138F, includes funding for F-22A Squadrons BPs 11 (Aircraft Modifications), 13 (Post-Production Support), 16 (Initial Spares), and 19 (Depot Activation) only.

\*\*\*F-22 Squadrons, APAF/PE 0207138F/F2232B, includes funding for F-22 Increment 3.2B BPs 11 (Aircraft Modifications) and 16 (Initial Spares) only.

**D. Acquisition Strategy**

In conjunction with the Raptor Enhancement Development & Integration II (REDI II) Indefinite Delivery/Indefinite Quantity (ID/IQ) ordering contract, the new Advanced Raptor Enhancement and Sustainment (ARES) ID/IQ will begin to be utilized in FY22 as well. The ARES contract is a follow-on to the REDI II contract. Both ID/IQ contracts maximize flexibility to start, stop, accelerate and decelerate projects as required and ARES provides maximum flexibility to manage various modernization projects. The REDI II and ARES contracts allow for the issuance of orders for efforts associated with the planning, analysis, design, development, qualification, test and documentation of F-22 weapon system performance enhancements, life-cycle improvements, Operational Flight Program (OFF) upgrades, and associated efforts essential to accomplishing the F-22 mission.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207138F / F-22A Squadrons	<b>Project (Number/Name)</b> 674788 / F-22 Tactical Mandates
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Communication Systems	SS/ Various	Lockheed Martin : Ft Worth, TX	0.000	202.484	Oct 2019	150.609	Oct 2020	0.072	Nov 2021	-		0.072	-	-	-
<b>Subtotal</b>			0.000	202.484		150.609		0.072		-		0.072	-	-	N/A
<b>Project Cost Totals</b>			0.000	202.484		150.609		0.072		-		0.072	-	-	N/A

**Remarks**  
 FY22 Communication System execution is captured in BPAC 674785 F-22 Squadrons in FY22.

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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date: May 2021**

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207138F / F-22A Squadrons	<b>Project (Number/Name)</b> 674788 / F-22 Tactical Mandates
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FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>F-22 TACTICAL MANDATES</b>	
Release 1 (initial Link 16 Transmit & IFF Transpond (IFFT) capability) Development, Integration, & Test	
Release 1 Combat Air Force (CAF) Installs	
Release 2 (additional Link 16 capability) Development, Integration, & Test	
Release 3 (additional Link 16 & IFFT capability) Development, Integration, & Test	
Release 4 (Mode 5 IFF Interrogate (IFFI)) Development, Integration, & Test	
Release 4 CAF Installs	

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207138F / <i>F-22A Squadrons</i>	<b>Project (Number/Name)</b> 674788 / <i>F-22 Tactical Mandates</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>F-22 TACTICAL MANDATES</i></b>				
Release 1 (initial Link 16 Transmit & IFF Transpond (IFFT) capability) Development, Integration, & Test	1	2020	4	2021
Release 1 Combat Air Force (CAF) Installs	1	2022	1	2025
Release 2 (additional Link 16 capability) Development, Integration, & Test	1	2020	4	2022
Release 3 (additional Link 16 & IFFT capability) Development, Integration, & Test	1	2022	4	2023
Release 4 (Mode 5 IFF Interrogate (IFFI)) Development, Integration, & Test	1	2020	4	2024
Release 4 CAF Installs	1	2025	4	2026

**Note**

FY22 execution under Communication Systems is captured in BPAC 674785 F-22 Squadrons exhibits.

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207142F / <i>F-35 Squadrons</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	0.000	94.731	114.621	69.365	0.000	69.365	-	-	-	-	-	-
675346: <i>F-35</i>	0.000	11.850	7.678	4.890	0.000	4.890	-	-	-	-	-	-
675349: <i>HPSI</i>	0.000	16.754	18.415	19.659	0.000	19.659	-	-	-	-	-	-
676011: <i>JSF DUAL CAPABLE AIRCRAFT</i>	0.000	66.127	88.528	44.816	0.000	44.816	-	-	-	-	-	-

**Program MDAP/MAIS Code:** 198

**A. Mission Description and Budget Item Justification**

The F-35 Joint Strike Fighter (JSF) Program will develop and field an affordable, highly common family of next generation strike aircraft for the United States Air Force, United States Navy, United States Marine Corps and International Partners countries. There are three variants: the F-35A Conventional Takeoff and Landing variant; the F-35B Short Take Off and Vertical Landing variant; and the F-35C Aircraft Carrier suitable variant. Maximum commonality among the variants, consistent with National Disclosure Policy, will minimize total air system life cycle costs.

Beginning in FY 2020, Continuous Capability Development & Delivery (C2D2) efforts designated as Block 4 that are not USAF-unique (US Service and International Partner common requirements) are requested in PE 0604840F. Remaining funding in PE 0207142F supports USAF-unique on-going User Information Data Exchange Service (UIDES), SEEK EAGLE, Hybrid Product Support Integrator (HPSI) and Dual Capable Aircraft (DCA) requirements. These continuing efforts are not new starts.

JSF C2D2 efforts provide incremental warfighting capability improvements to maintain joint air dominance against evolving threats. Requirements designated as Block 4 include a robust weapons integration portfolio and provide new opportunities for International Partners to assess, integrate, and field unique capabilities based on global sovereign requirements. The F-35 JSF Operational Requirements Document (ORD) calls for the F-35A to have the capabilities and provisions for DCA operations in the first post-SDD block upgrade. DCA is a NATO and US priority which is a critical capability in our collective defense and credible deterrence, with certification needed by Jan 2024. DCA refers to the capability to carry and deliver conventional and non-conventional weapons. DCA operations for the F-35A is internal carriage of up to two B61-12s. Due to extensive certification requirements, the DCA capability planning and design, testing and certification will continue throughout Block 4. Funding in this PE will resource the following F-35A DCA activities: development, analysis, test, integration, certification and risk-reduction activities necessary to field and maintain F-35A DCA capabilities throughout post-SDD block upgrades; assessment of DCA weapon integration and certification impacts on the JSF aircraft; identification and mitigation of potential technical and cost risks; definition of integration and certification trade-space to field the DCA capability with the B61-12 weapon; follow-on risk reduction efforts to ensure future integration alignment with the earliest feasible post-SDD block upgrade; full integration efforts pending Service decisions. This is not a new start effort.

The Air Force SEEK EAGLE Office (AFSEO) is the AF organization chartered to perform the compatibility mission and manage the compatibility enterprise. AFSEO delivers warfighting capability through aircraft/store compatibility testing and evaluation and provides accurate combat weapon delivery and mission planning software.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207142F / <i>F-35 Squadrons</i>
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Beginning in FY2020, the USAF will support FTI wiring and weapons integration tasks related to SEEK EAGLE requests. These tasks include, but are not limited to, envelope expansion, mixed loads testing, adding additional stores and F-35A specific risk reduction efforts and studies. This is not a new start effort.

The F-35 HPSI's primary role is to integrate support across the supply chain, maintenance, sustainment engineering, logistics information technology and training disciplines. It will deliver enduring, global support for fielded F-35s while preparing for future force expansion. USAF only will fund additional PMA to transition to a final HPSI, which will support sustainment analysis with product support managers, focused on long-term strategic planning and transition to a final integrated support plan. This is not a new start effort.

USAF F-35 User Information Data Exchange Service (UIDES) provides for Air Force development of a F-35 Autonomic Logistics Information System (ALIS) - UIDES that supports current and future Information Exchange Requirement (IER) data transfer capability from the F-35 ALIS into data reports and configurable tables to receive, store and integrate F-35 operations, maintenance, training and financial data within existing Air Force enterprise views and systems to support the growing fleet of AF F-35 aircraft, the ability to feed F-35 training and operations data to ALIS, and support modification of an enhanced data sharing capability (ability to consume increased volume and variety of ALIS IER data) to support operations planning, pilot and maintainer training, and depot data configuration and integration requirements. Activities also include studies and analysis to support both current program/project planning and execution and future program/project planning. This is not a new start effort.

This program element includes necessary civilian pay and travel expenses required to manage, execute, and deliver F-35 weapon system capability. The use of such program funds would be in addition to the civilian pay and travel expenses.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	99.943	132.229	70.054	0.000	70.054
Current President's Budget	94.731	114.621	69.365	0.000	69.365
Total Adjustments	-5.212	-17.608	-0.689	0.000	-0.689
• Congressional General Reductions	0.000	-0.209			
• Congressional Directed Reductions	0.000	-17.399			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-2.505	0.000			
• SBIR/STTR Transfer	-2.707	0.000			
• Other Adjustments	0.000	0.000	-0.689	0.000	-0.689

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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Air Force Date: May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207142F / <i>F-35 Squadrons</i>
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**Change Summary Explanation**

FY20 adjustments include \$2.707M for Small Business Innovative Research (SBIR) and a reprogramming for M-Code  
FY21 Congressional reduction of 17.399M to DCA for unjustified growth.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0207142F / F-35 Squadrons				<b>Project (Number/Name)</b> 675346 / F-35			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
675346: F-35	0.000	11.850	7.678	4.890	0.000	4.890	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Total cost, including International partner contributions, USN, USMC, and USAF funding: FY 2019 \$1,062.771M; FY 2020 USAF only \$11.850M; FY 2021 USAF only \$7.678M. Other ongoing efforts previously included in this PE continue in PE 0604840F.

F-35 C2D2 Includes:

PE 0207142F BPAC 675346

PE 0604840F BPAC 675346

FY13: USN PE 0604800N Project Unit 2261

FY14: USN PE 0604800N Project Unit 9999

FY15-18: USN PE 0604810N Project Unit 2936

FY19: USN PE 0604840N Project Unit 2936

FY13: USMC PE 0604800M Project Unit 2262

FY14: USMC PE 0604800M Project Unit 9999

FY15-18: USMC PE 0604810M Project Unit 2935

FY19: USMC PE 0604840M Project Unit 3410

International Partner Contributions

**A. Mission Description and Budget Item Justification**

The Air Force SEEK EAGLE Office (AFSEO) is the AF organization chartered to perform the compatibility mission and manage the compatibility enterprise. AFSEO delivers warfighting capability through aircraft/store compatibility testing and evaluation and provides accurate combat weapon delivery and mission planning software. Beginning in FY2020, the USAF will support Flight Test Instrumentation (FTI) wiring and weapons integration tasks related to SEEK EAGLE requests. These tasks include, but are not limited to, envelope expansion, mixed loads testing, adding additional stores and F-35A specific risk reduction efforts and studies.

USAF F-35 User Information Data Exchange Service (UIDES) provides for Air Force development of a F-35 Autonomic Logistics Information System (ALIS) - UIDES that supports current and future Information Exchange Requirement (IER) data transfer capability from the F-35 ALIS into data reports and configurable tables to receive, store and integrate F-35 operations, maintenance, training and financial data within existing Air Force enterprise views and systems to support the growing fleet of AF F-35 aircraft, the ability to feed F-35 training and operations data to ALIS, and support modification of an enhanced data sharing capability (ability to consume increased volume and variety of ALIS IER data) to support operations planning, pilot and maintainer training, and depot data configuration and integration requirements.

Neither the SEEK EAGLE nor UIDES effort is a new start.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207142F / F-35 Squadrons	<b>Project (Number/Name)</b> 675346 / F-35
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>Title:</b> Autonomic Logistics Information System (ALIS) User Information Data Exchange Service (UIDES)</p> <p><b>Description:</b> Beginning in FY 2020, the USAF unique ALIS User Information Data Exchange Service (UIDES) requirement will be broken out separately from the remaining systems engineering. USAF F-35 UIDES provides for Air Force development of a F-35 Autonomic Logistics Information System (ALIS) - User IT Data Exchange Service (UIDES) that supports current and future Information Exchange Requirement (IER) data transfer capability from the F-35 ALIS into data reports and configurable tables to receive, store and integrate F-35 operations, maintenance, training and financial data within existing Air Force enterprise views and systems to support the growing fleet of AF F-35 aircraft, the ability to feed F-35 training and operations data to ALIS, and support modification of an enhanced data sharing capability (ability to consume increased volume and variety of ALIS IER data) to support operations planning, pilot and maintainer training, and depot data configuration and integration requirements. Activities also include studies and analysis to support both current program/project planning and execution and future program/project planning.</p> <p><b>FY 2021 Plans:</b> Continue to support/develop companion USAF F-35 UIDES projects to support the IER updates and related new functionality.</p> <p><b>FY 2022 Plans:</b> Continue to support/develop companion USAF F-35 UIDES projects to support the IER updates and related new functionality.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> N/A</p>	2.550	2.588	2.596
<p><b>Title:</b> Test and Evaluation</p> <p><b>Description:</b> Integrated Test activities in support of Block 4, to include Lockheed Martin and Pratt &amp; Whitney support at all test sites. Non-recurring engineering required to plan for the service life extension of existing DT aircraft and modification necessary to bring DT aircraft fleet to a more production representative and sustainable configuration, and to develop flight test instrumentation and release test software to meet Block 4 requirements. Additional upgrades required to support development and evaluation of improvements driven by changes in the threat environment and as identified in the Electronic Warfare Initial Capability Document (ICD), the Fifth Generation Fighter Modernization ICD, and the Block 4 Capability Development Document (CDD). Efforts include non-recurring engineering and procurement of a test article to evaluate service life of F-35B STOVL Aircraft.</p> <p>Beginning in FY2020, the USAF will support Flight Test Instrumentation (FTI) wiring and weapons integration tasks related to SEEK EAGLE requests. These tasks include, but are not limited to, envelope expansion, mixed loads testing, adding additional stores and F-35A specific risk reduction efforts and studies.</p> <p><b>FY 2021 Plans:</b></p>	9.300	5.090	2.294

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207142F / F-35 Squadrons	<b>Project (Number/Name)</b> 675346 / F-35

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
USAF only funding will continue supporting SEEK EAGLE requests by providing FTI wiring and supporting weapons integration tasks.			
<b>FY 2022 Plans:</b> USAF only funding will continue supporting SEEK EAGLE requests by providing FTI wiring and supporting weapons integration tasks initiated in FY21, in addition to emergent SEEK EAGLE tasks.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Decrease due to changes in SEEK EAGLE requirements.			
<b>Accomplishments/Planned Programs Subtotals</b>	11.850	7.678	4.890

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• RDTE 07 PE 0604840F: <i>F-35A Continuous Capability Development and Delivery</i>	624.973	695.869	985.404	-	985.404	-	-	-	-	-	-
• RDTE 07 PE 0207142F <i>6011: Dual Capable Aircraft (DCA), BPAC 676011</i>	66.127	88.737	44.816	-	44.816	-	-	-	-	-	-
• RDTE 07 PE 0604840N 2936: <i>F-35C Continuous Capability Development and Delivery (CV)</i>	354.960	413.875	284.709	-	284.709	-	-	-	-	-	-
• RDTE 07 PE 0604840M 3410: <i>F-35B Continuous Capability Development and Delivery (STOVL)</i>	391.165	379.549	323.597	-	323.597	-	-	-	-	-	-
• RDTE 07 International: <i>International Continuous Capability Development and Delivery</i>	281.887	339.139	224.501	-	224.501	-	-	-	-	-	-

**Remarks**  
This is a joint program with no executive service. Service Acquisition Executive (SAE) authority alternates between the Department of the Navy and the Department of the Air Force and currently resides with the Navy.

PE 0207142F common Block 4 requirements moved in FY20 to PE 0604840F to separate USAF unique requirements.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207142F / F-35 Squadrons	<b>Project (Number/Name)</b> 675346 / F-35
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
Block 4 Planning and System Engineering, Technology Refresh 3 (TR-3), Infrastructure and Support Costs, and Autonomic Logistic Information System (ALIS) Development continues in PE 0604840F beginning in FY20.											

**D. Acquisition Strategy**

The C2D2 acquisition strategy is to employ both Cost and Fixed Price Incentive contracts for the Block 4 engineering and development efforts. A new modernization contract structure will be established for all post SDD Block 4 efforts. In addition, a separate Basic Ordering Agreement or Indefinite Quantity/Indefinite Delivery contract is planned to provide a long term approach to upgrading and maintaining laboratories and test aircraft and supporting technology maturation for future C2D2 capabilities.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207142F / F-35 Squadrons	<b>Project (Number/Name)</b> 675346 / F-35
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<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
USAF SEEK EAGLE	Various	Various : Various	0.000	9.300	Mar 2020	5.090	Mar 2021	2.294	Mar 2022	-		2.294	-	-	-
USAF UIDES	MIPR	Various : Various	0.000	2.550	Feb 2020	2.588	Feb 2021	2.596	Feb 2022	-		2.596	-	-	-
<b>Subtotal</b>			0.000	11.850		7.678		4.890		-		4.890	-	-	N/A

**Remarks**  
 Cost Category Item Removed due to realignment to BPAC 675346, PE 0604840F or no longer funding in FYDP Support  
 NAWC Paxutent River  
 NAWC China Lake  
 IPT Development Support  
 Technical Development Support  
 JRE Development Support  
 ALIS DevOps Development  
 ALIS Next Development

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	0.000	11.850	7.678	4.890	-	4.890	-	-	N/A

**Remarks**  
 The Project information shown here reflects USN, USMC, USAF and International Partner funding total for each contract. By agreement, USN and USMC funding shares are approximately equal and when combined are equal to the USAF share. Partner funding share is based upon future aircraft procurement numbers updated annually in accordance with the Production, Sustainment, Continuous Capability Development and Delivery (C2D2) (formerly Follow-on Modernization (FoM)) Memorandum of Agreement.

Subtotals and totals may not add due to rounding.

FY 2020 reflects \$11.850M USAF only; remaining efforts continue in PEs 0604840F/M/N  
 FY 2021 reflects \$7.678M USAF only; remaining efforts continue in PEs 0604840F/M/N

F-35 C2D2 Includes:

PE 0207142F BPAC 675346 - ends FY19  
 USAF PE 0604840F BPAC 675346 - begins FY20  
 FY13: USN PE 0604800N Project Unit 2261  
 FY14: USN PE 0604800N Project Unit 9999  
 FY15-18: USN PE 0604810N Project Unit 2936  
 FY19: USN PE 0604840N Project Unit 2936



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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207142F / <i>F-35 Squadrons</i>	<b>Project (Number/Name)</b> 675346 / <i>F-35</i>
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	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
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FY13: USMC PE 0604800M Project Unit 2262 FY14: USMC PE 0604800M Project Unit 9999 FY15-18: USMC PE 0604810M Project Unit 2935 FY19: USMC PE 0604840M Project Unit 3410 International Partner Contributions									
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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207142F / <i>F-35 Squadrons</i>	<b>Project (Number/Name)</b> 675346 / <i>F-35</i>
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FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b><i>F-35 UIDES and SEEK EAGLE</i></b>	
Ongoing support activities	

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207142F / <i>F-35 Squadrons</i>	<b>Project (Number/Name)</b> 675346 / <i>F-35</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>F-35 UIDES and SEEK EAGLE</i></b>				
Ongoing support activities	1	2020	4	2026

**Note**  
Schedule for Block 4 efforts reflected in FY19 and continuing in PE 0604840F is depicted in R-4/R-4A exhibits for PE 0604840F

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0207142F / F-35 Squadrons				<b>Project (Number/Name)</b> 675349 / HPSI			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
675349: HPSI	0.000	16.754	18.415	19.659	0.000	19.659	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The F-35 Hybrid Product Support Integrator's (HPSI's) primary role is to integrate support across the supply chain, maintenance, sustainment engineering, logistics information technology and training disciplines. It will deliver enduring, global support for fielded F-35s while preparing for future force expansion. USAF only will fund additional PMA to transition to a final HPSI, which will support sustainment analysis with product support managers, focused on long-term strategic planning and transition to a final integrated support plan.

Funding for HPSI was previously programmed for in PE 27142F/BPAC 675346. This is not a new start.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022
<b>Title:</b> Management Services	16.754	18.415	19.659
<b>Description:</b> This funding provides for the transition of the F-35 HPSI from multiple locations to Wright-Patterson Air Force Base (AFB). The funding supports HPSI AFLCMC civilian pay, contractor support and travel.			
<b>FY 2021 Plans:</b> The HPSI organization will continue to transition to Wright-Patterson AFB. This funding provides for HPSI AFLCMC civilian pay, contractor support and travel.			
<b>FY 2022 Plans:</b> The HPSI organization will continue to transition to Wright-Patterson AFB. This funding provides for HPSI AFLCMC civilian pay, contractor support and travel.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase due to greater number of personnel at Wright-Patterson AFB as HPSI transition continues			
<b>Accomplishments/Planned Programs Subtotals</b>	16.754	18.415	19.659

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

HPSI is an effort supporting F-35, a joint program with no executive service. Service Acquisition Executive (SAE) authority alternates between the Department of the Navy and the Department of the Air force and currently resides with the Navy.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207142F / <i>F-35 Squadrons</i>	<b>Project (Number/Name)</b> 675349 / <i>HPSI</i>

**D. Acquisition Strategy**

The HPSI will deliver enduring, global support for fielded F-35s, integrating sustainment support across the supply chain, maintenance sustainment engineering, logistics, information technology and training.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207142F / F-35 Squadrons	<b>Project (Number/Name)</b> 675349 / HPSI
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<b>Management Services (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
AFLCMC Civilian Pay	Allot	AFLCMC : TBD	0.000	10.902	Oct 2019	12.001	Oct 2020	12.939	Oct 2021	-		12.939	-	-	-
Other Core Contractor Support	Various	Various : TBD	0.000	5.279	Oct 2019	5.783	Oct 2020	6.235	Oct 2021	-		6.235	-	-	-
Travel	Various	Various : TBD	0.000	0.573	Oct 2019	0.631	Oct 2020	0.485	Oct 2021	-		0.485	-	-	-
<b>Subtotal</b>			0.000	16.754		18.415		19.659		-		19.659	-	-	N/A
<b>Project Cost Totals</b>			0.000	16.754		18.415		19.659		-		19.659	-	-	N/A

**Remarks**  
 Prior years reflect no funding because funding for HPSI in prior years was programmed under PE 27142F/BPAC 675346.  
 Cost Category Item "Management Services" was removed due to no funding from FY19 and beyond.

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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207142F / F-35 Squadrons	<b>Project (Number/Name)</b> 675349 / HPSI
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FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>Hybrid Product Support Integrator</b>	
Management Support Activities	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207142F / <i>F-35 Squadrons</i>	<b>Project (Number/Name)</b> 675349 / <i>HPSI</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Hybrid Product Support Integrator</i>				
Management Support Activities	1	2020	4	2024



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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0207142F / F-35 Squadrons				Project (Number/Name) 676011 / JSF DUAL CAPABLE AIRCRAFT			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
676011: JSF DUAL CAPABLE AIRCRAFT	0.000	66.127	88.528	44.816	0.000	44.816	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

F-35 C2D2 Includes:

- USAF PE 0207142F BPAC 675346 - ends FY19
- USAF PE 0604840F BPAC 675346 - begins FY20
- FY13: USN PE 0604800N Project Unit 2261
- FY14: USN PE 0604800N Project Unit 9999
- FY15-18: USN PE 0604810N Project Unit 2936
- FY19: USN PE 0604840N Project Unit 2936
- FY13: USMC PE 0604800M Project Unit 2262
- FY14: USMC PE 0604800M Project Unit 9999
- FY15-18: USMC PE 0604810M Project Unit 2935
- FY19: USMC PE 0604840M Project Unit 3410
- International Partner Contributions

F-35 DCA Includes:

- USAF PE 0207142F BPAC 676011

**A. Mission Description and Budget Item Justification**

The F-35 Joint Strike Fighter (JSF) Operational Requirements Document (ORD) calls for the F-35A variant to have the capabilities and provisions for Dual Capable Aircraft (DCA) operations in the first post SDD block upgrade. DCA refers to the capability to carry and deliver conventional and non-conventional weapons. DCA operation for the F-35A is internal carriage of either one or two B61-12 weapons.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022
<b>Title:</b> Dual Capable Aircraft (DCA) (F-35 JSF)	66.127	88.528	44.816
<b>Description:</b> This effort provides for the assessment of Dual Capable Aircraft (DCA) weapon integration and certification impacts on the Joint Strike Fighter (JSF) aircraft. It identifies and mitigates potential technical and cost risks, as well as defines the integration and certification trade-space to field the DCA capability with the B61-12 weapon. This effort also supports follow-on risk			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207142F / F-35 Squadrons	<b>Project (Number/Name)</b> 676011 / JSF DUAL CAPABLE AIRCRAFT

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>reduction efforts that will ensure future integration alignment with the earliest feasible post-SDD block upgrade, and is expected to include full integration efforts pending Service decisions.</p> <p>Integrated Test activities in support of Block 4, to include Lockheed Martin and Pratt &amp; Whitney support at all test sites. Non-recurring engineering required to plan for the service life extension of existing DT aircraft and modification necessary to bring DT aircraft fleet to a more production representative and sustainable configuration.</p> <p><b>FY 2021 Plans:</b> Continue execution of the Phase 2 C2D2 contract: DCA Software Development, Separation Flight Testing, DCA Pratt Whitney Propulsion Mission Support for Flight Test Operations, Mission System Flight Testing, and Preliminary AMAC Testing. The NSAR, TNSA, MICD, and EICD documentation for the initial nuclear certification will be completed. Delta Nuclear Certification activities continue in order to certify Lot 14 F-35As, that contain additional DCA hardware and software, as well as Lot 15 F-35As which comprises of a major hardware upgrade, TR-3. Continue initial nuclear certification hardware and software development and testing by the prime contractor, Lockheed Martin. In addition, the capability is considered MFR (Military Flight Release) complete and ready for graduation certification events ramp up in FY2021. Initiate the DCA monitor and control on a production aircraft as well as monitor and control graduation event on production aircraft. Complete full-up guide weapons test drops using production aircraft, initiate interim operational plan data document, and complete the final aircraft nuclear safety analysis report.</p> <p><b>FY 2022 Plans:</b> Continue execution of the Phase 2 C2D2 contract: DCA Software Regression Testing, Flyable Test Assets Testing, DCA Propulsion Mission Support for Flight Test Operations, Mission System Flight Testing, and Preliminary Aircraft Monitor and Control (AMAC) Testing. The NSAR, TNSA, MICD, and EICD documentation for the initial TR-3 nuclear certification. Delta Nuclear Certification activities continue in order to certify Lot 14 F-35As, that contain additional DCA hardware and software, as well as Lot 15 F-35As which comprises of a major hardware upgrade, TR-3. Continue initial TR-3 nuclear certification hardware and software development and testing by the prime contractor, Lockheed Martin. In addition, the capability is considered MFR (Military Flight Release) complete and ready for graduation certification events ramp up in FY2022. Initiate AMAC on a production aircraft as well as AMAC graduation event on production aircraft. Initiate interim operational plan data documents, and complete the interim aircraft nuclear safety analysis report.</p> <p>This program element includes necessary civilian pay and travel expenses required to manage, execute, and deliver F-35 weapon system capability. The use of such program funds would be in addition to the civilian pay and travel expenses.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Decrease from FY21 to FY22 due to Lot 13 DCA Testing Completion.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	66.127	88.528	44.816

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207142F / F-35 Squadrons	<b>Project (Number/Name)</b> 676011 / JSF DUAL CAPABLE AIRCRAFT

**C. Other Program Funding Summary (\$ in Millions)**

Line Item	FY 2020	FY 2021	FY 2022	FY 2022	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	Cost To	
			Base	OCO	Total					Complete	Total Cost
• RDTE 07 PE 0207142F 5346: JSF Follow on Modernization, BPAC 675346	11.850	7.678	4.890	-	4.890	-	-	-	-	-	-
• RDTE 07 PE 0604840F: F-35A Continuous Capability Development and Delivery	624.973	695.869	985.404	-	985.404	-	-	-	-	-	-
• RDTE 07 PE 0604840N 2936: F-35C Continuous Capability Development and Delivery (CV)	354.960	413.875	284.709	-	284.709	-	-	-	-	-	-
• RDTE 07 PE 0604840M 3410: F-35B Continuous Capability Development and Delivery (STOVL)	391.165	379.549	323.597	-	323.597	-	-	-	-	-	-
• RDTE 07 International: International Continuous Capability Development and Delivery	258.004	359.626	285.969	-	285.969	-	-	-	-	-	-

**Remarks**

Service Acquisition Executive (SAE) authority alternates between the Department of the Navy and the Department of the Air Force and currently resides with the Navy.

The United Kingdom, Italy, Netherlands, Canada, Australia, Denmark and Norway are international participants in the SDD and C2D2 phases of JSF.

Department of Navy funding in PEs 0604810N/M in FY18 and prior continue in 0604840N/M as the budget moved from BA05 to BA07.

**D. Acquisition Strategy**

The DCA effort will leverage contracting vehicles for the overall Block 4 F-35 C2D2 effort. The C2D2 acquisition strategy is to employ both Cost and Fixed Price Incentive contracts for the Block 4 engineering and development efforts. A new modernization contract structure will be established for all post SDD Block 4 efforts. In addition, a separate Basic Ordering Agreement or Indefinite Quantity/Indefinite Delivery contract is planned to provide a long term approach to upgrading and maintaining laboratories and test aircraft and supporting technology maturation for future C2D2 capabilities.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207142F / F-35 Squadrons	<b>Project (Number/Name)</b> 676011 / JSF DUAL CAPABLE AIRCRAFT
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<b>Product Development (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Block 4 Phase 2.3 - DCA to DT Complete	SS/CPFF	Lockheed Martin : Ft. Worth, TX	0.000	28.988	Feb 2020	32.701	Feb 2021	5.000	Feb 2022	-		5.000	-	-	-
DCA Prime PW Propulsion	SS/CPFF	Pratt Whitney - East : Hartford, CT	0.000	-		-		2.000	Feb 2022	-		2.000	-	-	-
DCA TE Prime LM DT AC Viability	C/CPFF	Lockheed Martin : Ft. Worth, TX	0.000	-		-		2.000	Dec 2021	-		2.000	-	-	-
DCA TE Prime LM Developmental Foundation Contract	C/CPFF	Lockheed Martin : Ft. Worth, TX	0.000	9.524	Mar 2020	5.000	Dec 2020	0.000		-		0.000	-	-	-
Delta Certification	SS/CPFF	Lockheed Martin : Ft. Worth, TX	0.000	4.315	Mar 2020	14.000	Mar 2021	5.050	Mar 2022	-		5.050	-	-	-
SEI&T	SS/CPAF	Not specified : TBD	0.000	-		-		1.563	Oct 2021	-		1.563	-	-	-
<b>Subtotal</b>			0.000	42.827		51.701		15.613		-		15.613	-	-	N/A

**Remarks**  
 Added DCA Prime PW Propulsion, DCA TE Prime LM DT AC Viability, and DCA TE Prime LM Developmental Foundation Contract - Broke out from Delta Certification and Test and Evaluation Edwards & OGC to account for DCA's cost share of Block 4 Prime Contracts.  
  
 Added SEI&T - Broke out from Delta Certification to account for DCA's cost share of SEI&T Contract.  
  
 Cost Category Removed:  
 Product Development - No funding in FYDP  
 Block 4 Phase 1 - DCA Requirements Decomposition - Item completed and no funding in FYDP  
 Block 4 Phase 2.1- DCA to PDR - Completion in FY19, no funding in FYDP  
 Prior Year - no longer funded in FYDP - No funding in FYDP  
 Prior Year - Block 4 Realignment - No funding in FYDP

<b>Support (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
B61-12/F-35 Certification	Various	Various : TBD	0.000	17.040	Feb 2020	18.591	Feb 2021	15.988	Feb 2022	-		15.988	-	-	-
B61-12 AUR/Tail-kit Program Office	MIPR	AUR/TKA SPO : Kirtland/Eglin AFB, NM	0.000	4.900	Feb 2020	3.800	Mar 2021	2.000	Mar 2022	-		2.000	-	-	-

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207142F / F-35 Squadrons	<b>Project (Number/Name)</b> 676011 / JSF DUAL CAPABLE AIRCRAFT
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<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
AFNWC/AFSEC Support	MIPR	Various : TBD	0.000	1.360	Feb 2020	4.000	Feb 2021	3.801	Feb 2022	-		3.801	-	-	-
<b>Subtotal</b>			0.000	23.300		26.391		21.789		-		21.789	-	-	N/A

**Remarks**  
 Cost Category Removed:  
 Support - No funding in FYDP  
 Prior Year - no longer funded in FYDP - No funding in FYDP

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test and Evaluation Edwards & OGC	MIPR	Testing : Edwards, CA	0.000	-		4.000	Feb 2021	2.000	Dec 2021	-		2.000	-	-	-
Air Force SEEK EAGLE Office (Combat Weapons Delivery Software)	MIPR	Testing : Eglin, FL	0.000	-		1.000	Feb 2021	2.000	Feb 2022	-		2.000	-	-	-
<b>Subtotal</b>			0.000	-		5.000		4.000		-		4.000	-	-	N/A

**Remarks**  
 Test and Evaluation Edwards was renamed to Test and Evaluation Edwards & OGC to reflect OGC cost and not include DTV Prime Contract.  
  
 Cost Category Removed:  
 Prior Year - no longer funded in FYDP - No funding in FYDP

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Management Services	C/CPAF	Not specified. : TBD	0.000	0.000		5.436	Feb 2021	3.000	Mar 2022	-		3.000	-	-	-
AFLCMC Civilian Pay	Allot	Not specified. : TBD	0.000	0.000		0.000		0.314	Oct 2021	-		0.314	-	-	-
Travel	Various	Not specified. : TBD	0.000	0.000		0.000		0.100	Oct 2021	-		0.100	-	-	-
<b>Subtotal</b>			0.000	0.000		5.436		3.414		-		3.414	-	-	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207142F / F-35 Squadrons	<b>Project (Number/Name)</b> 676011 / JSF DUAL CAPABLE AIRCRAFT
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	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	0.000	66.127	88.528	44.816	-	44.816	-	-	N/A

**Remarks**

F-35 C2D2 Includes:  
 USAF PE 0207142F BPAC 675346 - ends FY19  
 USAF PE 0604840F BPAC 675346 - begins FY20  
 FY13: USN PE 0604800N Project Unit 2261  
 FY14: USN PE 0604800N Project Unit 9999  
 FY15-18: USN PE 0604810N Project Unit 2936  
 FY19: USN PE 0604840N Project Unit 2936  
 FY13: USMC PE 0604800M Project Unit 2262  
 FY14: USMC PE 0604800M Project Unit 9999  
 FY15-18: USMC PE 0604810M Project Unit 2935  
 FY19: USMC PE 0604840M Project Unit 3410  
 International Partner Contributions

F-35 DCA Includes:  
 USAF PE 0207142F BPAC 676011

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Air Force</b>		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207142F / F-35 Squadrons	<b>Project (Number/Name)</b> 676011 / JSF DUAL CAPABLE AIRCRAFT

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>676011: JSF Dual Capable Aircraft</b>	
Nuclear Certification - NNSA & B61-12 AUR/TKA SPO	
Phase 1 (Nuclear Certification Tasks) Requirements Decomposition	
Phase 2.1 (Nuclear Certification Tasks) DCA to Preliminary Design Review (PDR)	
Phase 2.3 (Nuclear Certification Tasks) DCA to DT Complete	
Delta Certification of Hardware/Software Upgrades/DT Prime Contractor Support/SEI&T	

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207142F / <i>F-35 Squadrons</i>	<b>Project (Number/Name)</b> 676011 / <i>JSF DUAL CAPABLE AIRCRAFT</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>676011: JSF Dual Capable Aircraft</b>				
Nuclear Certification - NNSA & B61-12 AUR/TKA SPO	1	2021	4	2026
Phase 1 (Nuclear Certification Tasks) Requirements Decomposition	1	2021	4	2021
Phase 2.1 (Nuclear Certification Tasks) DCA to Preliminary Design Review (PDR)	1	2021	4	2022
Phase 2.3 (Nuclear Certification Tasks) DCA to DT Complete	1	2021	4	2024
Delta Certification of Hardware/Software Upgrades/DT Prime Contractor Support/ SEI&T	1	2021	4	2026

**Note**

Schedule details reflect fiscal years



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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207146F / F-15EX
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	0.000	159.470	118.126	0.000	118.126	-	-	-	-	-	-
670131: <i>F-15EX</i>	-	0.000	159.470	118.126	0.000	118.126	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Note**  
 The total F-15EX RDT&E funding for FY 2020 in the amount of \$404.996M resides in Program 0207134F Project 670131 (\$53.400M) and Project 676020 (\$351.596M).

**A. Mission Description and Budget Item Justification**

A refresh of the F-15C/D fleet is critical to maintaining combat viability (lethality, survivability, and supportability) in support of the 2018 National Defense Strategy. Older F-15C/D aircraft will be replaced to maintain a viable mix of 4th and 5th-generation fighters for the next 20+ years. The F-15EX will be based on the 2-seat F-15QA (Qatar) configuration upgraded with USAF-only capabilities, including the Eagle Passive Active Warning and Survivability System (EPAWSS) and the Suite 9.1 Operational Flight Program (OFP) software. With two seats, it will be multirole-capable and operable by one or two aircrew. F-15EX logistics, maintenance, and training will heavily leverage the existing F-15 infrastructure. Many F-15C/Ds are beyond their service life and have serious structures risks, wire chafing issues, and obsolete parts. The average F-15C/D is 37 years old and approaching the end of its safe service life; the oldest F-15C was delivered in 1979. Readiness goals are unachievable due to continuous structural inspections, time-consuming repairs, and on-going modernization efforts.

Funds may be used to manufacture aircraft, support equipment, and initial spares to support test activities; integrate hardware and software subsystems; upgrade training systems and systems integration labs; develop training materials and technical manuals; pursue other non-recurring engineering activities to reduce integration and cybersecurity risks, ramp up the production line capacity, prepare for and conduct ground and flight testing, and pursue technology insertion opportunities; resolve Diminishing Manufacturing Sources and Material Shortages (DMSMS) and/or obsolescence issues; fulfill Federal Aviation Administration or other mandates necessary to ensure continued aircrew safety and mission effectiveness; and cover other related requirements to manufacture and sustain the test aircraft.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 no funding was expended for civilian pay expenses in this program element, and in FY21 \$4.913M is forecasted for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207146F / F-15EX
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	0.000	159.761	0.000	0.000	0.000
Current President's Budget	0.000	159.470	118.126	0.000	118.126
Total Adjustments	0.000	-0.291	118.126	0.000	118.126
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	-0.291	118.126	0.000	118.126

**Change Summary Explanation**

FY22 delta is in response to the Non-Advocate Cost Assessment (NACA), FY 2022 RDT&E funding was added to the program.

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
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<b>Title:</b> F-15EX	0.000	159.470	118.126
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**Description:** FY 2020 funding resides in Program 0207134F Project 670131 and Program 0207134F Project 676020. F-15EX will refresh the F-15C/D fleet with new aircraft based on the F-15QA Foreign Military Sales (FMS) configuration being sold to Qatar. The program will also incorporate USAF-only capabilities, including the Eagle Passive Active Warning and Survivability System (EPAWSS) and the Suite 9.1 Operational Flight Program (OFP) software.

***FY 2021 Plans:***

Continue OFP integration efforts, including merging F-15EX-unique software back into the common F-15 OFP. Continue upgrading training systems and systems integration labs; developing training materials and technical manuals; and completing other non-recurring engineering activities to reduce integration and cybersecurity risks, ramp up production line capacity, prepare for and conduct ground and flight testing, and pursue technology insertion opportunities.

***FY 2022 Plans:***

Continue OFP integration efforts, including merging F-15EX-unique software back into the common F-15 OFP. Continue upgrading training systems and systems integration labs; developing training materials and technical manuals; and completing other non-recurring engineering activities to reduce integration and cybersecurity risks, conduct ground and flight testing, and pursue technology insertion opportunities.

***FY 2021 to FY 2022 Increase/Decrease Statement:***

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207146F / <i>F-15EX</i>
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Decrease due to efforts tapering off as baseline capabilities are tested and verified.			
<b>Accomplishments/Planned Programs Subtotals</b>	0.000	159.470	118.126

<b>D. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• APAF 01 F015E0: <i>F-15EX</i>	621.100	-	-	-	-	-	-	-	-	-	-
• APAF 05 F015EX: <i>F-15EX</i>	-	1,367.147	1,334.822	-	1,334.822	-	-	-	-	-	-

**Remarks**

**E. Acquisition Strategy**

The F-15EX design will be based on the F-15QA (Qatar) configuration upgraded with USAF-only capabilities like the Eagle Passive Active Warning and Survivability System (EPAWSS) and the Suite 9.1 Operational Flight Program (OFP) software. Since most subsystems are projected to be mature when required for integration into the F-15EX, the acquisition strategy is deemed low risk. To rapidly field the F-15EX, the USAF plans to focus engineering activities on integrating existing systems and ramping up the production line capacity. Test activities will likewise be tailored to focus on integration of F-15QA, EPAWSS, and the Suite 9.1 OFP, taking appropriate credit for previous USAF and FMS testing. Finally, logistics, maintenance, and training activities will heavily leverage the existing F-15 infrastructure.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207146F / F-15EX	<b>Project (Number/Name)</b> 670131 / F-15EX
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
F-15EX	Various	Various : Various	-	-		146.470	Jul 2021	97.526	Mar 2022	-		97.526	-	-	-
<b>Subtotal</b>			-	-		146.470		97.526		-		97.526	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Government Flight Test	Various	Eglin: : Various	-	-		4.600	Jan 2021	12.000	Jan 2022	-		12.000	-	-	-
<b>Subtotal</b>			-	-		4.600		12.000		-		12.000	-	-	N/A

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
AFLCMC Civ Pay	Various	AFLCMC CIV PAY: : WPAFB & Robins AFBs	-	-		6.800	Oct 2020	7.000	Oct 2021	-		7.000	-	-	-
Program Management Administration	Various	Various: : Various	-	-		1.600	Oct 2020	1.600	Oct 2021	-		1.600	-	-	-
<b>Subtotal</b>			-	-		8.400		8.600		-		8.600	-	-	N/A

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	-	-	159.470	118.126	-	118.126	-	-	N/A

Remarks

**UNCLASSIFIED**

**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207146F / F-15EX	<b>Project (Number/Name)</b> 670131 / F-15EX
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FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>F-15EX</b>	
F-15EX NRE and Integration	[REDACTED]
F-15EX MTP	[REDACTED]
F-15EX IOT&E	[REDACTED]

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207146F / <i>F-15EX</i>	<b>Project (Number/Name)</b> 670131 / <i>F-15EX</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>F-15EX</i></b>				
F-15EX NRE and Integration	2	2021	4	2025
F-15EX MTP	2	2022	2	2022
F-15EX IOT&E	1	2022	3	2022

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207161F / <i>Tactical AIM Missiles</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	223.665	10.012	19.382	32.974	0.000	32.974	-	-	-	-	-	-
674132: <i>AIM-9 Product Improvement</i>	223.665	10.012	19.382	32.974	0.000	32.974	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Program MDAP/MAIS Code:** 442

**A. Mission Description and Budget Item Justification**

The AIM-9X Block II/II+ Sidewinder (AIM-9X Blk II/II+) continues the evolution of the AIM-9 series of missiles. This missile program delivers a launch and leave, air combat munition that uses passive Infrared (IR) energy to acquire and track enemy air targets and complements the radar guided Advanced Medium Range Air-to-Air Missile (AMRAAM). The missile provides first shot, first kill opportunities while conducting air combat maneuvering Within Visual Range (WVR) which is essential for aircrew survival. The AIM-9X provides these opportunities with unmatched offensive and defensive capabilities against threats WVR, even when IR countermeasures are employed. The AIM-9X also provides air superiority in the Beyond Visual Range (BVR) air-to-air battle. Anti-tamper features have been incorporated to protect improvements inherent in this design. The AIM-9X Block II missile is critical for projecting power and winning decisively against threats identified in Defense Planning Guidance and the Air Force Strategic Master Plan.

AIM-9X is a Post Milestone C, Acquisition Category IC (ACAT-IC) joint service program led by the Department of the Navy. The Block II program has completed independent operational testing and found to be operationally effective and operational/suitable. The program achieved Air Force Initial Operational Capability (IOC) in September 2016 and received Full Rate Production (FRP) decision in August 2015. The first Full Rate Production Lot contract was awarded in September 2015. This budget line will continue technical refresh of critical obsolete components, implement cost reduction initiatives, improve insensitive munitions performance, correct deficiencies, and increase capabilities through software enhancements, and conduct testing to ensure platform integration onto threshold US Air Force aircraft.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

The FY 2022 funding request was decreased by \$1.592 million to account for the availability of prior year execution balances

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207161F / <i>Tactical AIM Missiles</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	10.314	19.417	26.760	0.000	26.760
Current President's Budget	10.012	19.382	32.974	0.000	32.974
Total Adjustments	-0.302	-0.035	6.214	0.000	6.214
• Congressional General Reductions	0.000	-0.035			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.302	0.000			
• Other Adjustments	0.000	0.000	6.214	0.000	6.214

**Change Summary Explanation**

FY 2021 decrease of \$0.035 for Congressional undistributed mark

FY 2022 increase of \$8.300M for increased development activities; realigned from Missile Procurement, Air Force; decrease of \$1.592M to account for the availability of prior year execution balances; decrease of \$0.494 for inflation adjustment

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
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<b>Title:</b> AIM- 9X Product Development	9.162	17.664	31.574
<b>Description:</b> Continuation of Primary Hardware Development/Pre-Planned Product Improvement (Tech Refresh) efforts for the AIM-9X weapon system. This includes Systems Engineering & Program management, as well as support required to ensure AIM-9X missile integration with threshold US Air Force aircraft platforms. This also includes efforts to redesign missile components in order to resolve obsolescence to ensure missile producibility and increase reliability. It will incorporate anti-tamper and cyber security technology improvements, implement cost reduction initiatives, and comply with the Insensitive Munitions (IM) requirements. In addition, the program will evaluate and begin risk reduction efforts that will address hardware and software improvements to facilitate follow-on capability and mitigate obsolescence.			
<b>FY 2021 Plans:</b> Continue Engineering Manufacturing Development required to redesign, integrate, test and qualify components due to obsolescence and implement cost reduction initiatives to include execution of SIP III Inertial Measurement Unit and processor hardware. In addition, continue development of the version 10.4 software, as well continue to support v9.4 Block II software testing. Incorporate anti-tamper and cyber security technology improvements. Continue to develop missile hardware design			



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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207161F / <i>Tactical AIM Missiles</i>
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
improvements necessary to enhance IM performance. Continue evaluation and risk reduction efforts to address hardware and software improvements to facilitate follow-on capability and obsolescence mitigation.  <b>FY 2022 Plans:</b> Complete AIM-9X SIP III 10.4 software and phase II hardware (Inertial Measurement Unit/ dome/processor) Engineering Change Proposal. In addition, the AIM-9X SIP-IV contract will be awarded in FY22 to address hardware and technological obsolescence in several missile sub-systems in order to maintain required performance against increasingly challenging threat platforms. Software will be developed to facilitate the use of the updated hardware. In particular, FY22 SIP-IV RDT&E funding will focus on the development of an advanced sensor replacement and electronic unit upgrades to address hardware obsolesce and processing improvement for the missile guidance system.  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increased in FY22 due to the ramp up of SIP IV development efforts.			
<b>Title:</b> AIM-9X, Test and Evaluation  <b>Description:</b> Test and Evaluation (T&E) and associated governmental support required to ensure the AIM-9X missile integration with US Air Force aircraft platforms. Developmental and Operational testing of Operation Flight Software.  <b>FY 2021 Plans:</b> Complete Operational Testing (OT-D1) of Operational Flight Software v9.4 and field v9.4 Block II software. Begin Flight test Operational Flight Software v10.4.  <b>FY 2022 Plans:</b> Continue SIP-III hardware testing to include verification of the Phase II Hardware (Inertial Measurement Unit/dome/processor) as well as 10.4 Software. Start SIP IV effort testing of follow-on 9.5 and 10.5 software builds.  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreased in FY22 due to completion of Operational Flight Software v9.4 testing in FY21.	0.850	1.718	1.400
<b>Accomplishments/Planned Programs Subtotals</b>	10.012	19.382	32.974

<b>D. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2022</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To</b>	<b>Total Cost</b>
			<b>Base</b>	<b>OCO</b>	<b>Total</b>					<b>Complete</b>	
• MPAF 02 Line Item M09HAI: <i>Sidewinder (AIM-9X)</i>	155.289	164.769	107.587	-	107.587	-	-	-	-	-	-

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207161F / <i>Tactical AIM Missiles</i>
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**D. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• MPAF 04 Line Item 000999: <i>Replen Spares, USAF</i>	5.818	5.906	5.937	-	5.937	-	-	-	-	-	-
• MPAF 04 Line Item 000999 <i>(2)...: Inital Spares, USAF</i>	0.234	1.861	2.659	-	2.659	-	-	-	-	-	-
• RDTE 07 PE 0207161N: <i>Tactical AIM Missile</i>	19.136	5.859	23.956	-	23.956	-	-	-	-	-	-
• WPN Line Item 2209: <i>Sidewinder</i>	149.239	113,651.000	86.366	-	86.366	-	-	-	-	-	-

**Remarks**

**E. Acquisition Strategy**

Milestone C decision for LRIP was held June 24, 2011. The program received USN Initial Operational Capability (IOC) in March 2015 and Full Rate Production (FRP) Approval in August 2015. The Air Force achieved IOC in September 2016. In February 2019, the Acquisition Program Baseline for the Navy and USAF was revised to increase total missile procurements and extend missile procurements through 2035. The program awarded FRP-6 in March 2020.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207161F / <i>Tactical AIM Missiles</i>	<b>Project (Number/Name)</b> 674132 / <i>AIM-9 Product Improvement</i>
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Software/OFP Upgrade/Hdw Development	SS/CPFF	RMS : Tucson, AZ	165.855	5.064	May 2020	14.589	Oct 2020	26.336	Oct 2021	-		26.336	-	-	309.622
Flight Termination System	MIPR	NAWC WD : China Lake, CA	3.059	0.975	Feb 2020	0.000	Feb 2021	2.000	Feb 2022	-		2.000	-	-	4.767
Munitions Improvement Study (USG)	MIPR	NAWC WD : China Lake, CA	12.443	0.000	Apr 2020	0.000	Apr 2021	0.000	Apr 2022	-		0.000	-	-	-
Systems Engineering (USG)	MIPR	NAWC WD : China Lake, CA	4.119	1.985	Feb 2020	2.000	Feb 2021	2.000	Feb 2022	-		2.000	-	-	-
Aircraft Integration	SS/CPFF	Boeing : St. Louis, MO	0.888	0.150	May 2020	0.195	May 2021	0.195	May 2022	-		0.195	-	-	2.624
<b>Subtotal</b>			186.364	8.174		16.784		30.531		-		30.531	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
DT&E/OT&E	PO	Eglin AFB : Eglin, FL	27.761	0.862	Jan 2020	1.542	Jan 2021	1.400	Jan 2022	-		1.400	-	-	-
IT/OT Support F-15	SS/CPAF	RMS : Tuscon, AZ	0.513	0.128	May 2020	0.176	May 2021	0.150	May 2022	-		0.150	-	-	4.063
<b>Subtotal</b>			28.274	0.990		1.718		1.550		-		1.550	-	-	N/A

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PMA	Various	Eglin AFB : Eglin, FL	9.027	0.848	Jan 2020	0.880	Jan 2021	0.893	Jan 2022	-		0.893	-	-	7.285
<b>Subtotal</b>			9.027	0.848		0.880		0.893		-		0.893	-	-	N/A

			Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>			223.665	10.012	19.382	32.974	-	32.974	-	-	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207161F / <i>Tactical AIM Missiles</i>	<b>Project (Number/Name)</b> 674132 / <i>AIM-9 Product Improvement</i>
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	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
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Remarks

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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207161F / <i>Tactical AIM Missiles</i>	<b>Project (Number/Name)</b> 674132 / <i>AIM-9 Product Improvement</i>
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FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>AIM-9X Block II Tech Refresh (SIP III): Software</b>	
Phase II Hardware (IMU, Dome, Processor)	
Phase II Hardware Cut in: Engineering Change Proposal	
Software v9.4 Improvements: Software v9.4 Release	
Software v10.4 Rehost: Development Testing (DT-D2)	
Software v10.4 Rehost: Software v10.4 Release	
<b>AIM-9X Block II Tech Refresh (SIP IV)</b>	
Hardware and Software Obsolescence	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207161F / <i>Tactical AIM Missiles</i>	<b>Project (Number/Name)</b> 674132 / <i>AIM-9 Product Improvement</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>AIM-9X Block II Tech Refresh (SIP III): Software</b>				
Phase II Hardware (IMU, Dome, Processor)	1	2020	3	2022
Phase II Hardware Cut in: Engineering Change Proposal	3	2022	3	2022
Software v9.4 Improvements: Software v9.4 Release	3	2021	3	2021
Software v10.4 Rehost: Development Testing (DT-D2)	1	2020	1	2023
Software v10.4 Rehost: Software v10.4 Release	3	2023	3	2023
<b>AIM-9X Block II Tech Refresh (SIP IV)</b>				
Hardware and Software Obsolescence	1	2022	4	2026

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207163F / <i>Advanced Medium Range Air-to-Air Missile (AMRAAM)</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	655.966	53.681	51.705	51.288	0.000	51.288	-	-	-	-	-	-
673777: <i>AMRAAM</i>	655.966	53.681	51.705	51.288	0.000	51.288	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Program MDAP/MAIS Code:** 185

**A. Mission Description and Budget Item Justification**

The Air Force and Navy continue to develop improvements to the Advanced Medium Range Air-to-Air Missile (AMRAAM) to counter existing and emerging air vehicle threats operating at high or low altitude, and having advanced Electronic Attack (EA) capabilities. The development program also enables AMRAAM compatibility with advanced fighters, enhances AMRAAM capability and operational flexibility against current and projected threats, incorporates high payoff technology development, performs risk reduction activities, and investigates new variants and/or alternate missions that may use AMRAAM attributes. The latest AMRAAM variant, the AIM-120D, delivers improved performance via Global Positioning System (GPS)-aided navigation; two-way datalink capability for enhanced aircrew survivability and improved network compatibility; and incorporates new guidance software that improves kinematic performance and weapon effectiveness. Operational Testing (OT) was completed in Jul 14 and the Air Force and Navy authorized operational fielding in Jan 15. The Navy declared Initial Operational Capability (IOC) in Jan 15 and the Air Force declared IOC in Jul 15. The program continues to address aircraft integration efforts to maintain compatibility/performance of the missile with changes occurring on threshold AMRAAM platforms per the Capability Production Document (CPD). To keep the existing inventory as effective as possible and address findings from the field, the Air Force and Navy also develop, test, and field improvements that are implemented via software upgrades reprogrammed into fielded AMRAAMs, and/or hardware upgrades inserted into production units. AMRAAM is a joint Air Force/Navy, Acquisition Category IC (ACAT IC) program with Air Force as lead service.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver WEAPON SYSTEM capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

FY 2022 funding totals include \$51.288M requested for the Pacific Defense Initiative.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207163F / <i>Advanced Medium Range Air-to-Air Missile (AMRAAM)</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	55.384	51.799	54.993	0.000	54.993
Current President's Budget	53.681	51.705	51.288	0.000	51.288
Total Adjustments	-1.703	-0.094	-3.705	0.000	-3.705
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-0.094			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-1.703	0.000			
• Other Adjustments	0.000	0.000	-3.705	0.000	-3.705

**Change Summary Explanation**

FY2021 reduction of \$0.094M for Congressional Undistributed Mark

FY2022 reduction of \$4.196M for higher Air Force priorities; increase of \$0.491M for Inflation Adjustment

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> System Improvement Program (SIP)	28.587	24.244	26.193
<b>Description:</b> Continuation of System Improvement Program (SIP) / Risk Reduction (RR) efforts for the AMRAAM weapons system. These include systems engineering, program management, missile software and/or hardware upgrades to increase capability, survivability, lethality, as well as aircraft Operational Flight Program (OFP) updates on a recurring basis. AIM-120D SIP-3F will host SIP-3 software on AIM-120D3 hardware. SIP 4 will exploit new Form, Fit, Function (F3R) hardware to maximize missile performance. SIP 3 Tape 2 will address newly matured capabilities, emerging threats, and Operational Test (OT) deficiencies. AIM-120C3-C7 Counter Emergent Threat (CET) software will maintain inventory viability by addressing emerging electronic attack threats.			
<b>FY 2021 Plans:</b> Conduct SIP-3 Functional Configuration Audit (FCA) and Operational Test. Continue SIP-3F software development builds and complete SIP-4 RR to mature software for the AIM-120D3 configuration. Continue the AIM-120 Candidate Selection Program (CSP) to analyze warfighters' priority deficiencies and enhancements. Continue AIM-120C3-C7 software development to address emerging threats.			
<b>FY 2022 Plans:</b> Deliver the SIP-3 software upgrade to the field. Complete SIP-3F and Counter Emergent Threat (CET) FCAs and flight test requirements. Field CET tactical software. Continue AIM-120 CSP to analyze warfighter's priority deficiencies and			



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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0207163F / <i>Advanced Medium Range Air-to-Air Missile (AMRAAM)</i>		
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
enhancements. Begin SIP 4 development to exploit Form, Fit, Function Refresh (F3R) hardware to maximize missile performance. Begin SIP-3 Tape 2 development to address newly matured capabilities, emerging threats, and deficiencies. <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreased due to completion of SIP-4 RR.				
<b>Title:</b> Test and Evaluation <b>Description:</b> Provides support to flight test efforts; develops test resources and equipment necessary to complete test events; provides contractor field team support personnel and services. <b>FY 2021 Plans:</b> Continue to develop and procure test resources required to meet test requirements and provide support personnel to complete AIM-120 test events. <b>FY 2022 Plans:</b> Continue to develop and procure test resources required to meet test requirements and provide support personnel to complete AIM-120 test events. <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreased from FY21 to FY22 due to a decrease in FY22 test requirements for ongoing efforts.		21.124	22.602	20.148
<b>Title:</b> Aircraft Integration <b>Description:</b> Supports the integration of AIM-120 on multiple aircraft platforms as AIM-120 software/hardware is updated and as aircraft OFPs are updated. <b>FY 2021 Plans:</b> Continue integration and testing of AIM-120 on multiple aircraft platforms. <b>FY 2022 Plans:</b> Continue integration and testing of AIM-120 on multiple aircraft platforms. <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increased due to efforts to maintain compatibility and performance with changes on threshold platforms per the Capability Production Document (CPD).		3.970	4.859	4.947
<b>Accomplishments/Planned Programs Subtotals</b>		53.681	51.705	51.288

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207163F / <i>Advanced Medium Range Air-to-Air Missile (AMRAAM)</i>
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**D. Other Program Funding Summary (\$ in Millions)**

<b>Line Item</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• MPAF 02 Line Item MAMRA0: <i>Missile Procurement, Air Force</i>	311.730	313.223	214.002	-	214.002	-	-	-	-	-	-
• MPAF 04 Line Item 000999: <i>Initial Spares/Repair Parts</i>	0.529	2.091	3.003	-	3.003	-	-	-	-	-	-
• MPAF 04 Line Item 000999 <i>Replen: Replen Spares/Repair Parts</i>	0.854	0.868	873.000	-	873.000	-	-	-	-	-	-
• MPAF 02 Line Item 2206: <i>Weapons Procurement, Navy</i>	211.827	204.251	0.000	-	0.000	-	-	-	-	-	-
• RDTE 07 Line Item 0981: <i>RDTE, Navy</i>	33.289	40.253	32.722	-	32.722	-	-	-	-	-	-

**Remarks**

**E. Acquisition Strategy**

AMRAAM Acquisition Strategy Report (ASR) was updated on 16 May 2018.

System Improvement Program (SIP) development efforts continually mature capabilities through software and/or hardware upgrades to maximize missile performance to address current and emerging threats. These missile performance improvements are incrementally fielded ensuring inventory viability into the future. SIP development contracts are cost type contract efforts.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207163F / <i>Advanced Medium Range Air-to-Air Missile (AMRAAM)</i>	<b>Project (Number/Name)</b> 673777 / AMRAAM
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Electronic Protection Improvement Program (EPIP)	Various	Raytheon : Tucson, AZ	86.959	-		-		-		-		-	-	-	86.959
System Improvement Program (SIP)	Various	Raytheon : Tucson, AZ	207.645	26.466	Jun 2020	20.971	Jun 2021	23.548	Jun 2022	-		23.548	-	-	405.098
F-22 Aircraft Integration	MIPR	Wright-Patterson AFB : Dayton, OH	114.890	-		-		-		-		-	-	-	114.890
Aircraft Integration Support	SS/CPFF	Raytheon : Tucson, AZ	14.318	3.970	May 2020	4.859	May 2021	4.947	May 2022	-		4.947	-	-	73.378
<b>Subtotal</b>			423.812	30.436		25.830		28.495		-		28.495	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Government Test	Various	Various : Various	85.637	5.726	Jan 2020	7.837	Jan 2021	7.285	Jan 2022	-		7.285	-	-	35.169
Test Support	SS/CPFF	Raytheon : Various	129.508	15.398	Jan 2020	14.765	Jan 2021	12.863	Jan 2022	-		12.863	-	-	292.585
<b>Subtotal</b>			215.145	21.124		22.602		20.148		-		20.148	-	-	N/A

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management Administration	Various	Various : Various	17.009	2.121	Jan 2020	3.273	Jan 2021	2.645	Jan 2022	-		2.645	-	-	0.000
<b>Subtotal</b>			17.009	2.121		3.273		2.645		-		2.645	-	-	N/A

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>		655.966	53.681	51.705	51.288	-	-	51.288	N/A



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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date: May 2021**

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207163F / <i>Advanced Medium Range Air-to-Air Missile (AMRAAM)</i>	<b>Project (Number/Name)</b> 673777 / <i>AMRAAM</i>
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>AMRAAM Development Program</b>																												
AIM-120C CET Development																												
AIM-120C CET Test																												
AIM-120C CET FCA																												
AIM-120C CET IOC																												
AIM-120D SIP-2 EMD																												
AIM-120D SIP-2 IOC																												
AIM-120D SIP-3 EMD																												
AIM-120D SIP-3 Test																												
AIM-120D SIP-3 FCA																												
AIM-120D SIP-3 IOC																												
AIM-120D SIP-3 Tape 2 Development																												
AIM-120D SIP-3 Tape 2 Test																												
AIM-120D SIP-3 Tape 2 FCA																												
AIM-120D SIP-3 Tape 2 IOC																												
AIM-120D3 SIP-3F Development																												
AIM-120D3 SIP-3F Test																												
AIM-120D3 SIP-3F FCA																												
AIM-120D3 SIP-3F IOC																												
AIM-120D3 SIP-4 Risk Reduction																												
AIM-120D3 SIP-4 Development																												
AIM-120D3 SIP-4 Test																												
AIM-120D3 SIP-4 FCA																												
AIM-120D3 SIP-4 IOC																												

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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207163F / <i>Advanced Medium Range Air-to-Air Missile (AMRAAM)</i>	<b>Project (Number/Name)</b> 673777 / AMRAAM
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

AIM-120D3 SIP-5 Development																												
AIM-120D3 SIP-5 Test																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207163F / <i>Advanced Medium Range Air-to-Air Missile (AMRAAM)</i>	<b>Project (Number/Name)</b> 673777 / AMRAAM

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>AMRAAM Development Program</b>				
AIM-120C CET Development	1	2020	2	2022
AIM-120C CET Test	1	2022	2	2022
AIM-120C CET FCA	2	2022	2	2022
AIM-120C CET IOC	2	2022	2	2022
AIM-120D SIP-2 EMD	1	2020	2	2020
AIM-120D SIP-2 IOC	2	2020	2	2020
AIM-120D SIP-3 EMD	1	2020	2	2022
AIM-120D SIP-3 Test	1	2020	2	2022
AIM-120D SIP-3 FCA	3	2021	3	2021
AIM-120D SIP-3 IOC	2	2022	2	2022
AIM-120D SIP-3 Tape 2 Development	4	2022	1	2025
AIM-120D SIP-3 Tape 2 Test	4	2024	1	2025
AIM-120D SIP-3 Tape 2 FCA	1	2025	1	2025
AIM-120D SIP-3 Tape 2 IOC	1	2025	1	2025
AIM-120D3 SIP-3F Development	1	2020	3	2023
AIM-120D3 SIP-3F Test	4	2021	3	2023
AIM-120D3 SIP-3F FCA	2	2023	2	2023
AIM-120D3 SIP-3F IOC	3	2023	3	2023
AIM-120D3 SIP-4 Risk Reduction	1	2020	4	2021
AIM-120D3 SIP-4 Development	1	2022	3	2025
AIM-120D3 SIP-4 Test	2	2024	3	2025

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207163F / <i>Advanced Medium Range Air-to-Air Missile (AMRAAM)</i>	<b>Project (Number/Name)</b> 673777 / AMRAAM
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Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
AIM-120D3 SIP-4 FCA	1	2025	1	2025
AIM-120D3 SIP-4 IOC	3	2025	3	2025
AIM-120D3 SIP-5 Development	2	2024	4	2026
AIM-120D3 SIP-5 Test	4	2026	4	2026

**Note**

Actual Dates:

- AIM-120D SIP-2 EMD began 03 Jul 2015
- AIM-120D SIP-3 EMD began 05 Sep 2017
- AIM-120D3 SIP-5 Development ends 4QFY27
- AIM-120D3 SIP-5 Test ends 4QFY27



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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207227F I <i>Combat Rescue - Pararescue</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	0.281	0.668	0.852	0.000	0.852	-	-	-	-	-	-
675352: <i>Guardian Angel RDT&amp;E</i>	-	0.281	0.668	0.852	0.000	0.852	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

Guardian Angel (GA) is an Air Force non-aircraft weapon system within the overarching Special Warfare Modernization program. GA is a Family of Systems (FoS) based in both human and equipment capabilities formulated to execute Air Force Personnel Recovery (PR) across the full spectrum of military operations. Established by the Air Force Chief of Staff in 2003 and officially captured in AFPD 10-9, the GA FoS is employed by three distinct Air Force specialties: Pararescuemen (PJ), Combat Rescue Officer (CRO), and Survival, Evasion, Resistance, Escape (SERE). The GA FoS is comprised of nine critical mission areas: Precision Aerial Insertion, Information Management, Force Application, Visual Augmentation, Maritime Recovery, Ground Mobility, Technical Rescue, Medical, and SERE. GA focus is on maintaining legacy weapon system capability while modernizing/improving subsystems for better mission effectiveness.

Funds will be used to obtain significant improvements in operational capability and develop items within the GA FoS to include but not limited to: Sound Navigation and Ranging (SONAR), Maritime Recovery, Ground Mobility, Technical Recovery, Oxygen Systems, Medical Monitoring, Aerial Insertion, Information Management (including Preservation of the Force and Family (POTFF) Tracking System), and include GA requirements in the Battlefield Air Operations Kit. This may be conducted through industry technology demonstrations, prototypes and associated engineering support to posture the GA program for technology insertion. The Guardian Angel weapon system development activities also include studies, analysis, requirements development and developmental testing to support both current and future program planning and execution. Funding will deliver enhanced capability for the dismounted Guardian Angel soldier in terms of dramatic weight reduction and increased mission effectiveness across the conflict spectrum. This funding request will support potential DMS and obsolescence solutions, to include if optimal, life of type buys or bridge buys limited to the program of record quantity.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Guardian Angel weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0 was expended for civilian pay expenses in this program element and in FY21 \$0 is forecasted to expended for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207227F / <i>Combat Rescue - Pararescue</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	0.281	0.669	0.910	0.000	0.910
Current President's Budget	0.281	0.668	0.852	0.000	0.852
Total Adjustments	0.000	-0.001	-0.058	0.000	-0.058
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-0.001			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-0.058	0.000	-0.058

**Change Summary Explanation**

Description for 3600 spending: A bulk of the RDT&E money is pushed for modernization in both communication equipment as well as maritime/open ocean personnel recovery. This also includes development of an aerial insertion maritime data collection capability. Leaning forward on validated requirements also includes signature management in denied/degraded environments and one man/multi-man survival life rafts. Finally, our 3600 money is currently used to fund direct cite authority of 4x civilian position at the program office.

Description for 3080 spending: Procurement money for FY22 will continue to allocate resources to existing requirements within the 9 core mission areas of the Guardian Angel portfolio to include, but not limited to, advanced communication and situational awareness tools, ground mobility assets, maritime recovery assets, weapons modernization, parachutes and oxygen systems, technical rescue and recovery equipment, and visual augmentation upgrades.

FY21 reduction - undistributed reduction, excess to need

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Guardian Angel Family of Systems (FoS)	0.281	0.668	0.852
<b>Description:</b> Standardize, modernize and develop additional capability for the Guardian Angel (GA) weapon system used by Combat Rescue Officers and Pararescuemen. Development efforts provide enhanced and improved capabilities for execution of Air Force combat search and rescue and personnel recovery. This weapon system is utilized across the full spectrum of Personnel Recovery (PR) military operations to include patient treatment, extrication, surface/underwater search and recovery, airborne infil/exfil, and ground recovery operations.			
<b>FY 2021 Plans:</b>			
-Will continue to complete studies, strategic planning, and development activities for increased capability.			

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207227F / <i>Combat Rescue - Pararescue</i>	

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
-Will continue necessary software upgrades to Special Warfare Assault Kit (SWAK) information management system. -Will conduct oxygen system testing for parachutist oxygen system. -Will conduct development and system enhancements on existing and future systems through incorporating test feedback and user inputs into subsequent iterations for better capability and mission success. -Will work with AFRL (711 HPW) to determine if additional funding is required to mature the Preservation of the Force and Family (POTFF) Tracking System. -Will meet with AFRL periodically to monitor ongoing RDT&E efforts and determine the best use of such funds.  <b>FY 2022 Plans:</b> -Will continue to complete studies, strategic planning, and development activities for increased capability. -Will continue necessary software upgrades to Special Warfare Assault Kit (SWAK) information management system. -Will conduct oxygen system testing for parachutist oxygen system. -Will conduct development and system enhancements on existing and future systems through incorporating test feedback and user inputs into subsequent iterations for better capability and mission success. -Will work with AFRL (711 HPW) to determine if additional funding is required to mature the Preservation of the Force and Family (POTFF) Tracking System. -Will meet with AFRL periodically to monitor ongoing RDT&E efforts and determine the best use of such funds.  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increased due to family of systems contract awards and necessary civilian pay expenses.			
<b>Accomplishments/Planned Programs Subtotals</b>	0.281	0.668	0.852

<b>D. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• OPAF 04 Line Item 842990: <i>Items Less than \$5M (Safety)</i>	22.295	22.695	23.169	-	23.169	-	-	-	-	-	-
• OPAF 02 Line Item 823230: <i>Security and Tactical Vehicles</i>	0.131	0.205	0.281	-	0.281	-	-	-	-	-	-
• WPN test: test	-	-	-	-	-	-	-	-	-	-	-

**Remarks**

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207227F / <i>Combat Rescue - Pararescue</i>
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**E. Acquisition Strategy**

The Guardian Angel (GA) program will address warfighter immediate needs to standardize, modernize, and develop additional capability for the weapon system used by Combat Rescue Officers and Pararescuemen. The program will also address future requirements for the weapon system that will encompass the needs of all three GA career fields.

The GA program is an incremental evolutionary acquisition effort in which requirements are fulfilled through further sub-system development and integration. These are being identified through updates to the Core Function Support Plan and GA Concept of Employment by HQ Air Combat Command. The program has been divided into phases to more rapidly meet the user's immediate need to standardize and modernize the weapon system.

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2022 Air Force</b>													<b>Date: May 2021</b>		
<b>Appropriation/Budget Activity</b> 3600 / 7						<b>R-1 Program Element (Number/Name)</b> PE 0207227F / <i>Combat Rescue - Pararescue</i>				<b>Project (Number/Name)</b> 675352 / <i>Guardian Angel RDT&amp;E</i>					
<b>Product Development (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Product Development	C/CPAF	Not specified. : TBD	-	-		0.000		0.000		-		0.000	-	-	-
GA Family Of Systems	Various	Various : Various	-	0.181	Apr 2020	0.618	Apr 2021	0.802	Apr 2022	-		0.802	-	-	-
Human Performance Organization Support (POTFF)	Various	Various : Various	-	0.100	Feb 2020	0.050	Feb 2021	0.050	Apr 2022	-		0.050	-	-	-
<b>Subtotal</b>			-	0.281		0.668		0.852		-		0.852	-	-	N/A
			<b>Prior Years</b>	<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>			-	0.281		0.668		0.852		-		0.852	-	-	N/A
<b>Remarks</b>															

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Air Force</b>		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207227F / <i>Combat Rescue - Pararescue</i>	<b>Project (Number/Name)</b> 675352 / <i>Guardian Angel RDT&amp;E</i>

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>Events By Sub Project</b>																												
BAO Kit (G) Software																												
Test Support																												
GA Equipment Upgrades																												
Human Performance Organization Support (POTFF)																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207227F / <i>Combat Rescue - Pararescue</i>	<b>Project (Number/Name)</b> 675352 / <i>Guardian Angel RDT&amp;E</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>Events By Sub Project</b>				
BAO Kit (G) Software	1	2020	4	2026
Test Support	1	2020	2	2026
GA Equipment Upgrades	2	2020	2	2026
Human Performance Organization Support (POTFF)	2	2020	1	2026

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207247F / AF TENCAP
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	22.115	18.820	23.685	0.000	23.685	-	-	-	-	-	-
670001: <i>Air Force TENCAP</i>	-	22.115	18.820	23.685	0.000	23.685	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

Air Force Tactical Exploitation of National Capabilities (TENCAP) increases warfighter effectiveness through the exploitation of national capabilities and promotes cross-domain integration of these capabilities into military operations/training and intelligence, surveillance and reconnaissance (ISR) activities.

AF TENCAP exploits existing air, space, cyber, national and global ISR, and Non-Traditional ISR (NTISR) for operational and tactical applications by rapidly prototyping and providing capability demonstrations. Projects are designed to transition to warfighters or national intelligence agencies for operational use, and to appropriate acquisition Programs of Record for sustainment and further development. AF TENCAP projects influence the design and operation of current and future air, space, cyber, national and global ISR, and NTISR systems while providing situational awareness to warfighters, national intelligence agency organizations, and units. AF TENCAP projects will begin an evolution to demonstrate prototype capabilities to accelerate Joint All-Domain Command and Control prototyping efforts into a single Common Operational Picture.

The program consists of multiple small projects supporting the Air Force Warfighting Integration Capability. Projects are executed to provide continued support to Special Operations Forces and the warfighter, with impacts at the national, operational, and tactical levels. Additionally, BY funding totals include 3M requested for Direct War costs.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver AF TENCAP system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0.000M was expended for civilian pay expenses in this program element, and in FY21 \$0.000M is forecasted for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207247F / AF TENCAP
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	21.365	21.644	22.100	0.000	22.100
Current President's Budget	22.115	18.820	23.685	0.000	23.685
Total Adjustments	0.750	-2.824	1.585	0.000	1.585
• Congressional General Reductions	0.000	-0.039			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.750	-2.785	1.585	0.000	1.585

**Change Summary Explanation**

FY20: Talon ARCHER 750K Below Threshold Request (BTR). BTR to support the 12 Talon ARCHER sites for NORAD/NORTHCOM Battlespace Awareness.

FY21: 0.039M Congressional reduction from equal distribution cut across all AF RDT&E programs. The correct amount for FY21 is 21.605M. There was an error in the XML database when data transferred from PRCP to IDECS incorrectly putting the FY21 amount at 18.820. The TENCAP PE has already been distributed the 21.605M based on the approved FY21 PB.

FY22: The FY2022 funding request was reduced by 1.415M to account for the availability of prior year execution balances. Additionally, BY funding totals include 3M requested for Direct War costs. This makes for a total addition of 1.585M.

**C. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<b>Title:</b> Exploitation Applications	17.023	11.356	12.185	0.000	12.185
<b>Description:</b> Exploiting existing air, space, cyber, national and global ISR, and Non-Traditional ISR (NTISR) for operational and tactical applications by rapidly prototyping and demonstrating capabilities. National capabilities are exploited to deliver rapid, cost-dominant and innovative warfighting solutions. Project activities (Talons) support Intelligence Surveillance and Reconnaissance requirements, the application of combat effects; Battlespace Awareness and Command and Control; and support to Special Operations Forces, Personnel Recovery and Close Air Support. Activities also influence the design and operation of future space, cyber, national and global ISR, and NTISR systems for tactical users.					
<b>FY 2021 Plans:</b>					

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207247F / AF TENCAP
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**C. Accomplishments/Planned Programs (\$ in Millions)**

The correct amount for FY21 is \$21.605M. There was an error in the XML database when data transferred from PRCP to IDECS incorrectly putting the FY21 amount at \$18.820. The TENCAP PE has already been distributed the \$21.605M based on the approved FY21 PB.

- Rapidly prototype projects and focus warfighter support and resource allocation based on AF TENCAP mission/investment areas
- Execute projects which provide continued support to Special Operations Forces and the warfighter, with impacts at the national, operational, and tactical levels
- Focus effort to increase Air Domain Awareness and Command and Control to Air Force and Joint Warfighters

**FY 2022 Base Plans:**

- Will continue to rapidly prototype projects and focus warfighter support and resource allocation based on AF TENCAP mission/investment areas
- Will continue focused efforts to increase Air Domain Awareness and Command and Control; support to Special Operations Forces; and support to ISR and Combat Applications to meet Air Force and Joint Warfighter requirements.

**FY 2022 OCO Plans:**

- None.

**FY 2021 to FY 2022 Increase/Decrease Statement:**

- Funding increase reflects additional funding profile from Direct War costs and additional Air Force TENCAP priorities.

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p><b>Title:</b> Talon CRESTONE</p> <p><b>Description:</b> TALON CRESTONE provides C-UAS capability in support of CENTCOM JUONS 558 &amp; 576. Capability will be employed from CENTCOM airborne platforms and payloads will be controlled via a remote central server. This effort leverages existing National &amp; Tactical technology and networks focused on the highest priority threats in CENTCOM. Initial fielding by Fall 2021.</p> <p><b>FY 2021 Plans:</b></p>	0.000	1.800	2.000	0.000	2.000

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207247F / AF TENCAP
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**C. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Talon CRESTONE will complete development in FY21. Integration and test activities will continue as well as transition activities to the program of record. Procurement of additional payloads will supplement critical development and integration.  <b>FY 2022 Base Plans:</b> Talon CRESTONE will begin transition activities to support handoff of the C-UAS capability to the program of record in support of CENTCOM JUONS 558 & 576. Funding will bridge transition to PoR, procure additional payloads and support critical integration and test within CENTCOM theater of operations.  <b>FY 2022 OCO Plans:</b> N/A.  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> - Funding increase reflects funding to support transition of capability from AF TENCAP to Program of Record. - Funding will bridge transition to Program of Record, procure additional payloads for CENTCOM theater, and enable critical continued integration and test.					
<b>Title:</b> Talon POWDERHORN  <b>Description:</b> - TALON POWDERHORN (previously Talon OMNIA) is a project to incorporate multi-domain Maritime and Air blue force data into the THRESHER common operational picture. TENCAP will develop architectures for blue force location and status data to inform decision makers on the AF JADC2 Awareness and Battle Management operational and tactical pictures. Talon POWDERHORN, will continue to develop methodologies and architectures to ingest blue force location and status data to provide decision makers blue force courses of action during force employment. Includes integration into THRESHER Program of Record (All Domain Awareness tool).  <b>FY 2021 Plans:</b> - Focusing previous Talon POWDERHORN efforts into two main areas:  - Accelerating existing multi-domain ingestion with the threshold to show THRESHER Maritime/ THRESHER Air in a single common operational picture	3.600	1.964	4.500	0.000	4.500

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207247F / AF TENCAP
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>- Developing methodologies and architectures to ingest blue force location and status data to provide decision makers blue force courses of action during force employment through Talon POWDERHORN.</p> <p><b>FY 2022 Base Plans:</b> - Talon POWDERHORN will continue to accelerate integration of air and maritime blue force data into a single interface and demonstrate a prototype of Blue Force Air and Maritime Domain Awareness capabilities.</p> <p>- Will continue to develop methodologies and architectures to ingest blue force location and status data to provide decision makers blue force courses of action during force employment.</p> <p><b>FY 2022 OCO Plans:</b> N/A.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> - Funding increase reflects additional project development and integration tasks with THRESHER Increment 6 deliverables.</p>					
<p><b>Title:</b> Talon 6A</p> <p><b>Description:</b> Talon 6A is a technology prototype to design, build, demonstrate a long-range passive ionospheric modeling research system to examine wide-area operational surveillance and assess airborne platform survivability. Effort will leverage National and Allied technologies.</p> <p><b>FY 2021 Plans:</b> - Continue rapid prototype development of ionospheric system to examine wide-area operational surveillance and assess airborne platform survivability in partnership with National and Allied partners.</p> <p><b>FY 2022 Base Plans:</b> - Will continue rapid prototype development of ionospheric system to examine wide-area operational surveillance and assess airborne platform survivability in partnership with National and Allied partners.</p> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> - Funding increase reflects additional development work required to prepare sites at deployed locations.</p>	0.516	2.000	3.000	0.000	3.000
<p><b>Title:</b> Talon PHOENIX</p>	0.976	1.700	2.000	0.000	2.000

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207247F / AF TENCAP
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p><b>Description:</b> Talon PHOENIX is an effort to develop distributed SAP mission planning for 5th Generation and beyond.</p> <p><b>FY 2021 Plans:</b> - Through partnership with DARPA, Talon PHOENIX will develop the distributed SAP mission planning for 5th Generation and beyond.</p> <p>- Develop enabler for kill-chains</p> <p><b>FY 2022 Base Plans:</b> - Will begin prototype testing capability</p> <p><b>FY 2022 OCO Plans:</b> N/A.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> - Funding increase reflects testing and simulation of Talon PHOENIX</p>					
<b>Accomplishments/Planned Programs Subtotals</b>	22.115	18.820	23.685	0.000	23.685

**D. Other Program Funding Summary (\$ in Millions)**  
N/A

**Remarks**  
N/A

**E. Acquisition Strategy**

Projects are selected based upon needs identified by the program's customers - DOD Departments, Combatant Commands, Components, MAJCOMs, and/or National Intelligence Agencies. Many projects are executed via existing contracts maintained by other agencies; others are executed via AF TENCAP contracts established with vendors responding to annual Broad Agency Announcements. The U.S. Government organization sponsoring a project is responsible for assuming acquisition, deployment, logistics, sustainment and budgetary responsibilities for the developed capability after it has been successfully demonstrated by AF TENCAP.

AF TENCAP projects typically use an incremental acquisition strategy. AF TENCAP utilizes a disciplined systems engineering approach that allows program teams to solve problems through a series of segments. Each increment has to be successful to pursue the following segment which mitigates cost and schedule risk.

Contracts funded in this program element will be awarded using competitive procedures to the maximum extent possible.



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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207247F / AF TENCAP	<b>Project (Number/Name)</b> 670001 / Air Force TENCAP
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FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>AF TENCAP Projects</b>																																
FY 2020 Exploitation Applications Developed, Evaluated, and Released																																
FY 2021 Exploitation Applications Developed, Evaluated, and Released																																
FY 2022 Exploitation Applications Developed, Evaluated, and Released																																
Talon CRESTONE																																
Talon POWEDERHON																																
Talon 6A																																
Talon PHOENIX																																



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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207247F / AF TENCAP	<b>Project (Number/Name)</b> 670001 / Air Force TENCAP
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>AF TENCAP Projects</b>				
FY 2020 Exploitation Applications Developed, Evaluated, and Released	1	2020	3	2021
FY 2021 Exploitation Applications Developed, Evaluated, and Released	1	2021	3	2022
FY 2022 Exploitation Applications Developed, Evaluated, and Released	1	2022	4	2022
Talon CRESTONE	1	2020	4	2022
Talon POWEDERHON	1	2020	4	2022
Talon 6A	1	2020	4	2022
Talon PHOENIX	1	2020	4	2022

**Note**

Most project selection activities occur approximately per the timelines shown, but some projects are initiated on a rolling basis throughout each year in response to time-sensitive operational requirements.

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207249F / <i>Precision Attack Systems Procurement</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	10.395	9.244	12.083	0.000	12.083	-	-	-	-	-	-
675347: <i>Advanced Targeting Pod</i>	-	10.395	9.244	12.083	0.000	12.083	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

Advanced Targeting Pods (ATPs) provide long-range target acquisition and expanded weapon delivery envelopes for greater aircraft survivability. ATPs feature an infrared (IR) sensor, charged coupled device television (CCD-TV), laser designator, eye-safe laser, laser spot tracker, infrared marker, and real-time video data link for connectivity with ground forces. As non-developmental items, the majority of improvements to ATPs are the result of investments made by industry Internal Research and Development (IRAD). In addition to operational flight program (OFP) development, this funding provides for the development and integration of capabilities which are either above the capabilities of the industrial base or that require accelerated development timelines in order to meet operational requirements. It also includes program management support, technical analysis, studies and assessments necessary to support the development and integration of future capabilities. Data-linking is one such area where there is an identified gap between industrial capabilities and operational requirements. Additional development efforts will be structured to support the documented ATP requirements as well as urgent operational needs (UONs) as they become known.

This program element may include necessary emergent or unanticipated civilian pay expenses required to manage, execute, and deliver precision attack for emergent or unanticipated weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605831F.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	10.696	9.261	12.264	0.000	12.264
Current President's Budget	10.395	9.244	12.083	0.000	12.083
Total Adjustments	-0.301	-0.017	-0.181	0.000	-0.181
• Congressional General Reductions	0.000	-0.017			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.301	0.000			
• Other Adjustments	0.000	0.000	-0.181	0.000	-0.181

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207249F / <i>Precision Attack Systems Procurement</i>
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**Change Summary Explanation**  
 No Significant Changes

**C. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022
<b>Title:</b> Advanced Targeting Pod - Sensor Enhancement (ATP-SE) Requirements <b>Description:</b> ATP-SE technology improvements, requirements definition (studies, analysis and assessments).  <b>FY 2021 Plans:</b> Accomplish ATP-SE Operational Flight Program (OFP) requirements, and further technology improvements, requirements definition, studies, analysis and assessments.  <b>FY 2022 Plans:</b> Accomplish ATP-SE Operational Flight Program (OFP) requirements, and further technology improvements, requirements definition, studies, analysis and assessments.  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increased in FY 2022 due to planned activities for developing operational flight programs (OFP) for LITENING and Sniper pods and the development and integration of capabilities to meet operational requirements.	10.395	9.244	12.083
<b>Accomplishments/Planned Programs Subtotals</b>	10.395	9.244	12.083

**D. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 05 Line Item 057: <i>Other Aircraft, Precision Attack Systems Modifications</i>	43.482	44.367	14.818	-	14.818	-	-	-	-	-	-
• APAF 06 Line Item 000999: <i>Initial Spares/Repair Parts</i>	3.367	3.423	3.425	-	3.425	-	-	-	-	-	-

**Remarks**

**E. Acquisition Strategy**

Current OFP development contract utilizes a firm-fixed price contract.



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Air Force</b>			<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207249F / Precision Attack Systems Procurement	<b>Project (Number/Name)</b> 675347 / Advanced Targeting Pod	

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>ATP-SE</b>																												
FY20 OFP Integration																												
FY21 OFP Integration																												
FY22 OFP Integration																												
FY23 OFP Integration																												
FY24 OFP Integration																												
FY25 OFP Integration																												
FY26 OFP Integration																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207249F / <i>Precision Attack Systems Procurement</i>	<b>Project (Number/Name)</b> 675347 / <i>Advanced Targeting Pod</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>ATP-SE</b>				
FY20 OFP Integration	2	2020	2	2021
FY21 OFP Integration	2	2021	2	2022
FY22 OFP Integration	2	2022	2	2023
FY23 OFP Integration	2	2023	2	2024
FY24 OFP Integration	2	2024	2	2025
FY25 OFP Integration	2	2025	2	2026
FY26 OFP Integration	2	2026	4	2026

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207253F / <i>Compass Call</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	30.687	15.825	91.266	0.000	91.266	-	-	-	-	-	-
674804: <i>Compass Call</i>	-	30.687	15.825	91.266	0.000	91.266	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

COMPASS CALL is the Air Force's wide-area, standoff, Airborne Electronic Attack (AEA) Command and Control Warfare/Information Operations (C2W/IO) weapon system. The employment of this weapon system interrupts adversary's use of the electronic battlespace and is a key active component in the information battlespace and prosecution of Overseas Contingency Operations (OCO). Compass Call's sophisticated electronic attack system is capable of surgical denial and/or disruption of adversary Radio Frequency (RF) communications, radar, and sensor systems.

The COMPASS CALL system was fielded in 1983 and employs an incremental development and fielding strategy that puts capability into the warfighter's hands as soon as practical and ensures each iteration of the weapon system is effective against the highest priority threats such as military and commercial communications, command and control operations, and new/emerging sensors. Due to the rapid advances in electronic attack techniques and technology, Compass Call was designed to be adaptable and must continuously modernize and evolve to keep pace with adversary tactics and emerging technologies. Sustaining that process requires a steady stream of system development funds. Development funding is required to perform trade studies, accomplish system upgrades and associated test activities, and develop and test Quick Reaction Capabilities (QRCs). The EC-130H Baseline 2 (BL2) configuration and the EC-130H mid-Baseline 2 (MBL2) enhancements are the latest in a line of fielded mission system upgrades to the EC-130H. The BL2 configuration and MBL2 enhancements currently fielded have advanced Compass Call's electronic attack capabilities significantly over the two previously fielded baselines.

On 23 March 2016, a Doctrine, Organization, Training, materiel, Leadership & Education, Personnel, Facilities (DOTmLPE) Change Recommendation (DCR) was approved. This requirement drives the re- hosting of Compass Call PME from the EC-130H to a modern, more cost-effective, survivable and operationally suitable commercial derivative aircraft which meets the range, speed, endurance and operating altitude needs of the combatant commands in an Anti-Access/Area Denial (A2AD) environment. As a result, in FY2017, the Compass Call re-host program was initiated to begin the transition to the EC-37B platform. The re-hosted Compass Call platform is based on a commercially-available modified G550 aircraft that already holds Federal Aviation Administration (FAA) Supplemental Type Certificates (STC) for airworthiness. The platform will undergo modifications to host Compass Call's PME and antenna arrays and receive additional STCs and Military Type Certificates (MTC). The EC-37B aircraft utilize PME harvested from the MBL2 EC-130H aircraft and upgraded to the latest Baseline. The EC-37B program is highly concurrent with developmental and procurement activities occurring in parallel.

Transitioning to the re-host effort, the program of record has procured six (6) new commercial derivative aircraft to date. The first five (5) EC-37B aircraft procured in FY2017 - FY2020 will be configured with Baseline 3 (BL3) PME. These aircraft will receive PME from legacy donor EC-130H aircraft, as well as new and updated PME. The sixth EC-37B aircraft procured in FY2021 will be the first Baseline 4 (BL4) configured aircraft.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207253F / <i>Compass Call</i>	
<p>In FY2022, the Compass Call program has deferred the planned procurement of the seventh EC-37B aircraft in FY2022 and associated installations and PME kit buys. The funding associated has been realigned within the program and is described below.</p> <p>The decision to defer procurement of the seventh EC-37B out of FY2022 was critical in order to maintain an aggressive BL4 development and fielding schedule as well as address deferred requirements that cannot be deferred further. These requirements include BL4 development activities, procurement of BL3 and BL4 support equipment for the PME and modified aircraft, procurement of the BL4 CCMCS, execution of change orders, modification of the sixth EC-37B aircraft to a BL4 configuration, and procurement of non-developmental hardware for BL4 integration activities.</p> <p>EC-37B BL3 updates existing, fielded MBL2 capabilities with the exception of the low band capability while significantly increasing operating altitude and standoff distances through re-host onto a new airframe. EC-37B BL4 adds incremental low-band capability, transitions the software baseline to an agile software framework, implements Open Mission Systems architecture to enable rapid integration of new capabilities offering a multiplicative increase in target capacity and addresses Diminishing Manufacturing Sources (DMS), along with other upgrades discussed in subsequent paragraphs. The realignment of EC-37B BL4 scope to include an incremental upgrade of low band via extension of an existing band was the result of cost constraints and prioritization from the user community. The Air Force determined that based on emerging threat priorities the delivery of a flexible and extensible open mission system architecture capable of rapidly integrating new capabilities delivered more capability to the warfighter than extension of the lower operational frequency range of the EC-37B alone. The open architecture implementation on Compass Call is referred to as SWORD-A (System-Wide Open Reconfigurable Dynamic Architecture).</p> <p>FY2022 RDT&amp;E efforts will concentrate on BL4 development and test activities while performing limited work on BL5 initiatives for PME upgrades and integration. Activities encompassed within PME upgrade may include, but not limited to, aircraft system integration, assembly, test and checkout; mission system upgrades, external communications upgrades, software development, systems engineering, test and evaluation, flight test, training systems, training events, support equipment, and program management administration (PMA) costs.</p> <p>Specific mission system developmental activities of interest include studies and analyses for future capabilities; maturation of higher Technology Readiness Level (TRL) technologies for future insertion; QRC application development for integration onto the Compass Call Software Defined Radio (SDR) capability; low band developmental test; power expansion; transmit and receive development; Size, Weight, Power and Cooling (SWAP-C) reductions; implementation of Obsolescence and DMS/Vanishing Vendor Items (VVI) that drive developmental redesign of impacted hardware; transition of Compass Call PME to open architecture compliant standards; and continued migration of the Compass Call Operating System (CCOS) to an agile software construct.</p> <p>Due to the rapidly changing threat environment encountered during Compass Call's prolonged commitment to overseas operations, the acquisition program manager has the authority to redirect funding as necessary to meet current stated and emerging requirements.</p> <p>This program element may include necessary civilian pay expenses required to manage, execute, and deliver Orion capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0.000M and in FY21 \$0.000M is forecasted for civilian pay expenses in this program element.</p>		

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207253F / <i>Compass Call</i>
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This program is in Budget Activity (BA) 07, Operational System Development because this BA includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

This requirement supports performance of a full financial audit as required by title 10 U.S.C. Chapter 9A, Sec 240-D

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	31.888	15.854	15.900	0.000	15.900
Current President's Budget	30.687	15.825	91.266	0.000	91.266
Total Adjustments	-1.201	-0.029	75.366	0.000	75.366
• Congressional General Reductions	0.000	-0.029			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-1.168	0.000			
• Other Adjustments	-0.033	0.000	75.366	0.000	75.366

**Congressional Add Details (\$ in Millions, and Includes General Reductions)**

**Project:** 674804: *Compass Call*

Congressional Add: *EC-37B Compass Call Re-host Congressional Add*

Congressional Add Subtotals for Project: 674804

Congressional Add Totals for all Projects

	<b>FY 2020</b>	<b>FY 2021</b>
	15.414	-
	15.414	-
	15.414	-

**Change Summary Explanation**

FY2020: SBIR assessment of \$582k against baseline budget and \$586k assessed against Congressional Add budget

FY2020: Upward Adjustment (UPAD) of \$33k to cover current for cancelled bills

FY2021: Unspecified Congressional cut of \$29k

FY2022: Adjustment for inflation of \$763K

FY2022: Realigned \$20.353M from Procurement for PME development in order to maintain an aggressive BL4 development and fielding schedule

FY2022: Realigned \$55.776M from Procurement for PME development and test in order to maintain an aggressive BL4 development and fielding schedule

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207253F / <i>Compass Call</i>
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>Title:</b> Baseline Upgrade Development</p> <p><b>Description:</b> Supports development of new PME baseline (BL), other subsystem, and platform upgrades in order to ensure COMPASS CALL capabilities remain ahead of emerging adversary tactics and technologies.</p> <p><b>FY 2021 Plans:</b> Continuing efforts for BL development on upgraded platform and associated developmental simulator activities and address anomalies, as required. Specific efforts may include but are not limited to the following:</p> <ul style="list-style-type: none"> <li>• Low Band antenna design</li> <li>• Advanced Military &amp; Commercial Communications Offensive capabilities</li> <li>• Emerging and Modern Target Technique</li> <li>• Platform integration for future capabilities</li> <li>• Updates to PME infrastructure</li> <li>• Platform upgrades and associated non-recurring engineering</li> <li>• Studies and analysis for current/future baseline development planning</li> <li>• Open Mission System Architecture</li> <li>• Software Defined Receiver/Transmit</li> <li>• QRCs</li> <li>• PME Integration and Testing</li> <li>• Testing activities</li> </ul> <p><b>FY 2022 Plans:</b> Will continue efforts for PME development, integration, and test on an upgraded platform and associated simulators, address PME anomalies, as required, and begin future baseline development activities. Specific efforts may include but are not limited to the following:</p> <ul style="list-style-type: none"> <li>• NRE to extend existing frequency coverage to Low Band range</li> <li>• Advanced Military &amp; Commercial Communications Offensive capabilities</li> <li>• Emerging and Modern Targets</li> <li>• Platform integration for future capabilities</li> <li>• Updates to PME infrastructure</li> <li>• Platform upgrades and associated non-recurring engineering</li> <li>• Studies and analysis for current/future baseline development planning</li> <li>• Open Mission System Architecture for rapid capability integration</li> <li>• Training system/simulator upgrades</li> </ul>	15.273	15.825	91.266

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0207253F / <i>Compass Call</i>		
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<ul style="list-style-type: none"> <li>• Software Defined Receiver/Transmit</li> <li>• Containerized agile software development/implementation</li> <li>• QRCs</li> <li>• PME Integration and Testing</li> <li>• Hardware prototyping and integration analysis</li> <li>• Testing activities</li> </ul> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increase from FY2021 to FY2022 includes a \$20.353M &amp; \$55.776M realignment from Procurement to RDT&amp;E. This funding increase will fund BL3 integration, test activities, BL4 development activities. BL4 development has ramped up through FY2021 and the Compass Call program must fund BL4 development material, associated prototyping, and software updates.</p>				
<b>Accomplishments/Planned Programs Subtotals</b>		15.273	15.825	91.266
		<b>FY 2020</b>	<b>FY 2021</b>	
<b>Congressional Add:</b> EC-37B Compass Call Re-host Congressional Add		15.414	-	
<p><b>FY 2020 Accomplishments:</b> EC-37B COMPASS CALL Re-host Congressional Add to accelerate BL4</p> <ul style="list-style-type: none"> <li>• Low Band antenna design and test</li> <li>• Advanced Military and Commercial Communications Offensive capabilities</li> <li>• Emerging and Modern Targets</li> <li>• Platform integration for future capabilities</li> <li>• BL4 Preliminary Design Review (PDR) and critical design activities</li> <li>• Updates to BL4 PME infrastructure</li> <li>• Platform upgrades and associated non-recurring engineering</li> <li>• Studies and analysis for current/future baseline development planning</li> <li>• Open Mission System Architecture</li> <li>• Software Defined Receiver/Transmit</li> <li>• BL Integration and Testing</li> </ul>				
<b>Congressional Adds Subtotals</b>		15.414	-	

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207253F / <i>Compass Call</i>
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**D. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 04 Line item CALL00: <i>Compass Call Aircraft</i>	114.095	159.867	0.000	-	0.000	-	-	-	-	-	-
• APAF 05 Line item CALL00: <i>Compass Call Mods</i>	110.539	169.683	195.098	-	195.098	-	-	-	-	-	-
• APAF 06 Line item CALL00: <i>Compass Call Mod Spares</i>	10.805	10.984	65.624	-	65.624	-	-	-	-	-	-

**Remarks**

**E. Acquisition Strategy**

COMPASS CALL maintains operational relevancy through an incremental upgrade strategy in which a new "Baseline" mission system configuration fields approximately every 3-4 years. Due to the re-hosting of PME onto the BL3 and BL4 EC-37B, this has temporarily lengthened the planned upgrade schedule. BL5 is planned to return to this upgrade cycle for major hardware updates. Urgent upgrades between Baselines are accomplished via QRCs. These efforts are accomplished by the 645th Aeronautical Systems Group (645 AESG) in accordance with their Acquisition Strategy, Program Management Directive (PMD), Class Justification and Approval (J&A) document for acquisition of supplies and services using other than full and open competition criteria, and Life Cycle Management Plan (LCMP) and cover the full spectrum of system life cycle management ("cradle to grave" support concept). Due to the rapidly changing threat environment encountered during Compass Call's prolonged commitment to OCO, the acquisition program manager has the authority to redirect funding as necessary to meet current stated and emerging Combatant Commander requirements.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207253F / <i>Compass Call</i>	<b>Project (Number/Name)</b> 674804 / <i>Compass Call</i>
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<b>Product Development (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Baseline Upgrade Development Primary Mission Equipment	SS/CPFF	BAE Systems : Nashua, NH	-	30.155	Jan 2020	14.961	Dec 2020	80.046	Oct 2021	-		80.046	-	-	-
<b>Subtotal</b>			-	30.155		14.961		80.046		-		80.046	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Test and Evaluation	SS/CPAF	Not specified. : TBD	-	0.318	Oct 2020	0.614	Sep 2021	9.086	Nov 2021	-		9.086	-	-	-
<b>Subtotal</b>			-	0.318		0.614		9.086		-		9.086	-	-	N/A

<b>Management Services (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Program Management Administration (PMA)	Various	AFLCMC : WPAFB, OH	-	0.214	Apr 2020	0.250	Apr 2021	2.134	Apr 2022	-		2.134	-	-	-
<b>Subtotal</b>			-	0.214		0.250		2.134		-		2.134	-	-	N/A

<b>Project Cost Totals</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
	-	30.687	15.825	91.266	-	91.266	-	-	N/A

**Remarks**  
The 1.884M increase in PMA costs is based on the projected program management needs associated with BL3 testing and BL4 development activities.

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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207253F / <i>Compass Call</i>	<b>Project (Number/Name)</b> 674804 / <i>Compass Call</i>
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FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b><i>Compass Call</i></b>	
Baseline 3 Development	
Baseline 3 Integration and Test	
Baseline 4 Development	



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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207253F / <i>Compass Call</i>	<b>Project (Number/Name)</b> 674804 / <i>Compass Call</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Compass Call</i></b>				
Baseline 3 Development	1	2020	1	2021
Baseline 3 Integration and Test	3	2020	4	2022
Baseline 4 Development	1	2020	4	2022

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207268F / <i>Aircraft Engine Component Improvement Program</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	108.446	125.666	103.715	0.000	103.715	-	-	-	-	-	-
671012: <i>Aircraft Engine Component Improvement Program</i>	-	75.283	98.104	75.754	0.000	75.754	-	-	-	-	-	-
675365: <i>F135 Aircraft Engine Component Improvement Program</i>	-	33.163	27.562	27.961	0.000	27.961	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

The Aircraft Engine Component Improvement Program (CIP) provides the only source of critical sustaining engineering support for in-service Air Force engines to maintain flight safety (highest priority) to correct deficiencies, improve system operational readiness (OR) and reliability & maintainability (R&M), reduce engine Life Cycle Cost (LCC), and sustain engines throughout their service life. Past investments have reduced warfighter Class A rates and decreased Engine Related Loss of Aircraft (ERLOA) and generated significant returns on investments. Significant new tasks for this year support increasing reliability and maintainability of the B-52 aircraft/TF33 engine, correcting the #1 removal driver for the TF34 engine to achieve LCC of 24M and eliminating a safety concern with cracked header on the F119 engine.

Engine CIP provides the only means to develop/address solutions to safety issues, obsolescence, reliability, availability, maintainability and affordability driven by changes in aircraft operational parameters, missions, usage or age. It also serves as the primary vehicle implement emerging technology solutions to resolve these issues.

The program starts with government acceptance of the first procurement-funded engine and continues over the engine's life, gradually decreasing to a minimum level (safety/depot repairs) sufficient to keep older engines operational. Engine CIP testing identifies and fixes engine-related problems ahead of operational impacts. R&M related Engine CIP efforts significantly reduce out year Operations and Maintenance (O&M) and spares costs.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver WEAPON SYSTEM capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207268F / <i>Aircraft Engine Component Improvement Program</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	112.505	95.896	116.818	0.000	116.818
Current President's Budget	108.446	125.666	103.715	0.000	103.715
Total Adjustments	-4.059	29.770	-13.103	0.000	-13.103
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	29.770			
• SBIR/STTR Transfer	-4.059	0.000			
• Other Adjustments	0.000	0.000	-13.103	0.000	-13.103

**Change Summary Explanation**

FY20 decrease of -\$4.059M due to a SBIR reduction

FY21 increase of +\$29.770 for Congressional Add for program increase

FY 22 funding request was reduced by -\$6M to account for F-35 Engine CIP efforts being early to need; the funding request was reduced by -\$5.538 million to account for the availability of prior year execution balances.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0207268F / Aircraft Engine Component Improvement Program				<b>Project (Number/Name)</b> 671012 / Aircraft Engine Component Improvement Program			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
671012: Aircraft Engine Component Improvement Program	-	75.283	98.104	75.754	0.000	75.754	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Aircraft Engine Component Improvement Program (CIP) provides the only source of critical sustaining engineering support for in-service Air Force engines to maintain flight safety (highest priority) to correct deficiencies, improve system operational readiness (OR) and reliability & maintainability (R&M), reduce engine Life Cycle Cost (LCC), and sustain engines throughout their service life. Engine CIP directly addresses engine related causes to aircraft Non-Mission-Capability rates. Significant new tasks for this year support increasing reliability and maintainability of the B-52 aircraft/TF33 engine, correcting the #1 removal driver for the TF34 engine to achieve LCC of 24M and eliminating a safety concern with cracked header on the F119 engine.

Changes in aircraft operational parameters and/or missions and task missions and tasks accelerating the discovery of new engine issues and the need to resolve issues; Engine CIP provides the only means to develop fixes for these problems. Engine CIP funding is driven by field events and types/maturity of engines, not by the total engine quantity. The program starts with government acceptance of the first procurement-funded engine and continues over the engine's life, gradually decreasing to a minimum level (safety/depot repairs) sufficient to keep older engines operational. Engine CIP testing identifies and fixes engine-related problems ahead of operational impacts. R&M related Engine CIP efforts significantly reduce out year Operations and Maintenance (O&M) and replacement spares costs.

Service-related engine deficiencies occur throughout the engine lifecycle. Given the uncertainty with regard to the number and timing of engine-related deficiencies, it is essential for the USAF to have adequate engineering capability, test capacity to rapidly respond to problems as they occur and absolutely paramount to reach SecDef directed 80% mission capability rate for F-22, F-16, and F-15 aircraft.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> F100 Aircraft Engine Component Improvement Program	8.115	10.145	9.232
<p><b>Description:</b> The F100-220 and F100-229 Engine CIP provides critical developmental engineering support for approximately 3908 engines (including foreign military sales [FMS]) to maintain flight safety (highest priority), to address parts obsolescence, to improve system operational readiness (OR) and reliability &amp; maintainability (R&amp;M), to reduce engine Life Cycle Cost (LCC), in order for engines to be sustainable throughout their service life. Funds may be used to address emerging and short-notice Diminishing Manufacturing Sources and Material Shortages (DMSMS) issues.</p> <p><b>FY 2021 Plans:</b></p>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207268F / Aircraft Engine Component Improvement Program	<b>Project (Number/Name)</b> 671012 / Aircraft Engine Component Improvement Program		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>F100-220 and F100-229:</p> <ul style="list-style-type: none"> <li>- Will execute 28+ tasks. Budget will address engine issues associated with the F-15 and F-16 aircraft.</li> <li>- Address engine component redesign, repair/rework procedures, engine maturation and life limit/mission analysis.</li> <li>- Validate redesigned parts and new repair procedures.</li> <li>- Maintain engine flight safety, address obsolescence deficiencies, improved system operational readiness (OR) and reliability &amp; maintainability (R&amp;M), reduced engine life cycle costs (LCC), and sustain engines throughout their service life.</li> <li>- Funds may be used to address emerging and short-notice Diminishing Manufacturing Sources and Material Shortages (DMSMS) issues.</li> </ul> <p><b>FY 2022 Plans:</b></p> <p>F100-220 and F100-229:</p> <ul style="list-style-type: none"> <li>- Will execute 35+ tasks. Budget will address engine issues associated with the F-15 and F-16 aircraft.</li> <li>- Address engine component redesign, repair/rework procedures, engine maturation and life limit/mission analysis.</li> <li>- Validate redesigned parts and new repair procedures.</li> <li>- Maintain engine flight safety, address obsolescence deficiencies, improved system operational readiness (OR) and reliability &amp; maintainability (R&amp;M), reduced engine life cycle costs (LCC), and sustain engines throughout their service life.</li> <li>- Funds may be used to address emerging and short-notice Diminishing Manufacturing Sources and Material Shortages (DMSMS) issues.</li> </ul> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b></p> <p>Decrease due to funding decrease in FY22.</p>				
<p><b>Title:</b> F110 Aircraft Engine Component Improvement Program</p> <p><b>Description:</b> The F101, F110-100, F110-129, F118-100, and F118-101 Engine CIP provides critical developmental engineering support for approximately 2845 engines (including foreign military sales [FMS]) to maintain flight safety (highest priority), to address parts obsolescence, to improve system operational readiness (OR) and reliability &amp; maintainability (R&amp;M), to reduce engine Life Cycle Cost (LCC), and to sustain engines throughout their service life. Funds may be used to address emerging and short-notice Diminishing Manufacturing Sources and Material Shortages (DMSMS) issues.</p> <p><b>FY 2021 Plans:</b></p> <p>F101, F110-100, F110-129, F118-100, and F118-101:</p> <ul style="list-style-type: none"> <li>- Will execute 31+ tasks. The budget will address engine issues associated with the B1, B-2, F-15, F-16, and U-2 aircraft.</li> <li>- Address safety of flight, engine component redesign, repair/rework procedures, engine maturation and life limit/mission analysis.</li> <li>- Validate redesigned parts and new repair procedures.</li> </ul>		15.142	15.557	16.080

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207268F / Aircraft Engine Component Improvement Program	<b>Project (Number/Name)</b> 671012 / Aircraft Engine Component Improvement Program		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>- Maintain engine flight safety, address obsolescence deficiencies, improved system operational readiness (OR) and reliability &amp; maintainability (R&amp;M), reduced engine life cycle costs (LCC), and sustain engines throughout their service life.</p> <p>- Funds may be used to address emerging and short-notice Diminishing Manufacturing Sources and Material Shortages (DMSMS) issues.</p> <p><b>FY 2022 Plans:</b> F101, F110-100, F110-129, F118-100, and F118-101:</p> <p>- Will execute 45+ tasks. The budget will address engine issues associated with the B1, B-2, F-15, F-16, and U-2 aircraft.</p> <p>- Address safety of flight, engine component redesign, repair/rework procedures, engine maturation and life limit/mission analysis.</p> <p>- Validate redesigned parts and new repair procedures.</p> <p>- Maintain engine flight safety, address obsolescence deficiencies, improved system operational readiness (OR) and reliability &amp; maintainability (R&amp;M), reduced engine life cycle costs (LCC), and sustain engines throughout their service life.</p> <p>- Funds may be used to address emerging and short-notice Diminishing Manufacturing Sources and Material Shortages (DMSMS) issues.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase due to requirement increase in FY22.</p>				
<p><b>Title:</b> F119 Aircraft Engine Component Improvement Program</p> <p><b>Description:</b> The F119 Engine CIP provides critical developmental engineering support for approximately 471 engines to maintain flight safety (highest priority), to address parts obsolescence, to improve system operational readiness (OR) and reliability &amp; maintainability (R&amp;M), to reduce engine Life Cycle Cost (LCC), and to sustain engines throughout their service life. Funds may be used to address emerging and short-notice Diminishing Manufacturing Sources and Material Shortages (DMSMS) issues.</p> <p><b>FY 2021 Plans:</b> F119:</p> <p>- Will execute 28+ tasks. The budget will address engine issues associated with the F-22 aircraft.</p> <p>- Address engine component redesign, repair/rework procedures, engine maturation and life limit/mission analysis.</p> <p>- Validate redesigned parts and new repair procedures.</p> <p>- Maintain engine flight safety, address obsolescence deficiencies, improved system operational readiness (OR) and reliability &amp; maintainability (R&amp;M), reduced engine life cycle costs (LCC), and sustain engines throughout their service life.</p> <p>- Funds may be used to address emerging and short-notice Diminishing Manufacturing Sources and Material Shortages (DMSMS) issues.</p> <p><b>FY 2022 Plans:</b></p>		26.553	26.559	27.035

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207268F / Aircraft Engine Component Improvement Program	<b>Project (Number/Name)</b> 671012 / Aircraft Engine Component Improvement Program		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>F119:</p> <ul style="list-style-type: none"> <li>- Will execute 35+ tasks. The budget will address engine issues associated with the F-22 aircraft.</li> <li>- Address engine component redesign, repair/rework procedures, engine maturation and life limit/mission analysis.</li> <li>- Validate redesigned parts and new repair procedures.</li> <li>- Maintain engine flight safety, address obsolescence deficiencies, improved system operational readiness (OR) and reliability &amp; maintainability (R&amp;M), reduced engine life cycle costs (LCC), and sustain engines throughout their service life.</li> <li>- Funds may be used to address emerging and short-notice Diminishing Manufacturing Sources and Material Shortages (DMSMS) issues.</li> </ul> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase due to requirement increase in FY22.</p>				
<p><b>Title:</b> Other Aircraft Engine Component Improvement Program</p> <p><b>Description:</b> The Other Engines (e.g., TF33, TF34, T53, T56, T700, T400, J85, F107, APUs) CIP provides critical developmental engineering support for approximately 8000+ engines (including foreign military sales [FMS]) to maintain flight safety (highest priority), to address parts obsolescence, to improve system operational readiness (OR) and reliability &amp; maintainability (R&amp;M), to reduce engine Life Cycle Cost (LCC), and to sustain engines throughout their service life. Funds may be used to address emerging and short-notice Diminishing Manufacturing Sources and Material Shortages (DMSMS) issues.</p> <p><b>FY 2021 Plans:</b> Other Engines (e.g., TF33, TF34, T53, T56, T700, T400, J85, APUs, F107):</p> <ul style="list-style-type: none"> <li>- Will execute 40+ tasks. The budget will address engine issues associated with the C-130, T38, UH-1N, UH/MH-60/60G, A-10, B-52, AWACS, and JSTARS aircraft, cruise missiles and aircraft APUs.</li> <li>- Address engine component redesign, repair/rework procedures, engine maturation and life limit/mission analysis.</li> <li>- Validate redesigned parts and new repair procedures.</li> <li>-Address issues leading to increased UERs and decreased flight safety.</li> <li>- Maintain engine flight safety, address obsolescence deficiencies, improved system operational readiness (OR) and reliability &amp; maintainability (R&amp;M), reduced engine life cycle costs (LCC), and sustain engines throughout their service life.</li> <li>- Funds may be used to address emerging and short-notice Diminishing Manufacturing Sources and Material Shortages (DMSMS) issues.</li> <li>- Funds will also be used to stand up any new Engine CIP TMS programs</li> </ul> <p><b>FY 2022 Plans:</b> Other Engines (e.g., TF33, TF34, T53, T56, T700, T400, J85, APUs, F107):</p>		25.473	45.843	23.407



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207268F / Aircraft Engine Component Improvement Program	<b>Project (Number/Name)</b> 671012 / Aircraft Engine Component Improvement Program
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022
<ul style="list-style-type: none"> <li>- Will execute 65+ tasks. The budget will address engine issues associated with the C-130, T38, UH-1N, UH/MH-60/60G, A-10, B-52, AWACS, and JSTARS aircraft, cruise missiles and aircraft APUs.</li> <li>- Address engine component redesign, repair/rework procedures, engine maturation and life limit/mission analysis.</li> <li>- Validate redesigned parts and new repair procedures.</li> <li>-Address issues leading to increased UERs and decreased flight safety.</li> <li>- Maintain engine flight safety, address obsolescence deficiencies, improved system operational readiness (OR) and reliability &amp; maintainability (R&amp;M), reduced engine life cycle costs (LCC), and sustain engines throughout their service life.</li> <li>- Funds may be used to address emerging and short-notice Diminishing Manufacturing Sources and Material Shortages (DMSMS) issues.</li> <li>- Funds will also be used to stand up any new Engine CIP TMS programs</li> </ul> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Decrease due to funding decrease in FY22.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	75.283	98.104	75.754

<b>C. Other Program Funding Summary (\$ in Millions)</b>										
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To Complete</u> <u>Total Cost</u>
• RDTE 07 0205633N: <i>Aviation Improvements</i>	-	-	-	-	-	-	-	-	-	-

**Remarks**  
Other APPN RELATED ACTIVITIES

(U) - PEs 0203752A and 0205633N, Army/Navy Aircraft Engine CIPs

**D. Acquisition Strategy**  
Sole Source Indefinite Delivery/Indefinite Quantity (IDIQ) contracts to 3 Original Equipment Manufacturers (OEMs), and DoD agencies with a 5-year ordering period and 7-year delivery period. Supports multiple tasks to accomplish CIP for more than 23 engine models.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)						Project (Number/Name)					
3600 / 7				PE 0207268F / Aircraft Engine Component Improvement Program						671012 / Aircraft Engine Component Improvement Program					
Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development	C/CPAF	Not specified. : TBD	-	-		-		0.000		-		0.000	-	-	-
Aircraft Engine CIP: Develop aircraft engine improvements - F110/F101/F118	SS/CPFF	GE : Evendale, OH	-	15.142	Dec 2019	15.557	Dec 2020	16.080	Dec 2021	-		16.080	-	-	-
Aircraft Engine CIP: Develop aircraft engine improvements-F100/F119/TF33/T400	SS/CPFF	Pratt & Whitney : Hartford, CT	-	40.194	Dec 2019	44.470	Dec 2020	36.267	Dec 2021	-		36.267	-	-	-
Aircraft Engine CIP: Develop aircraft engine improvements-TF34/J85/T700	SS/CPFF	GE : Lynn, MA	-	6.085	Dec 2019	7.441	Dec 2020	5.663	Dec 2021	-		5.663	-	-	-
Aircraft Engine CIP: Develop aircraft engine improvements-T56	SS/CPFF	Rolls Royce : Indianapolis, IN	-	1.495	Dec 2019	1.641	Dec 2020	1.637	Dec 2021	-		1.637	-	-	-
Aircraft Engine CIP: Develop aircraft auxiliary power unit improvements/T53	SS/CPFF	Honeywell : Phoenix, AZ	-	4.018	Dec 2019	0.887	Dec 2020	4.965	Dec 2021	-		4.965	-	-	-
Aircraft Engine CIP: Develop engine improvements-F107-Agilis	SS/FP	Agilis : Palm Beach Gardens, FL	-	0.029	Dec 2019	0.000	Dec 2020	0.031	Dec 2021	-		0.031	-	-	-
Aircraft Engine CIP: Develop engine improvements-F107-Florida Turbine Technologies (FTT)	SS/FP	FTT : Jupiter, FL	-	0.370	Dec 2019	0.000	Dec 2020	0.406	Dec 2021	-		0.406	-	-	-
<b>Subtotal</b>			-	67.333		69.996		65.049		-		65.049	-	-	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207268F / Aircraft Engine Component Improvement Program	<b>Project (Number/Name)</b> 671012 / Aircraft Engine Component Improvement Program
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<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Support	C/CPAF	Not specified. : TBD	-	-		-		0.000		-		0.000	-	-	-
Aircraft Engine CIP: Non-OEM CIP Tasks	Various	Various : Various	-	1.773	Dec 2019	1.474	Dec 2020	1.942	Dec 2021	-		1.942	-	-	-
<b>Subtotal</b>			-	1.773		1.474		1.942		-		1.942	-	-	N/A

**Remarks**  
Non-OEM CIP Tasks refer to work in support of Engine CIP.

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test and Evaluation	C/CPAF	Not specified. : TBD	-	-		-		0.000		-		0.000	-	-	-
Aircraft Engine CIP: Ground test and validate engine improvements	PO	AEDC : Arnold AFB, TN	-	0.241	Dec 2019	7.550	Dec 2020	2.263	Dec 2021	-		2.263	-	-	-
<b>Subtotal</b>			-	0.241		7.550		2.263		-		2.263	-	-	N/A

**Remarks**  
Fuel costs for contractor-performed T&E are included in the applicable contract.

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Management Services	C/CPAF	Not specified. : TBD	-	-		-		0.000		-		0.000	-	-	-
Aircraft Engine CIP: PMA	Various	Various : Various	-	2.406	Dec 2019	5.584	Dec 2020	2.634	Dec 2021	-		2.634	-	-	-
Aircraft Engine CIP: In House Support/Misc	Various	Various : Various	-	3.530	Dec 2019	13.500	Dec 2020	3.866	Dec 2021	-		3.866	-	-	-
<b>Subtotal</b>			-	5.936		19.084		6.500		-		6.500	-	-	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207268F / Aircraft Engine Component Improvement Program	<b>Project (Number/Name)</b> 671012 / Aircraft Engine Component Improvement Program
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Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			

**Remarks**  
PMA Description: Program Management support, travel, and A&AS.

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	-	75.283	98.104	75.754	-	75.754	-	-	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Air Force</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207268F / Aircraft Engine Component Improvement Program	<b>Project (Number/Name)</b> 671012 / Aircraft Engine Component Improvement Program

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>CIP Legacy Activities</b>	
F-100 Engine CIP activities	
F-110 Engine CIP Activities	
F-119 Engine CIP Activities	
Other Legacy Engine CIP Activities	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207268F / Aircraft Engine Component Improvement Program	<b>Project (Number/Name)</b> 671012 / Aircraft Engine Component Improvement Program

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>CIP Legacy Activities</i></b>				
F-100 Engine CIP activities	1	2020	1	2024
F-110 Engine CIP Activities	1	2020	1	2024
F-119 Engine CIP Activities	1	2020	1	2024
Other Legacy Engine CIP Activities	1	2020	1	2024

**Note**

Traditional schedule does not lend itself to Engine CIP activities. Schedule not showing past Q1FY24 as funding is currently zeroed out for FY24+.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0207268F / Aircraft Engine Component Improvement Program				<b>Project (Number/Name)</b> 675365 / F135 Aircraft Engine Component Improvement Program			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
675365: F135 Aircraft Engine Component Improvement Program	-	33.163	27.562	27.961	0.000	27.961	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The F135 Aircraft Engine Component Improvement Program (CIP) supports F-35 single-engine fighter propulsion system. It provides the only source of critical developmental engineering support for the F135 propulsion system. F135 CIP maintains flight safety (highest priority), corrects service revealed deficiencies, improves system Operational Readiness (OR) and Reliability & Maintainability (R&M), reduces propulsion system Life Cycle Cost (LCC), and sustains the propulsion system throughout its service life. Historically, aircraft systems change missions, tactics, and environment (including new fuels) and meet changing threats throughout their lives. New technical problems can develop in the propulsion system through actual use and the F135 CIP provides the means to develop fixes for these problems. F135 CIP funding is driven by field events and type/maturity of the propulsion system, not by the total quantity of engines. The program starts with government acceptance of the first procurement-funded engine and continues over the propulsion system's life, gradually decreasing to a minimum level (safety/depot repairs) sufficient to keep older engines operational. F135 CIP, through "Lead the Fleet" operational use and accelerated mission testing, identifies and fixes propulsion-related problems ahead of operational impacts. F135 CIP ensures continued improvements in R&M, which reduce out year support costs. Historically, R&M related CIP efforts significantly reduce out year O&M and spares costs.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> F135 Aircraft Engine Improvement Program	33.163	27.562	27.961
<p><b>Description:</b> The Aircraft Engine Component Improvement Program (CIP) provides the only source of critical developmental engineering support for F-35 propulsion systems to maintain flight safety (highest priority) for this single-engine fighter, correct service revealed deficiencies, improve system operational readiness (OR) and reliability &amp; maintainability (R&amp;M), reduce engine Life Cycle Cost (LCC), and sustain engines throughout their service life. Funds may be used to address emerging and short-notice Diminishing Manufacturing Sources and Material Shortages (DMSMS) issues.</p> <p><b>FY 2021 Plans:</b></p> <ul style="list-style-type: none"> <li>- Execute approximately 68+ AF-funded F135 engine tasks supporting F-35 flying operations.</li> <li>- Conduct accelerated mission test and analytical condition inspection.</li> <li>- Address safety of flight, engine component redesign, repair/rework procedures and life limit/mission analysis.</li> <li>- Validate redesigned parts and new repair procedures.</li> <li>- Maintain/improve engine flight safety, improve system operational readiness and reliability &amp; maintainability, reduce engine life cycle cost, and sustain engine throughout service life.</li> </ul>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207268F / Aircraft Engine Component Improvement Program	<b>Project (Number/Name)</b> 675365 / F135 Aircraft Engine Component Improvement Program

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
- Funds may be used to address emerging and short-notice Diminishing Manufacturing Sources and Material Shortages (DMSMS) issues.  <b>FY 2022 Plans:</b> - Execute approximately 80+ AF-funded F135 engine tasks supporting F-35 flying operations. - Conduct accelerated mission test and analytical condition inspection. - Address safety of flight, engine component redesign, repair/rework procedures and life limit/mission analysis. - Validate redesigned parts and new repair procedures. - Maintain/improve engine flight safety, improve system operational readiness and reliability & maintainability, reduce engine life cycle cost, and sustain engine throughout service life. - Funds may be used to address emerging and short-notice Diminishing Manufacturing Sources and Material Shortages (DMSMS) issues.  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase due to funding increase in FY22.			
<b>Accomplishments/Planned Programs Subtotals</b>	33.163	27.562	27.961

<b>C. Other Program Funding Summary (\$ in Millions)</b>										
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To Complete</u> <u>Total Cost</u>
• RDTE 07 0205633N: <i>Aviation Improvements</i>	-	-	-	-	-	-	-	-	-	-

**Remarks**  
Program Element 0205633N provides US Navy funding support for the F135 propulsion system.

**D. Acquisition Strategy**  
Contracts within this program are projected to be awarded sole source to engine manufacturer. F-135 Engine CIP tasks are generally assigned to the original engine manufacturer based on available funding and prioritization of candidates.



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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207268F / Aircraft Engine Component Improvement Program	<b>Project (Number/Name)</b> 675365 / F135 Aircraft Engine Component Improvement Program
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	C/CPAF	Not specified. : TBD	-	-		-		0.000		-		0.000	-	-	-
Aircraft Engine CIP: Develop F135 engine improvements	SS/CPFF	Pratt & Whitney : Hartford, CT	-	32.761	Jan 2020	22.601	Jan 2021	22.855	Jan 2022	-		22.855	-	-	-
<b>Subtotal</b>			-	32.761		22.601		22.855		-		22.855	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test and Evaluation	C/CPAF	Not specified. : TBD	-	-		-		0.000		-		0.000	-	-	-
Aircraft Engine CIP: Ground test and validate engine improvements	PO	AEDC : Arnold AFB, TN	-	0.000		4.685	Dec 2020	4.822	Dec 2021	-		4.822	-	-	-
<b>Subtotal</b>			-	0.000		4.685		4.822		-		4.822	-	-	N/A

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Management Services	C/CPAF	Not specified. : TBD	-	-		-		0.000		-		0.000	-	-	-
Aircraft Engine CIP: PMA	Various	Various : Various	-	0.402	Oct 2019	0.276	Oct 2020	0.284	Oct 2021	-		0.284	-	-	-
<b>Subtotal</b>			-	0.402		0.276		0.284		-		0.284	-	-	N/A

**Remarks**

PMA Description: Program Management support, travel, and A&AS.

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>		-	33.163	27.562	27.961	27.961	-	-	N/A



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Air Force</b>		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207268F / Aircraft Engine Component Improvement Program	<b>Project (Number/Name)</b> 675365 / F135 Aircraft Engine Component Improvement Program

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>CIP JSF Activities</b>	
F-135 Engine CIP Tasks	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207268F / Aircraft Engine Component Improvement Program	<b>Project (Number/Name)</b> 675365 / F135 Aircraft Engine Component Improvement Program

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>CIP JSF Activities</b>				
F-135 Engine CIP Tasks	1	2020	1	2024

**Note**  
Schedule not showing past Q1FY24 as funding is currently zeroed out for FY24+.

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207325F <i>Joint Air-to-Surface Standoff Missile (JASSM)</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	313.576	73.510	70.663	117.325	0.000	117.325	-	-	-	-	-	-
675356: <i>JASSM Extended Range (JASSM-ER)</i>	313.576	73.510	70.663	117.325	0.000	117.325	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Program MDAP/MAIS Code:** 555

**A. Mission Description and Budget Item Justification**

The Joint Air-to-Surface Standoff Missile (JASSM) family of missiles includes: JASSM Baseline (JASSM-BL/AGM-158A) and JASSM Extended Range (JASSM-ER/AGM-158B, AGM-158B-2, and the follow on missiles). JASSM-ER provides a long range, conventional air-to-surface, autonomous, precision-guided, low observable, standoff cruise missile compatible with fighter and bomber aircraft. JASSM-ER provides the capability to attack a variety of high value fixed or relocatable targets with precision, through preplanned missions or target-of-opportunity, deeper into enemy territory than JASSM-BL, all while minimizing the threat to launch aircraft. Aircraft integration of JASSM-ER/AGM-158B is complete on the B-1, F-15E, F-16 and B-52. Threshold aircraft is the B-1 and Objective aircraft are F-15E, F-16, B-52, B-2, and F-35.

JASSM-ER/AGM-158B-2 is an upgrade to the existing JASSM-ER/AGM-158B, incorporating multiple development initiatives to respond to rapidly changing threats and obsolescence issues. The 2018 National Defense Strategy (NDS) increased the JASSM inventory objective by 48% which resulted in the monitoring/resolution of obsolescence on 13 subsystems. Funding may be used to address Diminishing Manufacturing Sources and Material Shortages (DMSMS) issues.

The FY2022 funding request was reduced by 6.786 million to account for the availability of prior year execution balances.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0M was expended for civilian pay expenses in this program element, and in FY21 \$0M is forecasted for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207325F <i>Joint Air-to-Surface Standoff Missile (JASSM)</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	78.498	70.792	115.792	0.000	115.792
Current President's Budget	73.510	70.663	117.325	0.000	117.325
Total Adjustments	-4.988	-0.129	1.533	0.000	1.533
• Congressional General Reductions	0.000	-0.129			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-2.287	0.000			
• SBIR/STTR Transfer	-2.701	0.000			
• Other Adjustments	0.000	0.000	1.533	0.000	1.533

**Change Summary Explanation**

The FY2022 Budget increased to support development of the Weapon Data Link (WDL), additional program protection and cyber security requirements, and AGM-158B-2 integration.

The FY2022 funding request was reduced by \$6.786 million to account for the availability of prior year execution balances.

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<b>Title:</b> Warfighting Capability Enhancement	24.134	17.310	28.293	-	28.293
<b>Description:</b> Design and development of software and mission planning changes to ensure the missile maintains operational effectiveness in classified scenarios.					
<b>FY 2021 Plans:</b> Continued flight tests and updated classified software accordingly based on flight test results. Continued modification of classified software to enable the missile to maintain operational effectiveness in classified scenarios.					
<b>FY 2022 Base Plans:</b> Continue flight tests and update classified software accordingly based on flight test results. Continue modification of classified software to enable the missile to maintain operational effectiveness in classified scenarios. FY2022 includes two planned system level flight tests; previous flight tests were at the sub-system					

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force				<b>Date:</b> May 2021	
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0207325F <i>Joint Air-to-Surface Standoff Missile (JASSM)</i>			
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>					
level. Begin automation of Target Area Modeling (TAM) process, migrating away from the cumbersome manual update methods.					
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increased due to an additional requirement to automate TAM through FY2023, increased software level of effort, and the start of warfighter capability enhancement algorithm testing.					
<b>Title:</b> Advanced Survivability, Integration, and Test					
<b>Description:</b> This line of effort is not a new start, but a title update from "Wing Replacement/Chine Development, Survivability Enhancement, and Integration" to "Advanced Survivability, Integration, and Test." The decision to discontinue wing and chine development efforts necessitated this change. This effort includes development, integration and testing and will continue to enhance missile survivability through subsystem updates including cyber security implementation. It also ensures compatibility of the former wing design with new missile subsystems.					
<b>FY 2021 Plans:</b> Begin AGM-158B-2 flight test program to include contract efforts, in addition to ground/flying test beds, ground mounts, fit checks, captive carry, program protection and other tests as required.					
<b>FY 2022 Base Plans:</b> Continue AGM-158B-2 flight test program to include contract efforts, in addition to ground/flying test beds, ground mounts, fit checks, captive carry, free flight releases, wind tunnel tests, program protection and other tests as required.					
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increased due to B-1 integration and cyber security implementation, which includes test bed equipment and testing.					
<b>Title:</b> Electronic Safe and Arm Fuze (ESAF)					
<b>Description:</b> ESAF will resolve FMU-156 obsolescence and reliability issues, improve yield, and potentially lower costs.					
<b>FY 2021 Plans:</b> Continue sled testing; begin qualification testing and flight test preparation.					
<b>FY 2022 Base Plans:</b>					
	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
	28.666	25.426	47.159	-	47.159
	5.921	7.900	1.000	-	1.000

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development	<b>R-1 Program Element (Number/Name)</b> PE 0207325F I Joint Air-to-Surface Standoff Missile (JASSM)
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
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Continue flight test.  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreased due to the continuation of flight test with subsequent transition to production.					
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<b>Title:</b> Weapons Data Link (WDL)  <b>Description:</b> This effort includes development, integration and testing efforts, and is currently aimed at improving WDL capabilities to re-target the missile, post-launch, against time sensitive targets during mission execution. Efforts also include, but are not limited to, continued development of alternative communication methods/architecture, and waveforms to advance missile capabilities against critical emerging targets.  <b>FY 2021 Plans:</b> Begin missile data link interface control documentation, AGM-158B-2 specification update, and System Requirements Review(s) to define technical performance parameters. Start initial trade study to physically integrate the communication methods and develop communications architectures.  <b>FY 2022 Base Plans:</b> Continue missile data link interface control documentation, AGM-158B-2 specification update, System Requirements Review(s) to define technical performance parameters. Continue trade study to physically integrate the data link in the missile. Begin WDL antenna development, missile airframe reconfiguration effort, and address increased missile system software updates and additional cyber/crypto support.  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increased due to WDL antenna development, missile airframe integration reconfiguration effort, missile system software updates and cyber/crypto support.	0.000	10.400	37.219	-	37.219
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<b>Title:</b> Other Development/Safety/Survivability  <b>Description:</b> Develop and integrate advanced Precision, Navigation, and Timing (PNT) capabilities (e.g. GPS, M-Code, non-GPS, optical, passive, active, etc.), evaluations (study analysis), survivability enhancements to include safety certification, flight testing, DMSMS, improved Guidance, Navigation, Control (GNC), and obsolescence issues.  <b>FY 2021 Plans:</b>	14.789	9.627	3.654	-	3.654
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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207325F <i>I Joint Air-to-Surface Standoff Missile (JASSM)</i>
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Continue evaluation activity to address activities directed by JASSM's obsolescence plan to include safety and survivability studies; begin guidance, navigation, and control (GNC) and autopilot software allocations and updates.  <b>FY 2022 Base Plans:</b> Continue evaluation activity addressing JASSM's obsolescence plan directed activities to include safety and survivability studies. Continue guidance, navigation, and control (GNC) and autopilot software allocations and updates.  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreased due to inflation adjustments.					
<b>Accomplishments/Planned Programs Subtotals</b>	73.510	70.663	117.325	-	117.325

<b>D. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• MPAF 02 0207325F: JASSM	482.507	500.009	702.550	8.000	710.550	-	-	-	-	-	-

**Remarks**

**E. Acquisition Strategy**

The JASSM Acquisition Strategy was amended and approved on September 8, 2017. This amendment enables the JASSM program to introduce upgrades which ensure its viability as the threat environment evolves. All current development contracts use a Cost Plus type contract.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207325F / Joint Air-to-Surface Standoff Missile (JASSM)	<b>Project (Number/Name)</b> 675356 / JASSM Extended Range (JASSM-ER)
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<b>Product Development (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Warfighting Capability Enhancement	SS/CPAF	Lockheed Martin : Orlando, FL	9.547	24.134	Nov 2019	17.310	Nov 2020	28.293	Nov 2021	-		28.293	-	-	115.263
Advanced Survivability, Integration, and Test	SS/CPFF	Lockheed Martin : Orlando, FL	34.662	28.666	Nov 2019	25.326	Nov 2020	47.159	Nov 2021	-		47.159	-	-	155.800
ESAF	SS/CPFF	Lockheed Martin : Orlando, FL	20.536	5.921	Nov 2019	7.900	Apr 2021	1.000		-		1.000	-	-	22.331
M-code and Related Development Efforts	SS/CPFF	Lockheed Martin : Orlando, FL	11.531	0.000		0.000		0.000		-		0.000	-	-	11.531
Weapons Data Link	C/CPAF	Lockheed Martin : Orlando, FL	0.000	0.000		10.400	Jul 2021	37.219	Jul 2022	-		37.219	-	-	200.000
JASSM-ER development Test Missile Procurement (for DT/OT), parts upgrade, software updates, product improvements, survivability enhancements, LTIK, ITIK, and obsolescence.	Various	Lockheed Martin : Orlando, FL	158.866	12.769	Nov 2019	9.627	Jan 2021	3.554	Jan 2022	-		3.554	-	-	185.000
<b>Subtotal</b>			235.142	71.490		70.563		117.225		-		117.225	-	-	N/A

**Remarks**  
 -Intelligent Telemetry Instrumentation Kit (ITIK)  
 -Legacy Telemetry Instrumentation Kits (LTIK)  
 -Electronic Safe and Arm Fuze (ESAF)

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Government Test Support. Includes flight test equipment, targets, 96th Test Wing and Range Support, AEDC	Various	96 TW, Eglin AFB : TBD	36.528	-		-		-		-		-	-	-	-

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207325F / Joint Air-to-Surface Standoff Missile (JASSM)	<b>Project (Number/Name)</b> 675356 / JASSM Extended Range (JASSM-ER)
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<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
6 IT/6 OT Assets	SS/CPAF	Lockheed Martin : Orlando, FL	12.733	-		-		-		-		-	-	-	-
12 Operational Test (OT) assets	SS/FFP	Lockheed Martin : Orlando, FL	24.642	-		-		-		-		-	-	-	24.643
<b>Subtotal</b>			73.903	-		-		-		-		-	-	-	N/A

**Remarks**  
Test and Evaluation in FY19 and beyond will be incorporated into each separate development effort rather than broken out into its own category

<b>Management Services (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Program Management Administration (PMA). Provides program office oversight of development and upgrade activities.	Various	PMA : Eglin AFB, FL	4.531	2.020	Mar 2020	0.100	Mar 2021	0.100	Mar 2022	-		0.100	-	-	3.771
<b>Subtotal</b>			4.531	2.020		0.100		0.100		-		0.100	-	-	N/A

	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>		313.576	73.510	70.663	117.325	-	-	-	N/A

**Remarks**



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207325F / <i>Joint Air-to-Surface Standoff Missile (JASSM)</i>	<b>Project (Number/Name)</b> 675356 / <i>JASSM Extended Range (JASSM-ER)</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>RDT&amp;E Schedule Details</i></b>				
Warfighting Capability Enhancement	1	2020	4	2025
Advanced Survivability, Integration, and Test	1	2020	3	2024
Electronic Safe and Arm Fuze (ESAF)	1	2020	1	2022
ESAF Production Readiness Review (PRR)	3	2021	1	2022
Weapon Data Link	3	2021	2	2024
Diminishing Manufacture Sources and Obsolescence Evaluation/Development	1	2020	4	2026

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207327F I <i>Small Diameter Bomb (SDB)</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	0.000	20.780	27.109	0.000	27.109	-	-	-	-	-	-
675191: <i>SDB Increment II</i>	-	0.000	20.780	27.109	0.000	27.109	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Note**

In FY 2021, PE 0604329F, BA05, Project Small Diameter Bomb (SDB)-EMD efforts were transferred to PE 0207327F, BA07, Project Small Diameter Bomb (SDB), due to SDB II completion of BA05: System Development & Demonstrations (SDD) moved to Operational Systems Development BA07.

**A. Mission Description and Budget Item Justification**

GBU-53/B Small Diameter Bomb Increment II (SDB II) StormBreaker is a joint interest United States Air Force (USAF) and Department of Navy (DoN) Acquisition Category (ACAT) IC program, with the USAF as the lead service. SDB II addresses the following warfighter requirements: attack moving and stationary targets; adverse weather operations; multiple ordnance carriage; precision munitions capability; reduced munitions footprint; increased weapons effectiveness; minimized potential for collateral damage; reduced susceptibility of munitions to countermeasures; and provides a network-enabled weapon capability via Link-16 and Ultra High Frequency (UHF) weapon data link. SDB II is a key component of the Air Force Global Strike Task Force Concept of Operations (CONOPs). The threshold aircraft for the USAF is the F-15E, and the threshold aircraft for the DoN are the F-35B and F-35C. Objective aircraft include the F-22, F-16, F-35A, B-2, A-10, MQ-9, B-1, B-52, AC-130 and the F/A-18E/F. SDB II is compatible with the Bomb Rack Unit-61 (BRU-61) miniature munitions carriage, Type II carriage systems, the Container Numerical Unit-660/E (CNU-660/E) carriage system, the Common Munitions Built In Test (BIT)/Reprogramming Equipment (CMBRE), and the Joint Mission Planning System (JMPS). SDB II will develop and field a single weapon storage container (USAF) and a dual weapon storage container (DoN).

SDB II completed a competitive Risk Reduction in October 2009 and entered Milestone B Engineering and Manufacturing Development (EMD) in August 2010. A Fixed Price Incentive Firm EMD contract with five options for annual Low Rate Initial Production (LRIP) lots (FY15-FY19) was awarded in August 2010. SDB II received Milestone C approval to enter LRIP in June 2015 and completed an Acquisition Program Baseline update. Contract options for LRIP Lots 1-5 have been exercised. Initial Operational Test and Evaluation (IOT&E) started June 2018 and completed December 2019. SDB II was fielded for the F-15E in September 2020. Initial Operational Capability (IOC) for the DoN's F-35B and F-35C is scheduled for FY 2023 and is based on the F-35 B/C hardware and software modification schedule. DoN's first production lot (Lot 4/FY19) supports F/A-18E/F IOC.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0M was expended for civilian pay expenses in this program element, and in FY21 \$0.203M is forecasted for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207327F / <i>Small Diameter Bomb (SDB)</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	0.000	0.000	0.000	0.000	0.000
Current President's Budget	0.000	20.780	27.109	0.000	27.109
Total Adjustments	0.000	20.780	27.109	0.000	27.109
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	3.500			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	17.280	27.109	0.000	27.109

**Congressional Add Details (\$ in Millions, and Includes General Reductions)**

**Project:** 675191: *SDB Increment II*

Congressional Add: *Precise Navigation*

Congressional Add: *SDB II Tech Refresh*

Congressional Add Subtotals for Project: 675191

Congressional Add Totals for all Projects

	<b>FY 2020</b>	<b>FY 2021</b>
	0.000	3.500
	0.000	0.000
	0.000	3.500
	0.000	3.500

**Change Summary Explanation**

FY21 and FY22 funding increased as a result of PE 0604329F, BA05, Project Small Diameter Bomb (SDB)-EMD efforts being transferred to PE 0207327F, BA07, Project Small Diameter Bomb (SDB), due to SDB II completion of BA05: System Development & Demonstrations (SDD) moved to Operational Systems Development BA07.

**C. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> SDB II Development and Engineering Changes	0.000	5.967	19.341
<b>Description:</b> Development activities to deliver capabilities in the SDB II Capability Development Document (CDD). Design, develop, integrate, model, test, and qualify engineering changes to SDB II baseline hardware and software to meet emerging threat, new technologies and to maintain compatibility with external systems. Activities include, but are not limited to, DoD-mandated data link cryptographic modernization, program protection, exportability features, cyber security, advanced guidance, navigation and control, enhanced lethality, precise/advance navigation, and address obsolescence issues and affordability			



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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0207327F / <i>Small Diameter Bomb (SDB)</i>		
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>opportunities. Conduct trade studies and concept development for technology refresh redesigns as based on obsolescence forecasts.</p> <p><b>FY 2021 Plans:</b>                      Complete development and qualification of the cryptographic modernized TacNet 1.5 weapon data link (TacNet 1.5 WDL). Continue design integration of the TacNet 1.5 WDL into the current SDB II All-Up-Round (AUR) design. Conduct section level design verification testing of TacNet 1.5 WDL. Conduct component level production readiness activities. Continue collaboration with NSA on cryptographic modernized WDL key development, testing, fielding, and management. Continue enhancements for Joint Mission Planning (JMPS) and Operational Flight Program (OFP) software. Procure special test equipment required for AUR level testing. Modify equipment required to support TacNet 1.5 WDL operations.</p> <p>Continue redesign and design verification tests of circuit card assemblies (CCAs) affected by obsolescence and M-Code at Proof of Design (POD) level. Conduct POD quality design verification testing of integrated electronics stacks. Perform OFP and firmware updates to support new CCA designs. Continue integration and section level design verification testing of the TacNet 1.5 WDL and associated cryptographic keys with new CCAs and associated OFP changes.</p> <p>Continue development, qualification, and testing of engineering changes associated with program protection, exportability, cyber security, enhanced lethality, survivability, threat defeat, software-based capability enhancements, obsolescence, and affordability. Procure developmental test assets. Continue integration of SDB II with Command and Control Infrastructure, including AOC integration and Joint Terminal Attack Controller (JTAC) kits. Continue technical order updates to support ongoing OFP development efforts. Continue BRU-61 OFP updates and integration. Conduct trade studies and concept development for technology refresh redesigns as required based on obsolescence forecasts.</p> <p><b>FY 2022 Plans:</b>                      Complete cryptographic modernization weapon data link integration and subsystem level design verification testing. Complete integration of the TacNet WDL 1.5 into the current SDB II All-Up-Round (AUR) design. Conduct production readiness activities at the component level. Continue collaboration with NSA on cryptographic modernized WDL key testing, fielding, and management. Continue enhancements for JMPS and OFP software. Conduct all-up-round (AUR) testing.</p> <p>Continue redesign and design verification tests of electronic circuit card assemblies (CCAs) affected by obsolescence and M-Code moving toward Proof of Manufacturing quality CCAs. Perform OFP and firmware updates to support new CCA designs. Complete POD-level integrated CCA stack design verification testing and qualification. Finalize Proof of Manufacturing (POM) designs and purchase POM test assets. Continue integration of the TacNet 1.5 WDL with the new CCAs and associated OFP changes.</p>				

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0207327F / <i>Small Diameter Bomb (SDB)</i>		
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>Continue development, qualification, and testing of engineering changes associated with program protection, exportability, cyber security, enhanced lethality, survivability, threat defeat, software-based capability enhancements, obsolescence, and affordability. Begin System Improvement Program (SIP) to continually advance capability of the weapon and transition program to a steady OFP update cycle. Procure developmental test assets to support developmental test and conduct developmental Captive Flight Tests and platform integration testing. Continue integration of SDB II with Command and Control Infrastructure, including AOC integration and JTAC kits. Continue technical order updates to support ongoing OFP development efforts. Continue BRU-61 OFP updates and integration. Conduct trade studies and concept development for technology refresh redesigns as required based on obsolescence forecasts</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increased due to separate integration activities for TacNet 1.5 WDL with the current AUR CCAs in advance of M-Code and new CCAs being ready for AUR testing. Program will also begin System Improvement Program activities in response to anticipated warfighter requirements post fielding.</p>				
<p><b>Title:</b> SDB II M-Code</p> <p><b>Description:</b> M-Code provides an enhanced anti-jam capability and secures access to military GPS signals. Activities include, but are not limited to, design, development, test and qualification of engineering changes to the SDB II system required for M-Code, and enhanced anti-jam capability. M-Code will provide the ability to operate in increasing adversarial anti-access/area-denial (A2/AD) jamming environments with increased accuracy, better signal acquisition, and enhanced security features.</p> <p><b>FY 2021 Plans:</b> Continue activities to provide SDB II with M-Code capabilities for improved anti-jam and secure access to military GPS signals. Continue development, test, and qualification activities for M-Code receiver and associated component integration. Build component and section-level developmental test assets and conduct ground and aircraft integration testing. Update mission planning and threshold aircraft OFP software to ensure aircraft-to-weapon integration and transmission of the appropriate M-Code initialization data and crypto keys. Implement engineering change proposals required by GPS Directorate to comply with signal-in-space interface control documents, key management distribution and security requirements.</p> <p><b>FY 2022 Plans:</b> Continue activities to provide SDB II with M-Code capabilities for improved anti-jam and secure access to military GPS signals. Complete development, test, and qualification activities for M-Code receiver and continue associated component integration. Conduct M-Code receiver-level qualification, including security certification. Conduct production readiness activities at the receiver level. Build section level developmental test assets and conduct design verification testing. Update mission planning and threshold aircraft OFP software to ensure aircraft-to-weapon integration and transmission of the appropriate M-Code initialization</p>		0.000	11.313	7.768

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0207327F / <i>Small Diameter Bomb (SDB)</i>		
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
data and crypto keys. Implement engineering change proposals required by GPS Directorate to comply with signal-in-space interface control documents, key management distribution and security requirements.				
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decrease due to maturity of receiver integration into the AUR and component level activities transitioning from development and integration to qualification and test. AUR level test assets, qualification and test activities for the new production baseline will be funded by Procurement appropriations in FY22.				
<b>Accomplishments/Planned Programs Subtotals</b>		0.000	17.280	27.109
		<b>FY 2020</b>	<b>FY 2021</b>	
<b>Congressional Add:</b> Precise Navigation		0.000	3.500	
<b>FY 2020 Accomplishments:</b> Continue design, integration, test, and down-select candidate seeker-based algorithms suitable for operation in a GPS denied environment. Currently the program is integrating algorithms into the Integrated Flight Simulator (IFS) to initially characterize performance over various ranges and terrains. Efforts anticipate Captive Flight Test (CFT) data collection, and subsequent evaluation of algorithm candidates' performances in order to down-select.				
<b>FY 2021 Plans:</b> Continue design, integration, and test candidate seeker-based algorithms suitable for operation in a GPS denied environment. Integrate algorithms into the Integrated Flight Simulator (IFS) to characterize performance over various terrains. Integrate software into Captive Flight Test (CFT) pod and conduct Captive Flight Test (CFT) events for data collection. Evaluate candidate algorithm performance to determine if any are suitable for a tactical implementation.				
<b>Congressional Add:</b> SDB II Tech Refresh		0.000	0.000	
<b>FY 2020 Accomplishments:</b> Reference BA05 PE0604329F for SDB II FY20 Tech Refresh Effort Funding				
The SDB II Tech Refresh thrust supports the Seeker Cost Reduction Initiative and is a multi-year initiative to increase system affordability, protect our ability to produce and operate, and increase weapon value for the warfighter. This includes, but may not be limited to, reducing the cost of the seeker and other components, subsystems, and assemblies within the weapon and associated system-of-systems; mitigating or responding to Diminishing Manufacturing Sources and Material Shortages (DMSMS); solidifying and/or increasing competition within the supplier industrial base; maximizing operational weapon effectiveness and value through capability enhancements and countering emerging threats; and improving supportability, handling, mission planning and human machine interface.				

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207327F / <i>Small Diameter Bomb (SDB)</i>
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	<b>FY 2020</b>	<b>FY 2021</b>
<p>Conduct Analysis of Alternatives to evaluate redesign of the seeker and/or other components and subsystems within the weapon; evaluate supplier and assembly cost reduction; develop a technology roadmap for system affordability, predictability and operational improvements; analyze system requirements and conduct a Systems Requirements Review; mature key technologies and reduce risk for preferred alternatives; and develop and test software enhancements to provide near and/or longer term performance enhancements to maximize warfighter value for fielded or future weapons. Work may also extend beyond the weapon into the SDB II system-of-systems to improve operational effectiveness, operator reliability, aircraft integration, mission planning and human machine interface.</p> <p><b>FY 2021 Plans:</b> N/A</p>		
<b>Congressional Adds Subtotals</b>	0.000	3.500

**D. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• MPAF 02 Line Item SDB002: <i>Small Diameter Bomb II</i>	183.279	209.972	294.649	-	294.649	-	-	-	-	-	-
• RDTE 05 0604329F: <i>Small Diameter Bomb (SDB) - EMD</i>	44.530	-	-	-	-	-	-	-	-	-	-
• RDTE 05 PE 0604329N: <i>Small Diameter Bomb II</i>	44.372	43.884	41.940	-	41.940	-	-	-	-	-	-
• WPN Line Item 223800: <i>Small Diameter Bomb II</i>	108.452	57.755	40.877	-	40.877	-	-	-	-	-	-

**Remarks**

DoN RDT&E funds include F-35B and F-35C Integration and Support Cost.

**E. Acquisition Strategy**

The SDB II Engineering and Manufacturing Development (EMD) contract was awarded using competitive procedures. At the completion of the 42-month Risk Reduction phase in October 2009, one contractor was selected in April 2010 and awarded the EMD contract in August 2010. The EMD contract is a Fixed-Price Incentive Firm (FPIF) contract with priced production options for the first five production lots. SDB II production Lots 1-3 are FPIF. Production Lots 4-5 are firm fixed price. The Government is buying the SDB II based on the contractor System Performance Specification (SPS) which has been approved by the Government. The contractor is accountable for system performance as defined in the SPS and a system warranty as defined in the EMD contract and follow-on production contracts. Accordingly,

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207327F / <i>Small Diameter Bomb (SDB)</i>
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the contractor is accountable to the Government for the design of the weapon system, as well as the planning and execution of the Development Test and Evaluation (DT&E) program to verify system performance. The Government formally arranges and funds the use of Government flight test support for DT&E and OT&E.

In September 2017, the Government awarded a sole source indefinite delivery indefinite quantity (IDIQ) contract to Raytheon Missile Systems to design, develop, integrate, model, test, and qualify engineering changes to SDB II baseline hardware and software to meet emerging threats and to maintain compatibility with external systems. Activities include, but are not limited to M-Code GPS, data link cryptographic modernization, program protection, exportability features, cyber security, advanced guidance, navigation and control, enhanced lethality, and address obsolescence issues and affordability opportunities.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207327F / Small Diameter Bomb (SDB)	<b>Project (Number/Name)</b> 675191 / SDB Increment II
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<b>Product Development (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Engineering Changes & Technical Support	SS/ Various	Raytheon : Tucson, AZ	-	-		7.365	Dec 2020	12.764	Dec 2021	-		12.764	-	-	136.520
M-Code Integration	SS/ Various	Raytheon : Tucson, AZ	-	-		11.313	Mar 2021	7.768	Mar 2022	-		7.768	-	-	109.437
F-15E Integration & Test Support	SS/ Various	Boeing : St. Louis, MO	-	-		1.027	Jun 2021	5.492	Jun 2022	-		5.492	-	-	49.762
<b>Subtotal</b>			-	-		19.705		26.024		-		26.024	-	-	N/A

**Remarks**  
 Engineering Changes and Technical Support: upgrades to SDB II baseline hardware/software to meet emerging threats and to maintain compatibility with external systems. Activities include, but are not limited to, data link cryptographic modernization, program protection, exportability, cyber security, advanced guidance, navigation and control, enhanced lethality, and address obsolescence issues and affordability opportunities.  
 The increase in F-15E Integration and Test Support in FY22 is due to the biennial weapon OFP update.

<b>Management Services (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Engineering Professional Administrative Support Services (EPASS)	Various	Various : Eglin AFB, FL	-	-		0.750	Jun 2021	0.750	Jun 2022	-		0.750	-	-	25.508
Program Management Administration (PMA)	Various	Various : Eglin AFB, FL	-	-		0.325	Oct 2020	0.335	Oct 2021	-		0.335	-	-	11.536
<b>Subtotal</b>			-	-		1.075		1.085		-		1.085	-	-	N/A

**Remarks**  
 PMA: Other government costs (travel, Government Purchase Card (GPC), equipment supplies, and IT support)

	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>		-	-	20.780	27.109	-	-	27.109	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207327F / <i>Small Diameter Bomb (SDB)</i>	<b>Project (Number/Name)</b> 675191 / <i>SDB Increment II</i>
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	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
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**Remarks**

Engineering Changes: upgrades to SDB II baseline hardware/software to meet emerging threats, maintain compatibility with external systems and improve system performance. Activities include, but are not limited to, data link cryptographic modernization, program protection, exportability, cyber security, advanced guidance, navigation and control, enhanced lethality, and address obsolescence issues and affordability opportunities.

FINANCIAL PERFORMANCE: SDB II is evaluated against traditional Research and Development (R&D) program expenditure benchmarks. However, the SDB II LRIP contract is a FPIF contract with progress payments. A percent of incurred costs are withheld until the end of the contract, when they are liquidated. Mandatory funding obligations and progress payment withholds will cause the program to lag traditional expenditure benchmarks, painting an inaccurate portrait of overall program health.

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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date: May 2021**

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207327F / <i>Small Diameter Bomb (SDB)</i>	<b>Project (Number/Name)</b> 675191 / <i>SDB Increment II</i>
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FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b><i>SDB Increment II</i></b>																												
F-15E Integration & Test Support																												
M-Code Integration & Testing																												
Data Link Crypto Mod Integration & Testing																												
Integration & Testing on Threshold F-35B/C																												
Precision Navigation																												
SDB II Tech Refresh																												



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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207327F / <i>Small Diameter Bomb (SDB)</i>	<b>Project (Number/Name)</b> 675191 / <i>SDB Increment II</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>SDB Increment II</i></b>				
F-15E Integration & Test Support	2	2020	4	2022
M-Code Integration & Testing	1	2020	2	2025
Data Link Crypto Mod Integration & Testing	1	2020	4	2023
Integration & Testing on Threshold F-35B/C	1	2020	4	2023
Precision Navigation	1	2020	3	2022
SDB II Tech Refresh	4	2020	3	2021

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207410F / <i>Air &amp; Space Operations Center (AOC)</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	110.651	51.094	0.003	0.000	0.003	-	-	-	-	-	-
674596: <i>AOC WS Modifications</i>	-	110.651	51.094	0.003	0.000	0.003	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Note**  
 In FY 2022, PE 0207410F, Air & Space Operations Center (AOC), Project 674596, AOC WS Modifications, was transferred to PE 0608410F, Air & Space Operations Center (AOC), Project 684596, AOC WS Modifications, in order to a participate in DoD's Budget Activity 08 for Software and Digital Technology Pilot Program.

In FY 2022, PE 0207410F, Air & Space Operations Center (AOC), Project 674596, AOC WS Modifications, platform efforts were transferred to PE 0303248F, All Domain Common Platform (ADCP), Project 675218, Applications Development, in order to support enterprise level hosting platform activities.

FY 2022: There is no plan to execute the remaining \$0.003M amount; this is residual funding resulting from inflation rate adjustments that will be fixed during future database cleanup actions.

**A. Mission Description and Budget Item Justification**

The Air Operations Center Weapon System (AOC WS), AN/USQ-163 Falconer, the senior element of the Theater Air Control System (TACS), is the weapon system that the Commander, Air Force Forces (COMAFFOR) provides the Combined/Joint Force Air Component Commander (C/JFACC) for planning, executing, and assessing theater-wide air and space operations. The C/JFACC provides air, space and cyber support to the Combined/Joint Forces Commander (C/JFC) by coordinating, deconflicting, and assessing the progress of various weapon systems to advance the C/JFC's campaign. The AOC WS develops operations strategy and planning documents. The weapon system also disseminates tasking orders; executes day-to-day peacetime and combat air, space and cyber operations; and provides rapid reaction to immediate situations by exercising positive control of friendly forces. This program is part of the overarching Kessel Run portfolio.

Funding supports continued software engineering capacity required for AOC WS Modifications to enable the transition from legacy systems (e.g., Theater Battle Management Core System - Force Level (TBMCS FL) and AOC 10.1) to Block 20 modernized applications while delivering, enabling and operating an extensible cloud-based Infrastructure and Platform as a Service (IaaS/PaaS) hosting platform. Additionally, the continued software engineering capacity delivers air operations capabilities improving speed and automation of the full air tasking cycle, including unit-level sortie generation capabilities that feed friendly order of battle information to the Master Air Attack Plan process. AOC WS Modifications are required for the AOC to keep pace with evolving COTS/GOTS components, DoD directives, changes in the underlying IT environment, and to remain interoperable, certified, supportable, and compliant through software engineering solutions, integration, testing, fielding, training, and sustainment of new capabilities and upgrades to the AOC WS. This includes utilization of managed cloud IaaS/PaaS hosting platform. Also, AOC WS Modifications activities evolve the AOC utilizing Agile Methodologies and embracing DevOps practices to deliver improved capabilities in support of mission requirements at Geographic and Global (formerly Functional) AOCs, as well as Support and Manpower Augmentation units, keeping the AOC current and interoperable with the Combatant Commands (CCMDs), cyber requirements, and next generation weapon systems/weapons.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207410F / <i>Air &amp; Space Operations Center (AOC)</i>
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No FY 2022 funding requested; FY 2022 project efforts are detailed in PE 0303248F, ADCP, and PE 0608410F, AOC.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$9.910M was expended for civilian pay expenses in this program element, and in FY21 \$19.137M is forecasted for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	114.864	51.187	112.232	0.000	112.232
Current President's Budget	110.651	51.094	0.003	0.000	0.003
Total Adjustments	-4.213	-0.093	-112.229	0.000	-112.229
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-0.093			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-0.009	0.000			
• SBIR/STTR Transfer	-4.204	0.000			
• Other Adjustments	0.000	0.000	-112.229	0.000	-112.229

**Change Summary Explanation**

FY 2022: Funding decreased due to transfer to PE 0608410F, Air & Space Operations Center (AOC), in order to a participate in DoD's Budget Activity 8 for Software and Digital Technology Pilot Program.

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<b>Title:</b> AOC WS Modifications Development	97.554	47.523	0.003	0.000	0.003
<b>Description:</b> Conduct AOC WS infrastructure software engineering solutions and mission capability software engineering solutions by leveraging agile engineering methodologies to engineer, integrate, and test modification updates to the AOC WS leveraging test-driven development. Utilize CI/CD processes to provide engineering solutions, test, and deliver effective operational C2 capabilities including enhanced C2 capabilities to support multi-domain operations.					

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207410F / <i>Air &amp; Space Operations Center (AOC)</i>	

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<p><b><i>FY 2021 Plans:</i></b> - Continue rapid fielding of software capabilities to enable the retirement of TBMCS FL and MAAPTK - Continue development and establishment of an enterprise infrastructure baseline to support hosting a virtual private cloud</p> <p><b><i>FY 2022 Base Plans:</i></b> See PE 0303248F, ADCP, Project 675218, Applications Development, and PE 0608410F, AOC, Project Number 684596, AOC WS Modifications.</p> <p><b><i>FY 2022 OCO Plans:</i></b> N/A</p> <p><b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> Funding decreased due to transfer to PE 0608410F, AOC, Project Number 684596, AOC WS Modifications.</p>					
<p><b><i>Title:</i></b> AOC WS Modifications Direct Mission Support</p> <p><b><i>Description:</i></b> Plan and execute strategies to adopt commercial best practices for software development, scale out a modern IaaS/PaaS solution to the AOC WS enterprise, implement improved solutions for platform architecture and CI/CD pipeline, and maintain continuous Authority to Operate (ATO).</p> <p><b><i>FY 2021 Plans:</i></b> - Provide the competencies necessary to scale software development capacity and enable retirement of TBMCS FL - Continue to enable development and establishment of extensible cloud-based IaaS/PaaS hosting platform/ enterprise architecture baseline environment</p> <p><b><i>FY 2022 Base Plans:</i></b> See PE 0303248F, ADCP, Project 675218, Applications Development, and PE 0608410F, AOC, Project Number 684596, AOC WS Modifications.</p> <p><b><i>FY 2022 OCO Plans:</i></b> N/A</p> <p><b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> Funding decreased due to transfer to PE 0608410F, AOC, Project Number 684596, AOC WS Modifications.</p>	13.097	3.571	0.000	0.000	0.000
<b>Accomplishments/Planned Programs Subtotals</b>	110.651	51.094	0.003	0.000	0.003

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207410F / <i>Air &amp; Space Operations Center (AOC)</i>
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**D. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• OPAF 03 834520: <i>Theater Battle Mgt C2 System</i>	5.499	0.000	0.000	0.000	0.000	-	-	-	-	-	-
• OPAF 03 834530: <i>Air &amp; Space Operations Center (AOC)</i>	33.243	15.383	2.224	0.000	2.224	-	-	-	-	-	-

**Remarks**

**E. Acquisition Strategy**

The acquisition strategy builds on agile software engineering solutions and modification of existing capabilities using evolutionary acquisition to standardize and modify the AOC WS. The initial capability was AOC WS Increment 10.0, which fielded the 10.0 configuration to five operational sites, plus a Help Desk and a Formal Training Unit. The second increment, Increment 10.1, upgraded these locations to an integrated baseline and fielded the baseline to additional operational and reserve units worldwide. AOC WS Modifications will leverage commercial best practices of Agile DevOps to scale out a modern virtual private cloud to the AOCs and scale up additional software product teams in support of retiring TBMCS FL and other legacy mission critical applications allowing for eventual disposal of the AOC 10.1 infrastructure. This enables dynamic resource allocation based on current warfighter needs. AOC Modifications operates under authority of FY16 NDAA, Section 804, Middle Tier of Acquisition for Rapid Prototyping and Rapid Fielding, leveraging commercial best practices to reduce timelines by modularizing both the development work and the associated contracting and funding strategies. The program is transitioning to a Software Acquisition Pathway following DoDI 5000.87, Operation of Software Acquisition Pathway Guidance. The desired end state is continuous delivery of all AOC WS software.

AOC WS Modifications will leverage the AOC WS Long-Term Modification and Sustainment (LTM&S) contract which will provide support to government led integration of the AOC WS enterprise. AOC WS Modifications will also use Other Transaction Authority (OTA) to adopt commercial best practices for software development and to scale out a modern Infrastructure as a Service/Platform as a Service (IaaS/PaaS) solution. Activities are also accomplished via Military Interdepartmental Purchase Requests (MIPR). Additionally, significant technical expertise will be sought after via modular contracting approach and provided by Government Agencies, DoD Laboratory, Federally Funded Research and Development Centers (FFRDC), Academia, and Engineering & Professional Acquisition Support Services contractors as well as commercial industry partners.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force												Date: May 2021				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
3600 / 7				PE 0207410F / Air & Space Operations Center (AOC)				674596 / AOC WS Modifications								
<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
AOC WS Modifications Development	C/Various	Various : Multiple	-	56.931	Dec 2019	22.595	Dec 2020	0.003	Dec 2021	0.000		0.003	-	-	-	
AOC WS Modifications Other Transaction	Various	Pivotal : Multiple	-	16.509	Dec 2019	1.985	Dec 2020	0.000		0.000		0.000	-	-	-	
<b>Subtotal</b>			-	73.440		24.580		0.003		0.000		0.003	-	-	N/A	
<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
AOC WS Modifications Direct Mission Support	C/Various	Various : Various	-	13.097	Oct 2019	3.571	Dec 2020	0.000		0.000		0.000	-	-	-	
AOC WS Modifications Civilian Direct Cite Authorizations for Product Development	Allot	AFLCMC/FZA : TBD	-	9.910	Oct 2019	19.137	Oct 2020	0.000		0.000		0.000	-	-	-	
<b>Subtotal</b>			-	23.007		22.708		0.000		0.000		0.000	-	-	N/A	
<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
AOC WS Modifications Engineering Services	Various	Various : Various	-	5.454	Oct 2019	2.432	Dec 2020	0.000		0.000		0.000	-	-	-	
AOC WS Modifications Program Support	C/Various	Various : Various	-	8.750	Nov 2019	1.374	Dec 2020	0.000		0.000		0.000	-	-	-	
<b>Subtotal</b>			-	14.204		3.806		0.000		0.000		0.000	-	-	N/A	
<b>Project Cost Totals</b>			-	110.651		51.094		0.003		0.000		0.003	-	-	N/A	

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207410F / Air & Space Operations Center (AOC)	<b>Project (Number/Name)</b> 674596 / AOC WS Modifications
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	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
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**Remarks**  
AOC funding transferred to PE 0608410F, Air & Space Operations Center (AOC), Project 684596, AOC WS Modifications.



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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207410F / Air & Space Operations Center (AOC)	<b>Project (Number/Name)</b> 674596 / AOC WS Modifications

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>AOC WS Modifications</b>	
AOC WS Modifications Kessel Run	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207410F / Air & Space Operations Center (AOC)	<b>Project (Number/Name)</b> 674596 / AOC WS Modifications

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>AOC WS Modifications</b>				
AOC WS Modifications Kessel Run	1	2020	4	2021

**Note**

See PE 0303248F, All Domain Common Platform (ADCP), Project 675218, Applications Development, and PE 0608410F, Air & Space Operations Center (AOC), Project Number 684596, AOC WS Modifications for continued development events.

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207412F <i>I Control and Reporting Center (CRC)</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	6.642	16.012	9.875	0.000	9.875	-	-	-	-	-	-
67485L: <i>CRC Modernization</i>	-	6.642	16.012	9.875	0.000	9.875	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

The Control and Reporting Center (CRC) is a mobile, ground-based theater air control system (TACS) surveillance and battle management command and control (BMC2) element. It is a customizable, modular, transportable, and persistent weapon system employed at the tactical level to support air and surface operations to provide direct command and control to all air assets in an assigned Area of Responsibility (AOR) and to report back to the Joint Force Air Combat Commander (JFACC). The CRC is a family of systems which include: AN/TYQ-23A(V)1 Tactical Air Operations Module (TAOM), AN/TSC-147 Joint Tactical Information Distribution System (JTIDS) Module, AN/TRC-213/214 Remote Radio Secure Voice System (RRSVS), CRC Organic Software and the AN/TPS-75 radar which will be replaced and integrated into the Three-Dimensional Expeditionary Long-Range Radar (3DELRR) System. Air Combat Command (ACC) CRC Capability Road map provides for the modernization of this family of systems and will be programmed into phased updates through 2037.

CRC is part of the Air Force's Advanced Battle Management System (ABMS) initiative, to which CRC will provide a tactical C2 capability. CRC Modernization (formerly known as CRC Bridge to ABMS) strategy in FY20 commenced a consolidation of previous modernization efforts into a larger initiative that continues the upgrading of BMC2, sensors, and communications systems. These continuing modernization efforts will allow CRC to adopt a leaner, modular and streamlined architecture that can be tailored to execute a wide range of operations. Furthermore, CRC will develop organic operating software solutions that will ingest and disseminate Moving Target Indicator (MTI) feeds and tracks, enable Open Mission Systems (OMS)/Universal Command and Control Interface (UCI) compliance, and integrate Top Secret (TS)/ Sensitive Compartmented Information (SCI)/Special Access Program (SAP) hardware and software capability solutions. The organic software development efforts rely on having a steady stream of RDT&E funding through the FYDP.

In FY 2022, CRC development efforts support CRC Modernization include, but are not limited to: AN/TYQ-23A(V)1, AN/TRC-213/214 architecture modernization upgrades, RRSVS radio modernization upgrades (Second-Generation Anti-Jam Tactical UHF Radio for NATO (SATURN)/Mobile User Objective System (MUOS)/ Ethernet Over Internet Protocol (EOIP)), continuous software development/integration/deployment using Agile and development, security and operations (DevSecOps), 3DELRR Integration, Ground and Air MTI trackers, TS/SCI/Joint Worldwide Intelligence Communication System (JWICS) and Talon Thresher, SAP, hardware and software integration, ABMS, TS accredited structures and storage solutions in pursuit of emerging technology for OMS/Open System Architecture (OSA) advancements, along with possible hardware changes to support ABMS software/hardware development work and collaboration with other ABMS software factories, integration of Link 16 Radios and Secure Internet Protocol Router Network (SIPRNet) capabilities, TS/SCI/SAP accredited structures and storage solutions in pursuit of emerging technology for OMS/OSA advancements. Additionally, possible hardware changes to support ABMS architecture and Live/Virtual/Constructive (L/V/C) Operations capability, multilevel security, edge computing, and artificial intelligence/machine learning solutions. Additional CRC modifications are required for the system to keep pace with evolving COTS/GOTS components, DoD directives, changes in the underlying IT environment and any other emerging requirements, and to remain

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207412F <i>I Control and Reporting Center (CRC)</i>
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interoperable, certified, supportable, and compliant through the development, integration, testing, fielding, training and related equipment of new CRC capabilities, upgrades and electronic warfare techniques such as "Angry Kitten".

The FY 2022 funding request was reduced by 0.522 million to account for the availability of prior year execution balances.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0.462M was expended for civilian pay expenses in this program element, and in FY21 \$1.042M is forecasted for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	8.109	16.041	10.546	0.000	10.546
Current President's Budget	6.642	16.012	9.875	0.000	9.875
Total Adjustments	-1.467	-0.029	-0.671	0.000	-0.671
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-0.029			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-1.203	0.000			
• SBIR/STTR Transfer	-0.264	0.000			
• Other Adjustments	0.000	0.000	-0.671	0.000	-0.671

**Change Summary Explanation**

FY 2020: Decreased \$1.203M for Below Threshold Reprogramming.

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<b>Title:</b> CRC Modernization (formerly known as CRC Bridge to ABMS)	6.642	16.012	9.875	0.000	9.875
<b>Description:</b> CRC Modernization (formerly known as CRC Bridge to ABMS) efforts will incorporate all future modernization efforts. The following efforts will continue in FY21 and continue into FY22: - Radio Modernization: Upgrading existing radio configuration to include new software and hardware capable of MUOS and SATURN					

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207412F <i>I Control and Reporting Center (CRC)</i>
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>- CRC Modernization: OMS/UCI development/integration, organic system software development and upgrades in collaboration with ABMS Software factories, JWICS integration, Ground and Air MTI tracker integration, Multi-Level Security/Cross Domain Solution (MLS/CDS) Implementation, L/V/C Operations capability</p> <p><b>FY 2021 Plans:</b></p> <ul style="list-style-type: none"> <li>- Complete Radio Modernization prototypes and perform Developmental Testing/Operational Testing (DT/OT) testing activities (Joint Interoperability Test Command (JITC) and Air Force System Interoperability Test (AFSIT)); this effort was consolidated from "CRC Bridge to ABMS" program narrative in FY21 as defined above</li> <li>- Develop, test, and integrate MTI prototypes</li> <li>- Pursue efforts related to, but not excluded to, OMS/UCI development/integration, continuous software development, Mode 5 implementation, JWICS integration, MLS/CDS Implementation, L/V/C Operations capability, and AN/TPS-75 modernization</li> <li>- Develop, test, and integrate organic software; complete bi-weekly sprints developing requirements pulled from the CRC Functional Capabilities Document; development efforts may include but not be limited to Ground and Air MTI, sensor data ingestion, "platformONE" migration, recording and playback solutions, and electronic warfare techniques such as "Angry Kitten"</li> <li>- Develop and build modernized AN/TYQ-23A(V)1 and AN/TRC-213/214 prototype; this effort will primarily focus on, but not limited to, the integration and reduction in size of both the AN/TYQ-23A(V)1 and AN/TRC-213/214 and the adoption of a mobile and scalable architecture</li> </ul> <p><b>FY 2022 Base Plans:</b></p> <ul style="list-style-type: none"> <li>- Field minimum viable product of organic software</li> <li>- Continue development, test and integration of additional CRC requirements</li> <li>- Provide technical assistance for fielded software</li> <li>- Maintain security patches and required updates</li> <li>- Test and integrate modernized AN/TYQ-23A(V)1 and AN/TRC-213/214 prototype</li> </ul> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreased due to the expected completion of Radio Modernization development efforts in FY21.</p>					
<b>Accomplishments/Planned Programs Subtotals</b>	6.642	16.012	9.875	0.000	9.875

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207412F I <i>Control and Reporting Center (CRC)</i>
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**D. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• OPAF 03 833040: <i>Theater Air Control Sys Improvemen</i>	0.000	13.374	18.658	0.000	18.658	-	-	-	-	-	-

**Remarks**

**E. Acquisition Strategy**

The CRC Capability Roadmap provides for the modernization of the CRC family of systems and will be programmed into phased updates through 2037 to further advance current and future battlespace awareness and tactical battle management command and control capabilities. A variety of contract and organic vehicles will be used depending on type of effort and skills required. Management strategy relies on Air Force Program Executive Office for Digital (AFPEO BM) as the Milestone Decision Authority and the Air Force Life Cycle Management Center (AFLCMC) as the Contracting Authority.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force												Date: May 2021				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
3600 / 7				PE 0207412F / Control and Reporting Center (CRC)				67485L / CRC Modernization								
<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
CRC Modernization	C/Various	Various : Hill AFB, UT	-	5.003	Jan 2020	7.540	Jun 2021	3.901	Dec 2021	0.000		3.901	-	-	-	
CRC 520th Organic Software Development	C/FP	520 SWEG : Hill AFB, UT	-	0.824	Sep 2020	4.839	Dec 2020	3.175	Dec 2021	0.000		3.175	-	-	-	
<b>Subtotal</b>			-	5.827		12.379		7.076		0.000		7.076	-	-	N/A	
<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
CRC Modernization Direct Cite Authority - Additional 11 Civilian Positions	RO	Various : Hill AFB, UT	-	0.462	Jun 2020	1.042	Oct 2020	1.200	Oct 2021	0.000		1.200	-	-	-	
<b>Subtotal</b>			-	0.462		1.042		1.200		0.000		1.200	-	-	N/A	
<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
CRC Modernization Test Support	Various	Various : Various	-	0.322		0.209	Aug 2021	0.599	Nov 2021	0.000		0.599	-	-	-	
<b>Subtotal</b>			-	0.322		0.209		0.599		0.000		0.599	-	-	N/A	
<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Booze Allen Hamilton	C/FP	Not specified. : TBD	-	0.031	Jun 2020	1.192	Mar 2021	-		-		-	-	-	-	
HX5	C/FP	Not specified. : TBD	-	-		1.190	Mar 2021	1.000	Mar 2022	-		1.000	-	-	-	
<b>Subtotal</b>			-	0.031		2.382		1.000		-		1.000	-	-	N/A	





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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Air Force</b>		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207412F / <i>Control and Reporting Center (CRC)</i>	<b>Project (Number/Name)</b> 67485L / <i>CRC Modernization</i>

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b><i>AN/TRC-213/214 RRSVS Radio Modernization Upgrade</i></b>	
Design and Development	
Integration and Testing	
<b><i>CRC Modernization</i></b>	
Development and Integration	
Integration and Testing	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207412F / <i>Control and Reporting Center (CRC)</i>	<b>Project (Number/Name)</b> 67485L / <i>CRC Modernization</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>AN/TRC-213/214 RRSVS Radio Modernization Upgrade</i></b>				
Design and Development	2	2020	4	2020
Integration and Testing	4	2020	1	2022
<b><i>CRC Modernization</i></b>				
Development and Integration	1	2021	4	2022
Integration and Testing	4	2021	4	2022

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207417F / <i>Airborne Warning and Control System (AWACS)</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	67.341	123.925	171.014	0.000	171.014	-	-	-	-	-	-
67411L: <i>Airborne Warning &amp; Control System (AWACS)</i>	-	67.341	123.925	171.014	0.000	171.014	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Note**

This program, BA 7, PE 0207417F, project 67411L, E-3 AWACS Global Lightning (AGL), is a new start.

**A. Mission Description and Budget Item Justification**

Mission: E-3 Airborne Warning and Control System (AWACS) is the premier airborne platform providing Battle Management (BM)/Command and Control (C2) for Commander In Chief and combatant commander tasking in joint, allied, and coalition operations, humanitarian relief, and homeland defense. AWACS provides a real-time picture of friendly, neutral, and hostile air activity. Its capabilities include all-altitude/all-weather surveillance of the battle space; early warning of enemy actions; a real-time ability to find, fix, track, and assess airborne or maritime threats; and detection, location, and identification of electronic emitters.

1. E-3 DMS Replacement of Avionics for Global Operations and Navigation (DRAGON): DRAGON completes the Federal Aviation Administration (FAA), International Civil Aviation Organization (ICAO), and European Organization for the Safety of Air Navigation (EUROCONTROL) air traffic control mandated safety of flight capabilities. This program will provide the E-3 fleet with the flight instruments and other avionics for the Required Navigation Performance (RNP), and the surveillance and communication capabilities necessary to maintain continued critical unrestricted access to global airspace. Non-compliance will result in airspace restrictions and denials that will impact AWACS ability to support worldwide responses to situations requiring immediate on-scene BM/C2. DRAGON replaces the existing Diminishing Manufacturing Sources (DMS) Global Positioning System (GPS) Integrated Navigation System (GINS) with a modern Flight Management System (FMS) that will accommodate new capabilities including Mode 5 Identification Friend or Foe (IFF) and Joint Mission Planning System (JMPS). Also included as part of the modification is the addition of data link communications, voice and data link digital radios, and improved visual displays. Additionally, the acquisition of DRAGON flight simulators also contains DMS efforts which include removal of end-of-life software/hardware within simulator systems and move to a modular, common open system architecture that is sustainable and cyber resilient. The simulator effort also implements requirements and standards defined under the Simulator Common Architecture Requirements and Standards (SCARS) initiative. Emphasis on employment of Commercial-Off-The-Shelf (COTS) avionics is expected to lower cost, reduce the tech refresh cycle, and enhance life cycle management. The Engineering and Manufacturing Development (EMD) phase of DRAGON was being executed as a Cooperative Program between the US and NATO.

2. E-3 Electronic Protection (EP): EP will provide improved radar processing in a specific flight environment to meet a classified requirement. EP will replace the radar controller, exciter, receiver, and data processor in the current Radar System Improvement Program (RSIP) system. The EP-processed radar picture will appear on the battle manager's display and is intended to provide APY-2 radar quality to the entire U.S. AWACS fleet. EP also resolves DMSMS and obsolescence concerns with APY-1/APY-2 radar.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207417F / <i>Airborne Warning and Control System (AWACS)</i>	
<p>3.E-3 Training, Support, and Infrastructure (TSI): The TSI program provides continuing lab operations and maintenance support for AWACS modernization and enhancement across the enterprise, as well as the development and execution of an AWACS Integration and Test Support (AITS) lab transfer acquisition strategy. These activities include managing the AWACS Development Test and Evaluation (DT&amp;E) infrastructure and tracking and monitoring the AWACS support equipment and program Government Furnished Property, while managing the cost, schedule, and performance of the AITS lab transfer plan. The overall DT&amp;E test infrastructure supports development and production projects and maintains facilities to support AWACS aircraft during system and sub-system testing in Seattle, WA, Baltimore, MD, and Oklahoma City, OK, along with Third Party Integration support from The Boeing Company to AWACS customers in the System AITS labs. The TSI assets also support multiple Foreign Military Sales (FMS) projects on a maintenance fee basis, not limited to projects for France, Saudi Arabia and Japan efforts. Key programs include contractual management of the AWACS Avionics Integration Laboratory (AIL) integrated with the Block 40/45 Functional Group configured lab and the AWACS Radar Systems Integration Lab/Software Development Facility (SIL/SDF). These labs provide US, and Foreign Military Sales (FMS) and Direct Commercial Sales customers with a configured development and qualification system and subsystem environment supporting all AWACS system and radar programs. TSI efforts allow new support equipment technologies and test strategies to be analyzed to ensure concurrent capability to sustain existing, modified, and upgraded E-3 equipment.</p> <p>4. E-3 Command and Control, Intelligence, Surveillance, and Reconnaissance (C2ISR): C2ISR system improvements investigate and develop future capabilities of the AWACS weapon system. These efforts also include but are not limited to investigation, analysis, and development to ensure that AWACS successfully integrates with joint and coalition forces in a net-centric environment. C2ISR primarily supports pre-systems acquisition in the areas of materiel solution analysis and technology development. This is accomplished by prototyping and demonstrating capabilities required by the warfighter but also includes developing an E-3 Modernization &amp; Sustainment Roadmap that projects user capability needs, as well as materiel solutions for the user needs. C2ISR also support an analytical comparison of the operational effectiveness, suitability, life-cycle cost and system capabilities of alternative materiel solutions beyond the current AWACS that satisfy an established capability need identified in an Initial Capabilities Document (ICD), Rapid Prototyping Requirements Document (RPRD), or Rapid Fielding Requirements Document (RFRD).</p> <p>5. E-3 Internet Protocol Enabled Communication (IPEC): IPEC will provide the Block 40/45 E-3 with a medium-bandwidth Internet Protocol (IP) communications capability to connect to the Global Information Grid and will support net-centric operations/warfare. IPEC will provide a reliable IP-enabled communication capability to support a shortened digitized kill-chain of time-sensitive targets. The modification will provide a permanent Inmarsat-based IP-enabled communications package supporting warfighter identified requirements for increased bandwidth Secret Internet Protocol Router Network (SIPRNet) and multi-domain networks.</p> <p>6. E-3 Combat Identification (CID) DMS: AWACS' current CID capability is based upon 1960's era technology that has become unsustainable, and requires an update to retain a significant part of AWACS overall mission capability. AWACS will address C2 CID shortfalls with a modern, persistent Airborne Moving Target Indicator (AMTI) BM/C2 combat ID. CID DMS supports the kill chain and decision superiority.</p> <p>7. E-3 Communication Network Upgrade (CNU): CNU will provide a Link 16 capability with high-jam-resistance, high-speed, crypto-secure computer-to-computer connectivity in support of every type of military platform from Air Force fighters to Navy submarines. The current 20 year old Class 2 terminal has sustainability/DMS issues and does not support mandated Crypto Mod (CM) &amp; Freq. Remap (FR). CNU resolves DMS issues, provides CM &amp; FR, Link 16 enhancements &amp; growth for Next Gen Tactical Data Link (TDL). CNU capabilities will be delivered two Phases, comprised of three efforts (MVPs). Phase I: MVP1 (Crypto) will provide Enhanced Link</p>		

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207417F / <i>Airborne Warning and Control System (AWACS)</i>	
<p>16 Crypto and Frequency Mapping, and MVP2 (HPAs) will provide High Powered Amplification of Communications. Phase II: MVP3 (Link 16 Advanced Capabilities) will provide Link 16 Advanced Communications Throughput via Ethernet Connection.</p> <p>8. E-3 Mode 5 Acceleration: Updates flight deck to address known Air Traffic Management restrictions; upgrades the current flight deck transponder to include the Mode 5 capability since DRAGON's IOC 2022/FOC 2028 does not meet the Mode 5 mandate. This subset accelerates the Mode 5 transponder FOC independent of DRAGON.</p> <p>9. E-3 AWACS Communications Integration Program (ACIP): ACIP will provide Mobile User Objective System (MUOS) and Second Generation Anti-Jam Tactical UHF Radio for NATO (SATURN) capability by replacing the existing Have Quick II and DAMA SATCOM radios with new radios capable of communicating via the existing and additional military waveforms as a combined integration program on AWACS. Provides continued compatibility with US and Allied forces using frequency hopping UHF in support of airborne AMTI &amp; BMC2 to COCOMs for Joint, Allied &amp; Coalition ops by maintaining compatibility with CAF / Sister service C2 nodes and theater assets.</p> <p>10. E-3 GPS Upgrade (M-Code): The GPS upgrade provides E-3G AWACS with robust capability to operate in evolving GPS jamming environment. It incorporates M-Code capability into E-3G. As well as provides continued capabilities in GPS jamming environment in support of airborne AMTI &amp; BMC2 to COCOMs for Joint, Allied &amp; Coalition ops. We are compliant with OSD/NII mandate (2006), Public Law 111-383 and FY11 National Defense Authorization Act.</p> <p>11. E-3 AWACS Fifth to Fourth (5th to 4th): 5th to 4th provides the capability for E-3G AWACS to receive 5th generation data via Link 16 and other data feeds, as required. This capability includes the security domain required to integrate the 5th generation data into Mission Computing Software and generate an integrated operational air picture. 5th to 4th addresses gaps and inaccuracies in the Common Tactical Picture (CTP) and improves Situational Awareness (SA) and Battle Management Command and Control (BMC2) decision making by shortening the kill chain for warfighters in a contested environment. This is not a New Start; in FY 2020 program 0604281F, TDNE, project 655262 efforts were transferred to program 0207417F, Airborne Warning and Control System (AWACS), project 67411L in order to properly align requirement with the correct Weapon System.</p> <p>12. E-3 AWACS Global Lightning (AGL): AGL will provide E-3 with high bandwidth Internet Protocol (IP) communication capability leveraging the significant increase in bandwidth capacity using commercial and military SATCOM. AGL will improve current operations with very low latency, jamming resistance, gigabytes per second class bandwidth and enabling future joint mission operations to support a shortened digitized kill-chain of time-sensitive targets.</p> <p>This program element may include necessary emergent civilian pay expenses required to manage, execute, and deliver E-3 AWACS weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$2.802M expended and in FY21 \$2.441M is forecasted for civilian pay expenses in this program element.</p> <p>This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.</p>		

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207417F / <i>Airborne Warning and Control System (AWACS)</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	67.996	138.303	173.584	0.000	173.584
Current President's Budget	67.341	123.925	171.014	0.000	171.014
Total Adjustments	-0.655	-14.378	-2.570	0.000	-2.570
• Congressional General Reductions	0.000	-0.226			
• Congressional Directed Reductions	0.000	-14.152			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-0.132	0.000			
• SBIR/STTR Transfer	-0.523	0.000			
• Other Adjustments	0.000	0.000	-2.570	0.000	-2.570

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
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<b>Title:</b> E-3 DMS Replacement of Avionics for Global Operations and Navigation (DRAGON)	1.362	1.351	0.000
<b>Description:</b> DRAGON: Provides analog to digital cockpit addressing the Federal Aviation Administration (FAA), International Civil Aviation Organization (ICAO), and European Organization for the Safety of Air Navigation (EUROCONTROL) air traffic control mandated safety of flight capabilities. Provides the E-3 fleet with the flight instruments and other avionics for the Required Navigation Performance (RNP), and the surveillance and communication capabilities necessary to maintain continued critical unrestricted access to global airspace.			
<b>FY 2021 Plans:</b> - Complete Development of Motion Trainer Simulator			
<b>FY 2022 Plans:</b> - N/A			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> - Completed EMD Effort			

<b>Title:</b> E-3 Electronic Protection (EP)	12.822	22.710	42.369
<b>Description:</b> EP: Provides improved radar processing in a specific flight environment to meet a classified requirement. Replaces the radar controller, exciter, receiver, and data processor in the current Radar System Improvement Program (RSIP) system.			
<b>FY 2021 Plans:</b>			

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0207417F / <i>Airborne Warning and Control System (AWACS)</i>		
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>- Continued Phase 1A rapid prototyping</p> <p><b>FY 2022 Plans:</b></p> <p>- Begin Phase 1B of rapid prototyping</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b></p> <p>- Increase is due to continuation of rapid prototyping. Phase 1B is designed to include a larger breadth of work than Phase 1A, which was the Risk Reduction effort before the full scale development in Phase 1B. FY22 Phase 1B activities include 4 HW Kits, beginning of the 1B SW development effort, Boeing reach back support, and start up of the 558th MC SW development effort.</p>				
<p><b>Title:</b> E-3 Training, Support and Infrastructure (TSI)</p> <p><b>Description:</b> Training, Support, and Infrastructure (TSI): Provides continuing management support for AWACS modernization and enhancement to include managing the AWACS Development Test and Evaluation (DT&amp;E) and Production infrastructure and tracking and monitoring the AWACS vendor's core mission and aircrew training, support equipment and program Government Furnished Property, as well as providing Third Party Integration support from The Boeing Company to the AWACS Enterprise.</p> <p><b>FY 2021 Plans:</b></p> <p>TSI continued to maintain and provide DT&amp;E labs to AWACS programs, support AWACS development and production programs lab integration &amp; test efforts. Provided system lab support, integration, and test to current AWACS programs. Supported Third Party Integration efforts in The Boeing Company labs in Oklahoma and Washington. Supported AWACS and other OSD mandated interoperability testing and support mandatory E-3 Operational, Safety, and. Additionally, supported Suitability and Effectiveness program and the execution of the AITS lab transfer acquisition strategy.</p> <p><b>FY 2022 Plans:</b></p> <p>TSI will continue to maintain and provide DT&amp;E labs to AWACS programs and support AWACS development and production programs lab integration &amp; test efforts. Will provide system lab support, integration, and test to current AWACS programs and support Third Party Integration efforts in The Boeing Company labs in Oklahoma and Washington. Will continue to support AWACS and other OSD mandated interoperability testing and support mandatory E-3 Operational, Safety, and Suitability and Effectiveness program. Additionally, will continue to support the execution of the AITS lab transfer acquisition strategy.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b></p>		8.974	14.389	11.390

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0207417F / <i>Airborne Warning and Control System (AWACS)</i>		
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
- Funding decrease as strategy has shifted to retain Boeing AIL in Seattle rather than move to Boeing OKC. Costs associated with anticipated relocation were removed, but this reduction was largely offset by use of Option 2 on System AITS 2 support contract.				
<p><b>Title:</b> E-3 Command and Control, Intelligence, Surveillance and Reconnaissance (C2ISR)</p> <p><b>Description:</b> Command and Control, Intelligence, Surveillance, and Reconnaissance (C2ISR): Investigate and develops future capabilities of the AWACS weapon system to include but are not limited to investigation, analysis, and development to ensure that AWACS successfully integrates with joint and coalition forces in a net-centric environment. Primarily supports pre-systems acquisition in the areas of materiel solution analysis and technology development (i.e. risk reduction activities).</p> <p><b>FY 2021 Plans:</b></p> <ul style="list-style-type: none"> <li>- Continue to conduct engineering / integration studies to determine required modifications and associated costs to upgrade and support risk reduction activities for program planning</li> <li>- Continue to execute cooperative Independent Research and Development</li> </ul> <p><b>FY 2022 Plans:</b></p> <ul style="list-style-type: none"> <li>- Continue to conduct engineering / integration studies to determine required modifications and associated costs to upgrade and support risk reduction activities for program planning</li> <li>- Continue to execute cooperative Independent Research and Development</li> </ul> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b></p> <ul style="list-style-type: none"> <li>- Decrease in funding due to decreased volume of risk reduction activities in support of potential POM initiatives as well as previous risk reduction activities moving into Rapid Fielding and no longer requiring C2ISR funding</li> </ul>		5.723	29.587	4.214
<p><b>Title:</b> E-3 Internet Protocol Enabled Communication (IPEC)</p> <p><b>Description:</b> Internet Protocol Enabled Communication (IPEC): Provides the Block 40/45 E-3 with a medium-bandwidth Internet Protocol (IP) communications capability to connect to the Global Information Grid and supports net-centric operations/warfare. Provides a reliable IP-enabled communication capability to support a shortened digitized kill-chain of time-sensitive targets.</p> <p><b>FY 2021 Plans:</b></p> <ul style="list-style-type: none"> <li>- N/A</li> </ul> <p><b>FY 2022 Plans:</b></p>		0.923	0.000	0.000



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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0207417F <i>I Airborne Warning and Control System (AWACS)</i>		
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
- N/A				
<p><b>Title:</b> E-3 Combat Identification (CID) Diminishing Manufacturing Sources (DMS)</p> <p><b>Description:</b> Combat Identification (CID) Diminishing Manufacturing Sources (DMS): Addresses C2 CID shortfalls with a modern, persistent Airborne Moving Target Indication (AMTI) BM/C2 combat ID. Supports the kill chain and decision superiority.</p> <p><b>FY 2021 Plans:</b> - Continue SW and sub-system level development; begin sub-system level integration</p> <p><b>FY 2022 Plans:</b> - Complete SW and sub-system level development; prepare for Alpha Phase II RFP release</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> - Funding increase is due to the continuing prototype development of the CID system. In FY22, Alpha Phase (AP) will finalize design. AP will complete in Q3FY22 with a demonstration of a working prototype. Progressing from Phase I to Phase II the program will buy material to build, integrate and test a full system prior to full scale production.</p>		15.032	0.313	27.711
<p><b>Title:</b> E-3 Communication Network Upgrade (CNU)</p> <p><b>Description:</b> Communication Network Upgrade (CNU): Provides a Link 16 capability with high-jam-resistance, high-speed, crypto-secure computer-to-computer connectivity in support of every type of military platform from Air Force fighters to Navy submarines.</p> <p><b>FY 2021 Plans:</b> - Continue rapid prototyping and development effort (MVP1 Crypto), AFSIT and JIT Testing, HPA Prototyping (MVP2 HPAs)</p> <p><b>FY 2022 Plans:</b> - Beginning rapid prototyping and development of Phase II (MVP3 Link 16 Advanced Capabilities)</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> - Decrease due to completion of Rapid Prototyping Phase I (MVP1 (Crypto) and MVP2 (HPAs))</p>		16.095	29.290	22.096
<p><b>Title:</b> E-3 Mode 5 Acceleration</p> <p><b>Description:</b> Mode 5 Acceleration: Updates flight deck to address known Air Traffic Management restrictions; upgrades the current flight deck transponder to include the Mode 5 capability. Accelerates the Mode 5 transponder FOC independent of DRAGON.</p>		5.043	3.616	0.000

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0207417F / <i>Airborne Warning and Control System (AWACS)</i>		
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>FY 2021 Plans:</b> - Complete rapid prototyping and development effort</p> <p><b>FY 2022 Plans:</b> - N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> - Decrease due to completion of prototyping</p>				
<p><b>Title:</b> E-3 AWACS Communications Integration Program (ACIP)</p> <p><b>Description:</b> AWACS Communications Integration Program (ACIP)Development: Provides Mobile User Objective System (MUOS) and Second Generation Anti-Jam Tactical UHF Radio for NATO (SATURN) capability by replacing the existing Have Quick II and DAMA SATCOM radios with new radios capable of communicating via the existing and additional military waveforms as a combined integration program on AWACS.</p> <p><b>FY 2021 Plans:</b> - Complete risk reduction and begin prototyping development effort</p> <p><b>FY 2022 Plans:</b> - Continue prototyping development effort</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> - Increase in funding due to beginning of rapid prototyping effort</p>		1.367	14.883	24.194
<p><b>Title:</b> E-3 AWACS GPS Upgrade (M-Code)</p> <p><b>Description:</b> AWACS GPS Upgrade (M-Code): Provides E-3G AWACS with robust capability to operate in evolving GPS jamming environment. Incorporates GPS M-Code capability into E-3G and provides continued capabilities in GPS jamming environment in support of airborne AMTI &amp; BMC2 to COCOMs for Joint, Allied &amp; Coalition ops.</p> <p><b>FY 2021 Plans:</b> - Begin risk reduction effort</p> <p><b>FY 2022 Plans:</b> - Continue risk reduction and begin prototyping development effort</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b></p>		0.000	0.180	11.040

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0207417F / <i>Airborne Warning and Control System (AWACS)</i>		
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
- Funding increase due to beginning of rapid prototyping effort				
<b>Title:</b> E-3 AWACS Fifth to Fourth (5th to 4th)		0.000	7.606	27.000
<b>Description:</b> E-3 AWACS Fifth to Fourth (5th to 4th): 5th to 4th provides the capability for E-3G AWACS to receive 5th generation data via Link 16. This capability includes the security domain required to integrate the 5th generation data into Mission Computing Software and generate an integrated operational air picture. 5th to 4th addresses gaps and inaccuracies in the Common Tactical Picture (CTP) and improves Situational Awareness (SA) and Battle Management Command and Control (BMC2) decision making by shortening the kill chain for warfighters in a contested environment.				
<b>FY 2021 Plans:</b> - Risk reduction efforts & analysis to prepare for Rapid Prototyping RFP release.				
<b>FY 2022 Plans:</b> - Rapid Prototyping & Development contract award.				
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> - Increase is due to the start of the Rapid Prototyping phase to support building up the contractor's facility to simulate a Link-16, Mission Computing environment for Software Development, System Test/Integration, and Cyber Activities for the end-to-end 524 solution.				
<b>Title:</b> E-3 AWACS Global Lightning (AGL)		0.000	0.000	1.000
<b>Description:</b> E-3 AWACS Global Lightning (AGL): AGL will provide E-3 with high bandwidth Internet Protocol (IP) communication capability leveraging the significant increase in bandwidth capacity using commercial and military SATCOM. AGL will improve current operations with very low latency, jamming resistance, gigabytes per second class bandwidth and enabling future joint mission operations to support a shortened digitized kill-chain of time-sensitive targets.				
<b>FY 2021 Plans:</b> N/A				
<b>FY 2022 Plans:</b> Conduct engineering/integration studies to determine required modifications and associated cost to upgrade and support risk reduction activities for program planning. Complete flight demonstration.				
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase due to New Start				
<b>Accomplishments/Planned Programs Subtotals</b>		67.341	123.925	171.014

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207417F / <i>Airborne Warning and Control System (AWACS)</i>
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**D. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 05 Line Item E00300: <i>E-3</i>	102.092	135.740	162.960	-	162.960	-	-	-	-	-	-
• APAF 05 Line Item E34045: <i>Airborne Warning and Control System</i>	34.240	53.343	42.392	-	42.392	-	-	-	-	-	-
• APAF 06 Line Item 000999: <i>Initial Spares/Repair Parts</i>	13.892	21.264	21.689	-	21.689	-	-	-	-	-	-

**Remarks**

**E. Acquisition Strategy**

The modernization of the AWACS weapon system consists of multiple capability upgrades that are developed and fielded on competitive and sole source contracts. Full and open competition is explored for all new efforts where market research indicates opportunities exist.

Air Force Program Executive Officer (PEO) for PEO Digital (AFLCMC HB) is the Milestone Decision Authority (MDA) for AWACS Programs, with the exception of the E-3 Block 40/45 Upgrade. The E-3 Block 40/45 Upgrade MDA is the Secretary of the Air Force, with authority delegated to the Assistant Secretary of the Air Force (Acquisition) [SAF/AQ]. Of note, E-3 Block 40/45 Upgrade has completed development activities, so it has no 3600 funding and thus not otherwise referenced in this document. The Decision Authority for AWACS Mid Tier Acquisition (MTA) programs is delegated to the E-3 Systems Program Manager (SPM). Air Force Life Cycle Management Center (AFLCMC) is the Contracting Authority for the AWACS portfolio and provides Contracts, Legal, and Comptroller Support.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207417F / Airborne Warning and Control System (AWACS)	<b>Project (Number/Name)</b> 67411L / Airborne Warning & Control System (AWACS)
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
E-3 DMS Replacement of Avionics for Global Operations and Navigation (DRAGON)	SS/FPIF	L3 : Arlington, TX	-	1.362	Mar 2020	1.351	Jan 2021	-		-		-	-	-	-
E-3 Electronic Protection (EP)	SS/CPFF	GTRI : Atlanta, GA	-	-		4.005	Nov 2020	-		-		-	-	-	-
E-3 Electronic Protection (EP) Rapid Prototyping Alpha Phase 1A	C/FFP	AFLCMC/ACI OTA to SOSSEC : Salem, NH	-	6.405	Jun 2020	8.997	Feb 2021	-		-		-	-	-	-
E-3 Electronic Protection (EP) Rapid Prototyping Alpha Phase 1B	C/CPIF	TBD : TBD	-	-		7.753	Oct 2021	35.592	Nov 2021	-		35.592	-	-	-
E-3 Command and Control, Intelligence, Surveillance, and Reconnaissance (C2ISR)	SS/ Various	BAH & Various : Washington, DC	-	3.940	Jan 2020	24.867	Jan 2021	2.040	Jan 2022	-		2.040	-	-	-
E-3 Command and Control, Intelligence, Surveillance, and Reconnaissance GTRI Study (C2ISR)	SS/CPFF	GTRI : Atlanta, GA	-	0.348	Feb 2020	0.291	Feb 2021	-		-		-	-	-	-
E-3 Combat Identification (CID) Diminishing Manufacturing Sources (DMS) Risk Reduction	SS/CPFF	Raytheon : Fort Wayne, IN	-	5.689	Apr 2020	-		-		-		-	-	-	-
E-3 Combat Identification (CID) Diminishing Manufacturing Sources (DMS) Prototype Development	MIPR	DMEA : McClellan, CA	-	-		-		2.176	Nov 2021	-		2.176	-	-	-
E-3 Combat Identification (CID) Diminishing Manufacturing Sources (DMS) SW and	SS/CPFF	Raytheon : Fort Wayne, IN	-	9.019	Aug 2020	-		21.966	Jan 2022	-		21.966	-	-	-

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207417F / Airborne Warning and Control System (AWACS)	<b>Project (Number/Name)</b> 67411L / Airborne Warning & Control System (AWACS)
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Sub-System Level Development															
E-3 Combat Identification (CID) Diminishing Manufacturing Sources (SMS) SW Dev	Various	76 SWES : Tinker AFB, OK	-	-		-		1.938	Jan 2022	-		1.938	-	-	-
E-3 Internet Protocol Enabled Communication (IPEC)	SS/ Various	Boeing : Oklahoma City, OK	-	0.629	Nov 2020	-		-		-		-	-	-	-
E-3 Communication Network Upgrade (CNU)	Various	Space & Naval Warfare Sys : San Diego, CA	-	0.248	Jan 2020	0.505	Jan 2021	0.250	Jan 2022	-		0.250	-	-	-
E-3 Communication Network Upgrade (CNU) GTRI	Various	GTRI : Atlanta, GA	-	8.409	Feb 2020	12.778	Feb 2021	10.256	Feb 2022	-		10.256	-	-	-
E-3 Communication Network Upgrade (CNU) Boeing	Various	Boeing : Oklahoma City, OK	-	0.312	Feb 2021	2.195	Feb 2021	1.045	Feb 2022	-		1.045	-	-	-
E-3 Communication Network Upgrade (CNU) SW Dev	Various	76th SWES : Tinker AFB, OK	-	2.465	Jan 2020	1.500	Jan 2021	2.035	Jan 2022	-		2.035	-	-	-
Mode 5 Acceleration	MIPR	DMEA : McClellan, CA	-	3.499	Aug 2020	3.158	Feb 2021	-		-		-	-	-	-
ACIP Rapid Prototyping Alpha Phase	TBD	TBD : TBD	-	1.373	Jan 2020	8.803	Aug 2021	16.689	Jan 2022	-		16.689	-	-	-
ACIP Rapid Prototyping GFE	MIPR	TBD : TBD	-	-		1.591	Aug 2021	1.373	Jan 2022	-		1.373	-	-	-
AWACS GPS Upgrade (M-Code)	TBD	TBD : TBD	-	-		-		8.240	Jun 2022	-		8.240	-	-	-
Fifth to Fourth (5th to 4th) Risk Reduction	Various	Various : Various	-	-		3.964	Nov 2020	-		-		-	-	-	-
Fifth to Fourth (5th to 4th) Rapid Prototyping GFE	MIPR	Various : TBD	-	-		0.810	Mar 2021	-		-		-	-	-	-

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207417F / Airborne Warning and Control System (AWACS)	<b>Project (Number/Name)</b> 67411L / Airborne Warning & Control System (AWACS)
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Fifth to Fourth (5th to 4th) Rapid Prototyping Alpha Phase	C/TBD	TBD : TBD	-	-		-		21.140	Dec 2021	-		21.140	-	-	-
AGL Risk Reduction	TBD	TBD : TBD	-	-		-		1.000	Dec 2021	-		1.000	-	-	-
<b>Subtotal</b>			-	43.698		82.568		125.740		-		125.740	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
E-3 Training, Support & Infrastructure (TSI) Systems AITS II	C/Various	Boeing : Oklahoma City, OK	-	2.254	Jun 2020	3.969	Jan 2021	8.219	Jan 2022	-		8.219	-	-	-
E-3 Training, Support & Infrastructure (TSI) Radar AITS II	C/Various	Northrop Grumman : Linthicum, MD	-	2.793	Jun 2020	4.801	Jan 2021	4.902	Jan 2022	-		4.902	-	-	-
<b>Subtotal</b>			-	5.047		8.770		13.121		-		13.121	-	-	N/A

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
(U) Program Management Administration (PMA)	Various	AWACS Program Office : Hanscom AFB, MA	-	18.596	Jan 2020	32.587	Jan 2021	32.153	Jan 2022	-		32.153	-	-	-
<b>Subtotal</b>			-	18.596		32.587		32.153		-		32.153	-	-	N/A

			Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>			-	67.341	123.925	171.014	-	171.014	-	-	N/A





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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Air Force</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207417F / Airborne Warning and Control System (AWACS)	<b>Project (Number/Name)</b> 67411L / Airborne Warning & Control System (AWACS)

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>AWACS PE 0207417F</b>																												
DRAGON IOT&E	█	█																										
EP Alpha Phase			█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
TSI	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
C2ISR	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
CID DMS Alpha Phase			█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
CID DT/OT																												
CNU Beta Decision (Jun 2021)																												
CNU Development	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Mode 5 Development	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Mode 5 Beta Decision (Oct 2021)																												
ACIP Risk Reduction																												
ACIP Prototyping																												
GPS Upgrade (M-Code) Risk Reduction																												
Fifth to Fourth (5th to 4th) Risk Reduction																												
Fifth to Fourth (5th to 4th) Alpha Phase																												
AGL Risk Reduction																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207417F / Airborne Warning and Control System (AWACS)	<b>Project (Number/Name)</b> 67411L / Airborne Warning & Control System (AWACS)

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>AWACS PE 0207417F</b>				
DRAGON IOT&E	1	2020	2	2020
EP Alpha Phase	3	2020	4	2022
TSI	1	2020	4	2022
C2ISR	1	2020	4	2022
CID DMS Alpha Phase	4	2020	4	2022
CID DT/OT	4	2022	4	2022
CNU Beta Decision (Jun 2021)	3	2021	3	2021
CNU Development	1	2020	4	2022
Mode 5 Development	1	2020	4	2021
Mode 5 Beta Decision (Oct 2021)	4	2020	1	2021
ACIP Risk Reduction	4	2020	2	2021
ACIP Prototyping	4	2021	4	2022
GPS Upgrade (M-Code) Risk Reduction	1	2021	4	2021
Fifth to Fourth (5th to 4th) Risk Reduction	1	2021	3	2021
Fifth to Fourth (5th to 4th) Alpha Phase	1	2022	4	2022
AGL Risk Reduction	1	2022	4	2022

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207418F / AFSPECWAR - TACP
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	2.372	4.215	4.598	0.000	4.598	-	-	-	-	-	-
675234: <i>TACP Support</i>	-	2.372	4.215	4.598	0.000	4.598	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

The Joint Terminal Control Training and Rehearsal (JTC TRS) Program, under the Tactical Airborne Control System, funds development necessary to provide a Distributed Mission Operations (DMO) capable, high-fidelity simulator for Battlefield Airmen, to include Joint Terminal Attack Controller (JTAC) operations, Special Tactics Combat Control Team (CCT), and Air Support Operations Center (ASOC) operations.

JTC TRS is essential to provide initial training, mission qualification training, continuation training, and currency control requirements to JTACs and Special Tactics personnel. JTAC control training requirements exceed the ability of live-fly aircraft to meet, and JTC TRS is the only capability enabling JTACs to achieve and maintain minimum required training for both qualification and proficiency in accordance with the U.S and Partner Nation Memorandum of Agreement for JTAC certification and qualification.

The JTC TRS Program provides research and development to facilitate interoperability with joint and sister Service air-ground simulation using industry standards. JTC TRS will provide the capability to network aircrew full mission trainers and training centers in a live-virtual-constructive network. This development effort will also integrate ASOCs with the Joint Theater Air Ground Simulation System (JTAGSS) trainer for Joint Fires integration. The simulator will supplement live field training and live-fly sorties to provide realistic introductory, proficiency, currency, and upgrade training in a simulated battlefield, disaster, or humanitarian relief environment. FY 22 funds are required to complete development of the DACAS engineering solution which will enable trainees to fully exercise digital missions required to employ 4th and 5th generation capabilities and be and contribute to effective Joint All-Domain Command and Control (JADC2). Cuts in program 3600 in FY-20 and FY-21 due to contractual problems which prevented execution of funds, make FY 22 3600 critically important to field late to need DACAS capability.

b. JTAGSS is a continuation of the ASOC simulation trainer initially funded in 2009 and complements the JTC TRS trainer by providing a total air-ground constructive simulation environment for integrated networked training and mission rehearsal capability that will develop JTAC/CCT and ASOC/Special Operations Forces (SOF) Command and Control (C2) battle staff skills. JTAGSS will provide the ASOC, SOF, and TACP (Tactical Air Control Party) with the vertical and horizontal C2 communications and coordination training and mission rehearsal required for mission effectiveness. There are insufficient exercises and live training events available to meet mandated readiness requirements. The system will include a secure network connection, a constructive simulation environment generator with sharable databases, computer work stations that have synthetic reflex agent applications for each ASOC/SOF crew position to execute the air tasking order.

Funds may be used to address emerging and short-notice Diminishing Manufacturing and Material Shortage (DMSMS) issues. DMS efforts to include removal of end-of-life software/hardware within simulators systems and move to a modular, common open system architecture that is sustainable and cyber-resilient. Implement

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207418F / AFSPECWAR - TACP
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requirements and standards defined under the Simulator Common Architecture Requirements and Standards (SCARS) initiative. This program element may include necessary civilian pay expenses required to manage, execute, and deliver the JTC TRS weapon system capability.

OSD recommends re-phase .371 of FY 22 funds due to under-execution of previous year's funds. Sub-optimal obligation and execution of funds was a direct result of the prime contractor's legal suspension for fraud. FY 22 3600 critically important to continue development and refinement of JTAGSS as it transitions from AFRL to AFLCMC/WNS for long term sustainment and modification to meet TACP/ASOC requirements.

This program element may include necessary emergent or unanticipated civilian pay expenses required to manage, execute, and deliver JTC TRS weapon system capability until permanent manpower authorizations are funded. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F.

FY 22 3600 funds will be required to begin modifying JTAGSS to accommodate a full Joint Air Ground Integration Cell (JAGIC), increasing trainee workstations from 13 to 21. Adding additional workstations and integrating joint and other service C4 systems will enable the full JADC2 capability and facilitate a persistent "train as you fight" for the AF and joint and coalition air to ground command staff members and battle managers.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	2.462	4.223	5.040	0.000	5.040
Current President's Budget	2.372	4.215	4.598	0.000	4.598
Total Adjustments	-0.090	-0.008	-0.442	0.000	-0.442
• Congressional General Reductions	-0.090	-0.008			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-0.442	0.000	-0.442

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<b>Title:</b> JTC TRS Trainer Development	0.000	0.000	4.598	-	4.598

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207418F / AFSPECWAR - TACP
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p><b>Description:</b> Development and test of Engineering Change Proposals (ECPs) for TACP-Close Air Support System (CASS).</p> <p><b>FY 2021 Plans:</b> None</p> <p><b>FY 2022 Base Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> N/A</p>					
<p><b>Title:</b> JTAGSS Trainer Development</p> <p><b>Description:</b> Develops high fidelity simulation system for ASOC/SOF Command and Control System that supports JTAC training. Currently an AFRL program funded by Air Combat Command</p> <p><b>FY 2021 Plans:</b> Continue JTAGSS 3.0. Integrate TACP Close Air Support System 1.4.4. and internal agents.</p> <p>No OCO at this time.</p> <p><b>FY 2022 Base Plans:</b> N/A</p> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> N/A</p>	2.372	4.215	0.000	0.000	0.000
<b>Accomplishments/Planned Programs Subtotals</b>	2.372	4.215	4.598	0.000	4.598

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207418F / AFSPECWAR - TACP
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**D. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• OPAF 03 Line Item 837100: <i>Tactical C-E Equipment</i>	3.870	3.939	4.009	-	4.009	-	-	-	-	-	-

**Remarks**

**E. Acquisition Strategy**

a. The JTC TRS acquisition is a single step to full capability as defined in the CPD. A small business set-aside competitive lowest price technically acceptable source selection was conducted and resulted in the award of a single contract to produce and sustain JTC TRS. The contract includes pre-priced production options for additional JTC TRS production, Emulated Military Equipment (EME) program management, cybersecurity support, Contractor Logistic Support (CLS), Training System Support Center (TSSC), training, relocation, a legacy system compatibility study. The pre-price production options include credit to the government for use of existing equipment when updating current fielded active duty immersive JTAC training systems (Air National Guard (ANG) Advanced JTAC Training System (AAJTS)) to the JTC TRS baseline. The contract structure allows for maintaining concurrency, implementing system improvements/technical refresh, and other modifications as required. JTC TRS awarded a competitive contract in January 2016 to procure up to 32 devices. The JTC TRS received a Full Rate Production (FRP) decision in February 2017 and is currently fielding production units. . Development will be required for engineering changes related to Legacy System Compatibility, TACP-Close Air Support System (TACP-CASS).

b. The acquisition strategy for the JTAGSS trainer will be to field advance technology demonstration units to continue to perform proof of concept and technology validation of mission simulations for all ASOC crew positions including detailed communications planning, asset deconfliction, integration of joint fires, and other critical mission areas required for integrated TACP/ASOC C2 mission success. At the completion of the technology validation, a contract will be competitively awarded to complete JTAGSS development, deployment and integration. Current software is Government or Commercial Off-the-Shelf technologies (GOTS/COTS) allowing almost any training technology development company to compete, which lowers technical risk, schedule risk, and cost.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207418F / AFSPECWAR - TACP	<b>Project (Number/Name)</b> 675234 / TACP Support
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
JTC TRS Trainer Development	C/FFP	AFLCMC/WNS, AFMC : Wright Patterson AFB, OH	-	-		4.215	Dec 2020	4.598		-		4.598	-	-	-
JTAGSS Development	C/CPFF	AFRL, AFMC : Wright Patterson AFB, OH	-	2.372	Jan 2020	-		-		-		-	-	-	-
<b>Subtotal</b>			-	2.372		4.215		4.598		-		4.598	-	-	N/A

**Remarks**  
 JTC TRS 2.0  
 - Adds Air Traffic Control and Assault Zone operations for Special Operations Special Tactics personnel and TACP-CASS.

JTAGSS 2.0. This effort: a) Will increase the autonomous functionality and capability using reflex agents; b) improve internal ASOC crew capacity with increased voice recognition capabilities; c) make the JTAGSS system DMO ready and capable; and d) provide joint and coalition full mission rehearsal capability.  
 -ASOC/JTAGSS Metric Development.  
 -Scenario Authoring Tool.  
 -Distributed Mission Operations Ready  
 -Internal Reflex Agent Research and Development.  
 -Instructor Operator Station.  
 -After Action Review.  
 -JTAGSS Documentation and Rapid Transition Documentation.

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract	
<b>Project Cost Totals</b>		-	2.372	4.215	4.598	-	4.598	-	-	N/A

**Remarks**

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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date: May 2021**

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207418F / AFSPECWAR - TACP	<b>Project (Number/Name)</b> 675234 / TACP Support
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FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b><i>JTC TRS Trainer Development</i></b>	
Develop and Test TACP Engineering Change Proposals	[REDACTED]



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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207418F / AFSPECWAR - TACP	<b>Project (Number/Name)</b> 675234 / TACP Support
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>JTC TRS Trainer Development</i></b>				
Develop and Test TACP Engineering Change Proposals	1	2020	4	2022

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207431F / <i>Combat Air Intelligence System Activities</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	13.547	16.534	21.863	0.000	21.863	-	-	-	-	-	-
675307: <i>TARGETING ENTERPRISE RESEARCH</i>	-	12.801	15.775	21.100	0.000	21.100	-	-	-	-	-	-
675309: <i>GEO Info &amp; Serv Software</i>	-	0.746	0.759	0.763	0.000	0.763	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

The mission of Combat Air Intelligence Systems (CAIS) is to process, analyze, and disseminate intelligence for air component and unit operations worldwide by providing key intelligence infrastructure and production capabilities for the supported and supporting forces with true backbone type of intelligence support for air operations and air support to joint operations. CAIS is focused on providing the intelligence infrastructure and funding to Air Force Major Commands, Intelligence, Cyber and Space Squadrons, Field Operating Agencies, and subordinate units.

Modernizations utilize Section 804, Middle Tier of Acquisitions as a rapid fielding effort to provide required modernization to remain interoperable, certified, supportable, and compliant through software engineering solutions, integration, testing, fielding, and sustainment of new capabilities and upgrades. This includes the utilization of Agile software engineering methodologies and managed cloud infrastructure and platform services. Modernizations are required for the CAIS enterprise capabilities, inside and outside AOCs to keep pace with evolving Government Off the Shelf (GOTS) components, integrated Commercial Off the Shelf (COTS) components, Department of Defense (DoD) directives, and changes in the underlying Information Technology (IT) environment, as well as to deliver effective operational capabilities for the user. In Summer of FY20, the decision was made to transition from MTA, Sec 804 Rapid Prototyping/Fielding to the new NDAA FY20 - Software Acquisition Pathway, which is the preferred path for acquisition and development of software-intensive systems.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Targeting and Geospatial Intelligence weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F. In FY19 \$0.000M and in FY20 \$0.000M was expended for civilian pay expenses in this program element.

This program is part of the overarching Kessel Run portfolio.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207431F / <i>Combat Air Intelligence System Activities</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	13.668	16.564	23.358	0.000	23.358
Current President's Budget	13.547	16.534	21.863	0.000	21.863
Total Adjustments	-0.121	-0.030	-1.495	0.000	-1.495
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.121	0.000			
• Other Adjustments	0.000	-0.030	-1.495	0.000	-1.495

**Change Summary Explanation**

FY22 funding decreased to address other Air Force requirements.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0207431F / <i>Combat Air Intelligence System Activities</i>				<b>Project (Number/Name)</b> 675307 / <i>TARGETING ENTERPRISE RESEARCH</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
675307: <i>TARGETING ENTERPRISE RESEARCH</i>	-	12.801	15.775	21.100	0.000	21.100	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

Provides support to personnel utilizing Target Development, Planning, and Execution applications; Unit Level Intelligence; Tactical Intelligence Applications; and direct support to national, combatant command, and Air Force intelligence missions. This program element may include necessary civilian pay expenses required to manage, execute, and deliver Targeting for weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F. In FY19 \$0.000M and in FY20 \$0.000M was expended for civilian pay expenses in this program element.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Targeting Enterprise Research	12.801	15.775	21.100
<b>Description:</b> Conduct Targeting Enterprise research and advancement for projects such as Joint Targeting Toolbox (JTT) [In both the Global Command and Control System Joint (GCCS-J) and Stand-alone configurations-JTT-Capability Package (JTT-CP)] and the Unit Level Intelligence (ULI) systems Toolkit for Intelligence Targeting Analysis (TITAN) and Targeting Application Workstation (TAW).) This budget item also funds emerging targeting capabilities (such as Target System Analysis, 4D visualization, etc.) and Targeting Enterprise software application modernization efforts.			
<b>FY 2021 Plans:</b> Continue the phased modernization of capabilities within the T&G portfolio, expand test automation, and migrate to a true Continuous Integration/DevOps environment to support continuous delivery to the warfighter.			
<b>FY 2022 Plans:</b> Continue the phased modernization of capabilities within the T&G portfolio, expand test automation, and migrate to a true Continuous Integration/DevOps environment to support continuous delivery to the warfighter.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase attributed to 14 FTEs supporting Targeting modernization efforts for different product teams.			
<b>Accomplishments/Planned Programs Subtotals</b>	12.801	15.775	21.100

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207431F / <i>Combat Air Intelligence System Activities</i>	<b>Project (Number/Name)</b> 675307 / <i>TARGETING ENTERPRISE RESEARCH</i>

**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• OPAF 03 Line Item 832070: <i>Intelligence Comm Equipment</i>	5.363	14.535	-	-	-	-	-	-	-	-	-

**Remarks**

Combat Air Intelligence System (CAIS) procurement funds.

**D. Acquisition Strategy**

The acquisition strategy builds on agile software engineering methodologies and modernization of existing capabilities utilizing evolutionary acquisition. Using Section 804, timelines are reduced by modularizing both software engineering solutions and the associated contracting and funding strategies. This enables dynamic resource allocation based on current warfighter needs. The desired end state is continuous delivery of Software. In Summer of FY20, the decision was made to transition from MTA, Sec 804 Rapid Prototyping/Fielding to the new NDAA FY20 - Software Acquisition Pathway, which is the preferred path for acquisition and development of software-intensive systems.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207431F / <i>Combat Air Intelligence System Activities</i>	<b>Project (Number/Name)</b> 675307 / <i>TARGETING ENTERPRISE RESEARCH</i>
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Targeting Enterprise Research	Various	TBD : TBD	-	9.539	Jan 2020	10.831	Jan 2021	16.400	Jan 2022	-		16.400	-	-	-
<b>Subtotal</b>			-	9.539		10.831		16.400		-		16.400	-	-	N/A

<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
DMS, MilCloud	Various	Various : TBD	-	0.012	Jun 2020	-		-		-		-	-	-	-
Targeting Civilian Direct Cite Authorizations for Product Development	Reqn	AFLCMC : WPAFB, OH	-	-		2.501	Oct 2020	-		-		-	-	-	-
<b>Subtotal</b>			-	0.012		2.501		-		-		-	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
45th Test Squadron	PO	45th Test Squadron : Eglin, FL	-	0.268	Dec 2019	0.474	Dec 2020	0.581	Dec 2021	-		0.581	-	-	-
<b>Subtotal</b>			-	0.268		0.474		0.581		-		0.581	-	-	N/A

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Targeting Research Enterprise	Various	Program Management Office : Hanscom, MA	-	2.982	Nov 2019	1.969	Nov 2020	4.119	Nov 2021	-		4.119	-	-	-
<b>Subtotal</b>			-	2.982		1.969		4.119		-		4.119	-	-	N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2022 Air Force</b>								<b>Date: May 2021</b>					
<b>Appropriation/Budget Activity</b> 3600 / 7				<b>R-1 Program Element (Number/Name)</b> PE 0207431F / <i>Combat Air Intelligence System Activities</i>				<b>Project (Number/Name)</b> 675307 / <i>TARGETING ENTERPRISE RESEARCH</i>					
	<b>Prior Years</b>	<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>	-	12.801		15.775		21.100		-		21.100	-	-	N/A

**Remarks**



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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207431F / <i>Combat Air Intelligence System Activities</i>	<b>Project (Number/Name)</b> 675307 / <i>TARGETING ENTERPRISE RESEARCH</i>

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>Targeting</b>	
Software/Hardware Development	
Test and Evaluation	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207431F / <i>Combat Air Intelligence System Activities</i>	<b>Project (Number/Name)</b> 675307 / <i>TARGETING ENTERPRISE RESEARCH</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>Targeting</b>				
Software/Hardware Development	1	2020	4	2025
Test and Evaluation	1	2020	4	2025

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0207431F / <i>Combat Air Intelligence System Activities</i>				<b>Project (Number/Name)</b> 675309 / <i>GEO Info &amp; Serv Software</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
675309: <i>GEO Info &amp; Serv Software</i>	-	0.746	0.759	0.763	0.000	0.763	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

Provides support to personnel using Geospatial resources utilized in Geospatial Intelligence (GEOINT) databasing applications, technology exploration and refresh initiatives, geospatial imagery data management and dissemination architecture, geospatial information and services modernization, and enablers for intel and targeting capabilities. Provides support to the MAJCOMs to ensure requisite and available target intelligence and GEOINT tools for information directly available to warfighters.

The GEOINT information and service software program funds the Air Force Enhanced Geospatial Product Library (EGPL) which is currently fielded to all combatant command air components and subordinate units supporting global air operations. The EGPL provides digital GEOINT data to support mission planning, targeting & intelligence in support of mission objectives.

The Enhanced Geospatial Product Library (EGPL) is world-wide distributed United States Air Force (USAF) repository for geospatial products from the National Geospatial Intelligence Agency (NGA) and other government sources. Its purpose is to provide the Geospatial Intelligence (GEOINT) information needed by the Air Force (AF) and other DoD command and control systems. EGPL is on premise, continuously updated, NGA Foundational GEOINT data seamlessly accessible via shared drive or browser.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Geospatial Intelligence weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F. In FY19 \$0.000M and in FY20 \$0.000M was expended for civilian pay expenses in this program element.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Enhanced Geospatial Product Library (EGPL)	0.746	0.759	0.763
<b>Description:</b> Provide continuing support for EGPL software and storage to meet future and evolving IT and GEOINT standards and support.			
<b>FY 2021 Plans:</b> Continue to develop EGPL software and continue modernization efforts utilizing Agile Methodologies.			
<b>FY 2022 Plans:</b> Continue to develop EGPL software and continue modernization efforts utilizing Agile Methodologies.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207431F / <i>Combat Air Intelligence System Activities</i>	<b>Project (Number/Name)</b> 675309 / <i>GEO Info &amp; Serv Software</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Increase in requirements			
<b>Accomplishments/Planned Programs Subtotals</b>	0.746	0.759	0.763

**C. Other Program Funding Summary (\$ in Millions)**

<b>Line Item</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• OPAF 03 Line Item 832070: <i>Intelligence Comm Equipment</i>	5.363	14.535	-	-	-	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

The acquisition strategy builds on agile software engineering methodologies and modernization of existing capabilities utilizing evolutionary acquisition. Using section 804, timelines are reduced by modularizing both software engineering solutions and the associated contracting and funding strategies. This enables dynamic resource allocation based on current warfighter needs. The desired end state is continuous delivery of Software. In Summer of FY20, the decision was made to transition from MTA, Sec 804 Rapid Prototyping/Fielding to the new NDAA FY20 - Software Acquisition Pathway, which is the preferred path for acquisition and development of software-intensive systems.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207431F / <i>Combat Air Intelligence System Activities</i>	<b>Project (Number/Name)</b> 675309 / <i>GEO Info &amp; Serv Software</i>
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
EGPL	SS/T&M	Charles Stark Draper Lab : Cambridge, MA	-	0.746	Sep 2020	0.430	Oct 2020	0.416	Oct 2021	-		0.416	-	-	-
<b>Subtotal</b>			-	0.746		0.430		0.416		-		0.416	-	-	N/A

<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
GEOINT Civilian Direct Cite Authorizations for Product Development	Reqn	AFLCMC : WPAFB, OH	-	-		0.305	Oct 2020	-		-		-	-	-	-
<b>Subtotal</b>			-	-		0.305		-		-		-	-	-	N/A

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Office Support	Reqn	Various : Hanscom, MA	-	-		0.024	Oct 2020	0.347	Oct 2021	-		0.347	-	-	-
<b>Subtotal</b>			-	-		0.024		0.347		-		0.347	-	-	N/A

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract	
<b>Project Cost Totals</b>		-	0.746	0.759	0.763	-	0.763	-	-	N/A

**Remarks**  
 Realigned \$100K from BPAC 675307 to BPAC 675309 for EGPL follow-on contract.

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Air Force</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207431F / <i>Combat Air Intelligence System Activities</i>	<b>Project (Number/Name)</b> 675309 / <i>GEO Info &amp; Serv Software</i>

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>Geoint</b>	
Software Development	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207431F / <i>Combat Air Intelligence System Activities</i>	<b>Project (Number/Name)</b> 675309 / <i>GEO Info &amp; Serv Software</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>Geoint</b>				
Software Development	1	2020	4	2025

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207438F / <i>Theater Battle Management (TBM) C4I</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	0.000	7.844	7.905	0.000	7.905	-	-	-	-	-	-
675218: <i>Applications Development</i>	-	0.000	7.844	7.905	0.000	7.905	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

This project funds software development capacity necessary to deliver Air Force's (AF) Command and Control (C2) capabilities and services. Applications Development is executed under the Air Operations Center (AOC) Block 20 Modification effort. Applications Development provides worldwide operational capabilities for AF C2 in support of DoD, Coalition Partners, and other government agencies. These efforts focus on support of the Joint Forces Air Component Commander (JFACC) that provides air, space and cyber support as presented to the AOC and to other AF and Joint Services C2 systems. Applications Development efforts deliver capabilities identified in the Joint Command and Control (JC2) Capability Development Document (CDD) (2013). This program is part of the overarching Kessel Run portfolio.

In FY 2022, C2 Applications Development will focus on providing software capabilities for the combat plans and operations divisions to build, disseminate and execute the Master Air Attack Plan (MAAP). C2 Applications Development also provides an Airspace Management tool used for building airspaces, evaluating requests and instantaneously generating the Airspace Control Order (ACO). These efforts deliver modern software for inclusion to the AOC Weapon System Modifications to replace the Master Air Attack Plan-Toolkit (MAAPTK) and components of Theater Battle Management Core System - Force Level (TBMCS FL). This effort will investigate and develop a solution to address joint partner and non-AOC usage of C2 Applications in TBMCS FL use cases.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0.000M was expended for civilian pay expenses in this program element, and in FY21 \$2.400M is forecasted for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development	<b>R-1 Program Element (Number/Name)</b> PE 0207438F I Theater Battle Management (TBM) C4I
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	0.000	7.858	8.024	0.000	8.024
Current President's Budget	0.000	7.844	7.905	0.000	7.905
Total Adjustments	0.000	-0.014	-0.119	0.000	-0.119
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-0.014			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-0.119	0.000	-0.119

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<b>Title:</b> C2 Applications Development	0.000	7.844	7.905	0.000	7.905
<b>Description:</b> Employ agile software development methodologies to engineer, integrate, and test modern C2 software capabilities leveraging test-driven development. Provide engineering solutions, test, and deliver effective operational C2 capabilities utilizing continuous integration and continuous delivery (CI/CD) processes.					
<b>FY 2021 Plans:</b> - Deliver software to AOC WS Modifications to replace the MAAPTK and portions of TBMCS FL					
<b>FY 2022 Base Plans:</b> - Continue delivery of software to AOC WS Modifications to replace the MAAPTK and portions of TBMCS FL					
<b>FY 2022 OCO Plans:</b> N/A					
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increased due to expanded development efforts.					
<b>Accomplishments/Planned Programs Subtotals</b>	0.000	7.844	7.905	0.000	7.905

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207438F / <i>Theater Battle Management (TBM) C4I</i>
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**D. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• OPAF 03 834520: <i>Theater Battle Mgt C2 System</i>	0.000	3.045	3.683	0.000	3.683	-	-	-	-	-	-

**Remarks**

**E. Acquisition Strategy**

The acquisition strategy builds on agile development and modification of existing capabilities using evolutionary acquisition to standardize and modernize C2 Applications Development. C2 Applications Development will operate under FY16 NDAA, Section 804, Middle Tier of Acquisition for Rapid Prototyping and Rapid Fielding, leveraging commercial best practices to fully retire MAAPTK and components of TBMCS FL.



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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207438F / Theater Battle Management (TBM) C4I	<b>Project (Number/Name)</b> 675218 / Applications Development

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>Applications Development</b>	
C2 Applications Development	████████████████████

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207438F / Theater Battle Management (TBM) C4I	<b>Project (Number/Name)</b> 675218 / Applications Development

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>Applications Development</b>				
C2 Applications Development	1	2021	4	2022

**Note**

See PE 0305015F, C2 Air Operations Suite - C2 Information Services (C2AOS-C2IS), Project 675218, Applications Development, for prior years development events.

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development	<b>R-1 Program Element (Number/Name)</b> PE 0207439F I Electronic Warfare Integrated Reprogramming (EWIR)
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	15.000	0.000	15.000	-	-	-	-	-	-
673310: Electronic Warfare Integrated Reprogram RDT&E	-	0.000	0.000	15.000	0.000	15.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Note**  
 This program, BA 7, PE 0207439F, project 673310, Develop Deployment Strategy for STITCHES, is a new start.  
 This program, BA 7, PE 0207439F, project 673310, Accomplish Requirements Outlined in NDAA Section 804 (Verify, Validate and Test), is a new start.  
 This program, BA 7, PE 0207439F, project 673310, Accomplish Requirements Outlined in NDAA Section 804 (Deploy Secure Cloud Structures), is a new start.  
 This program, BA 7, PE 0207439F, project 673310, Accomplish Requirements Outlined in NDAA Section 804 (Develop Kill Chains), is a new start.

**A. Mission Description and Budget Item Justification**

In FY 2022, DARPA efforts, previously funded in PE 0603766E, Network-Centric Warfare Technology, Project Net-01, Joint Warfare Systems; are transferred to the Air Force for funding in PE 0207439F, Electronic Warfare Integrated Reprogramming (EWIR), Project 673310, Electronic Warfare Integrated Reprogram RDT&E; to continue development of System of System Technology Integration Tool Chain for Heterogeneous Electronic Systems (STITCHES).

The Electronic Warfare Integrated Reprogramming (EWIR) program element hosts the first DoD transition of STITCHES Warfighter Application Team (SWAT) which is an integration team transferred from DARPA employing, maintaining, and instructing other teams in the DoD how to use the STITCHES integration toolchain. STITCHES is a fully government developed, owned, and open source software toolchain that integrates any DoD fielded systems together in different configurations of system of systems within mission planning time in order to create new capabilities without the need to modify system source code. STITCHES' separable and community-based database allows disparate teams across the DoD to utilize STITCHES and SWAT in separate security levels without comingling data. The Spectrum Warfare Wing will employ STITCHES using the SWAT by employing the STITCHES generated interoperability software on systems within the SWW and deploying the capabilities created through integration. SWAT interfaces and integrates with other DoD systems and their authorities in order to support SWW missions and HHQ directed activities. SWAT is responsible for testing and deploying STITCHES generated interoperability into DoD systems supported by the SWW, with working with existing DoD test and certification organizations, and teaming with organizations outside of the SWW when adapting and creating novel system of systems using capabilities from these organizations. SWAT will deliver adaptive and cutting-edge electromagnetic spectrum capabilities that provide the warfighter a tactical and strategic competitive advantage and freedom to attack, maneuver, and defend.

SWAT is an agile software development team composed of a government tiger team, the STITCHES toolchain developer, and a secure cloud infrastructure and repository developer. SWAT includes a revolving team of subsystem subject matter experts (SMEs) when adapting DoD systems using STITCHES.

SWAT is responsible for the execution of tasks employing STITCHES outlined in NDAA 2021 Section 804 and supports Joint All Domain Command and Control (JADC2) tasking and integration efforts in support of JADC2.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207439F / <i>Electronic Warfare Integrated Reprogramming (EWIR)</i>
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This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 0 was expended for civilian pay expenses in this program element, and in FY21 0 is forecasted for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	0.000	0.000	0.000	0.000	0.000
Current President's Budget	0.000	0.000	15.000	0.000	15.000
Total Adjustments	0.000	0.000	15.000	0.000	15.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	15.000	0.000	15.000

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Develop Deployment Strategy for STITCHES	-	0.000	4.750
<b>Description:</b> Develop Deployment Strategy for System Technology Integration Tool Chain for Heterogeneous Electronic Systems (STITCHES). This effort involves development of training and implementation process for STITCHES.			
<b>FY 2021 Plans:</b> N/A			
<b>FY 2022 Plans:</b> Develop deployment strategy for STITCHES			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Effort transferred from PE 0603766E			
<b>Title:</b> Accomplish Requirements Outlined in NDAA Section 804 (Verify, Validate and Test)	-	0.000	2.500



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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0207439F / <i>Electronic Warfare Integrated Reprogramming (EWIR)</i>		
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>Description:</b> Improve existing STITCHES verification, validation, and testing capabilities and apply to STITCHES integrated systems in coordination with DoD test, accreditation, and certification authorities</p> <p><b>FY 2021 Plans:</b> N/A</p> <p><b>FY 2022 Plans:</b> Improve STITCHES verification, validation, and testing capabilities and apply to STITCHES integrated systems in coordination with DoD test, accreditation, and certification authorities</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Effort transferred from PE 0603766E</p>				
<p><b>Title:</b> Accomplish Requirements Outlined in NDAA Section 804 (Deploy Secure Cloud Structures)</p> <p><b>Description:</b> Deploy secure cloud infrastructures and Section 804 repositories into FENCES environment.</p> <p><b>FY 2021 Plans:</b> N/A</p> <p><b>FY 2022 Plans:</b> Deploy secure cloud infrastructures and Section 804 repositories into FENCES environment.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Effort transferred from PE 0603766E</p>		-	0.000	2.500
<p><b>Title:</b> Accomplish Requirements Outlined in NDAA Section 804 (Develop Kill Chains)</p> <p><b>Description:</b> Develop a System of System Technology Integration Tool Chain for Heterogeneous Electronic Systems (STITCHES) Warfighter Application Team (SWAT) which is an integration team transferred from DARPA. STITCHES will integrate DoD fielded systems together in different configurations of system of systems within mission planning time in order to create new capabilities without the need to modify system source code.</p> <p><b>FY 2021 Plans:</b> N/A</p> <p><b>FY 2022 Plans:</b></p>		0.000	0.000	5.250

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207439F / <i>Electronic Warfare Integrated Reprogramming (EWIR)</i>
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022
Create novel kill chains involving previously incompatible weapon systems, sensor, and command, control, and communication systems from multiple military services in cooperation with United States Indo-Pacific Command or United States European Command.			
<b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> Effort transferred from PE 0603766E			
<b>Accomplishments/Planned Programs Subtotals</b>	0.000	0.000	15.000

**D. Other Program Funding Summary (\$ in Millions)**  
N/A

**Remarks**

**E. Acquisition Strategy**  
Project utilizes existing DoD contracts to develop, maintain, and deploy interoperability within the DoD. SWAT will generate interoperability derived from system interface details as the requirements from NDAA 2021 Section 804 are delivered to DoD repositories. These details are delivered via existing DoD programs. SWAT will serve existing programs to train and deliver their interface details into existing repositories including those Section 804 compliant repositories maintained by the STITCHES team. SWAT's System Adaptation effort generates those interface artifacts for programs not able to perform those functions on their own. SWAT and SWAT supporting contracts can accept external funding when requests for support exceed SWAT programmed funding.



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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207439F / <i>Electronic Warfare Integrated Reprogramming (EWIR)</i>	<b>Project (Number/Name)</b> 673310 / <i>Electronic Warfare Integrated Reprogram RDT&amp;E</i>

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b><i>STITCHES Development</i></b>	
Develop Offensive and Defensive Electromagnetic Spectrum Capabilities	████████████████████
<b><i>STITCHES Test and Evaluation</i></b>	
Test & Evaluate Offensive and Defensive Electromagnetic Spectrum Capabilities	████████████████████

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207439F / <i>Electronic Warfare Integrated Reprogramming (EWIR)</i>	<b>Project (Number/Name)</b> 673310 / <i>Electronic Warfare Integrated Reprogram RDT&amp;E</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>STITCHES Development</i></b>				
Develop Offensive and Defensive Electromagnetic Spectrum Capabilities	1	2022	4	2022
<b><i>STITCHES Test and Evaluation</i></b>				
Test & Evaluate Offensive and Defensive Electromagnetic Spectrum Capabilities	1	2022	4	2022

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207444F / <i>Tactical Air Control Party-Mod</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	4.019	12.882	13.081	0.000	13.081	-	-	-	-	-	-
676013: <i>Equipment Modernization</i>	-	4.019	12.882	13.081	0.000	13.081	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

Tactical Air Control Party (TACP) are Air Force units manned by Special Warfare airmen (previously known as Battlefield Airmen) who advise Army Ground Commanders and plan, request and control air power in support of army ground maneuver operations. These capabilities are employed at all echelons of Army organizations by: Air Support Operation Center (ASOC) TACPs, Division TACPs, Brigade TACPs, Battalion TACPs, and dismounted (on foot) Joint Terminal Attack Controllers (JTAC) deployed with Army companies or scout teams on the front lines. TACPs coordinate, request, and control Strike aircraft, Joint fires, airlift support and intelligence, surveillance, and reconnaissance (ISR) support for Army combat operations, and they provide ground communications support for federal disaster response and Homeland Defense operations. TACPs deploy with their aligned Army units and operate in a variety of environments including fixed operations from ASOCs and Tactical Operations Centers (TOC), mobile operations in tactical vehicles, and dismounted operations with Army infantry patrols.

The purpose of the Tactical Air Control Party - Modernization (TACP-M) program is to provide TACPs voice, data and video communications, targeting and battlefield awareness/management capabilities across all domains. Improved targeting and data communications capabilities provide more accurate target coordinates, reduce Close Air Support (CAS) response times, and reduce the probability of fratricide or collateral damage using networked data communication.

The TACP-M program support includes addressing frequent TACP combat deployments that sometimes lead users to change equipment procurement priorities to support urgent operational needs and respond to evolving threat environments. The TACP-M program works with the Special Warfare (SW) program office to procure dismounted equipment and software. This teaming arrangement helps standardize battlefield airmen equipment, improve efficiency by consolidating acquisition efforts, and often reduces unit costs by increasing procurement quantities.

The TACP-M program provides and modernizes capabilities in the following four major areas: (1) ASOC/TOC systems (used in fixed and mobile operations centers), (2) Vehicle Mounted Systems (used in TACP tactical vehicles) and semi-mobile operations, (3) Dismounted Systems (used by JTACs during dismounted infantry operations), and (4) Close Air Support System (CASS) software.

ASOC provides execution management and integration with fires systems, utilizes Air Operations Center (AOC) (i.e., the Air Tasking Order (ATO)) inputs and archives data, provides a visual depiction and will assist in the management of the forward battlespace/area of contention in coordination with DOD, non-governmental, and international partners. It additionally provides TACP planning documents and data management/server capability for integrating ISR management and video feeds, managing Air Tasking real time, and receiving Battle Damage Assessment (BDA) inputs. The ASOC will provide Joint All Domain Command and Control (JADC2) capabilities that will be leader-centric, network enabled, and ready to operate in complex and degraded information environments; to include the ability to support/execute air taskings should the AOC required assistance during periods of degraded operations

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207444F / <i>Tactical Air Control Party-Mod</i>
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Dismounted and ASOC/TOC/Mounted (ATM) software meets the technical needs of implementing TACP C2 capabilities in operational environments. Software supports a wide variety of radio systems and other emerging systems that are expected to be employed by TACPs in the future. Future upgrades are necessary to maintain interoperability with strike aircraft, joint fire support systems, and emerging data networking waveforms. Software upgrades provide a modular architecture for digital communications, messaging, data handling, hardware management, and targeting, and battle space awareness capabilities. The key characteristic of the software will be the agile development of Open System, Modular architectures that will enable rapid integration with new end user devices (such as laser range finders, radios, Full Motion Video, targeting and laptops/hand held computing devices, tactical gateway's and rapid development, testing and fielding of new mission capability modules to meet immediate and future requirements. The ASOC will be aligned and integrated with the Advanced Battle Management System to ensure synergy of effort.

CASS software provides required advanced communication, advanced targeting capability, and significant interoperability improvements for mobile computing devices used by vehicle-mounted systems and stationary systems used in operations centers. TACP CASS software enables digital data communications with joint Command and Control (C2) nodes, other TACPs, strike aircraft, and Army C2 and Fire Support systems. It includes interfaces with TOC, ASOC, and JTAC radios, and targeting devices, interoperability across the Dismounted, vehicle-mounted systems, and ASOC/TOC mission sets. It also provides battlespace awareness capabilities needed to plan, request, coordinate, and control CAS in support of ground maneuver forces. The CASS software interfaces with all TACP-M components and provides interoperability with joint strike aircraft (F-35, A-10, F-16, F-15, F/A-18, AV-8B, B-52, etc.), Remotely Piloted Aircraft (RPA), artillery fire support systems, network-enabled weapons, and C2 nodes. To enable data communications with those systems / nodes, CASS incorporates several communications protocols including Variable Message Format (VMF), Link 16, Situational Awareness Data Link (SADL), Marine Tactical System (MTS), and U.S. Message Text Format (USMTF); along with emerging waveform technologies.

Funding supports Dismount, ATM, and ASOC software to address: interfaces with new dismount requirements, evolution of existing Tactical Assault Kit (TAK) software which provides a framework for the dismounted software, ASOC modernization (interoperability and hardware/ software interfaces), changes to Army fires support systems, changes to AOC Theater Battle Management Core Systems , updates for fielded versions, new joint Digitally-Aided CAS (DACAS) standards, technical support to operators employing the software, and system prototyping for required future ASOC/TOC/Mounted system capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver CASS weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0.000M was expended for civilian pay expenses in this program element, and in FY21 \$0.000M is forecasted for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development, because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207444F / <i>Tactical Air Control Party-Mod</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	4.117	12.906	13.976	0.000	13.976
Current President's Budget	4.019	12.882	13.081	0.000	13.081
Total Adjustments	-0.098	-0.024	-0.895	0.000	-0.895
• Congressional General Reductions	0.000	-0.024			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.098	0.000			
• Other Adjustments	0.000	0.000	-0.895	0.000	-0.895

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0207444F / <i>Tactical Air Control Party-Mod</i>				<b>Project (Number/Name)</b> 676013 / <i>Equipment Modernization</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
676013: <i>Equipment Modernization</i>	-	4.019	12.882	13.081	0.000	13.081	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

Tactical Air Control Party (TACP) are Air Force units manned by Special Warfare airmen (previously known as Battlefield Airmen) who advise Army Ground Commanders and plan, request and control air power in support of army ground maneuver operations. These capabilities are employed at all echelons of Army organizations by: Air Support Operation Center (ASOC) TACPs, Division TACPs, Brigade TACPs, Battalion TACPs, and dismounted (on foot) Joint Terminal Attack Controllers (JTAC) deployed with Army companies or scout teams on the front lines. TACPs coordinate, request, and control Strike aircraft, Joint fires, airlift support and intelligence, surveillance, and reconnaissance (ISR) support for Army combat operations, and they provide ground communications support for federal disaster response and Homeland Defense operations. TACPs deploy with their aligned Army units and operate in a variety of environments including fixed operations from ASOCs and Tactical Operations Centers (TOC), mobile operations in tactical vehicles, and dismounted operations with Army infantry patrols.

The purpose of the Tactical Air Control Party - Modernization (TACP-M) program is to provide TACPs voice, data and video communications, targeting and battlefield awareness/management capabilities across all domains. Improved targeting and data communications capabilities provide more accurate target coordinates, reduce Close Air Support (CAS) response times, and reduce the probability of fratricide or collateral damage using networked data communication.

The TACP-M program support includes addressing frequent TACP combat deployments that sometimes lead users to change equipment procurement priorities to support urgent operational needs and respond to evolving threat environments. The TACP-M program office works with the Special Warfare (SW) program office to procure dismounted equipment and software. This teaming arrangement helps standardize Special Warfare airmen equipment, improve efficiency of acquisition efforts, and often reduces unit costs by increasing procurement quantities.

The TACP-M program provides and modernizes capabilities in the following major areas: (1) ASOC/TOC systems (used in fixed and mobile operations centers, (2) Dismounted Systems (used by JTACS during dismounted infantry operations) and Vehicle Mounted Systems (used in TACP tactical vehicles) and semi-mobile operations, and (3) Close Air Support System (CASS) software.

ASOC provides execution management and integration with fires systems, utilizes Air Operations Center (AOC) (i.e., the Air Tasking Order (ATO)) inputs and archives data, provides a visual depiction and will assist in the management of the forward battlespace/area of contention in coordination with DOD, non-governmental, and international partners. It additionally provides TACP planning documents and data management/server capability for integrating ISR management and video feeds, managing Air Tasking real time, and receiving Battle Damage Assessment (BDA) inputs. The ASOC will provide Joint All Domain Command and Control (JADC2) capabilities that will be leader-centric, network enabled, and ready to operate in complex and degraded information environments; to include the ability to support/execute air taskings should the AOC required assistance during periods of degraded operations.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207444F / <i>Tactical Air Control Party-M</i> <i>od</i>	<b>Project (Number/Name)</b> 676013 / <i>Equipment Modernization</i>
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Dismounted and ASOC/TOC/Mounted (ATM) software meets the technical needs of implementing TACP C2 capabilities in operational environments. Software supports a wide variety of radio systems and other emerging systems that are expected to be employed by TACPs in the future. Future upgrades are necessary to maintain interoperability with strike aircraft, joint fire support systems, and emerging data networking waveforms. Software upgrades provide a modular architecture for digital communications, messaging, data handling, hardware management, and targeting, and battle space awareness capabilities. The key characteristic of the software will be the agile development of Open System, Modular architectures that will enable rapid integration with new end user devices (such as laser range finders, radios, Full Motion Video, targeting and laptops/hand held computing devices, tactical gateway's and rapid development, testing and fielding of new mission capability modules to meet immediate and future requirements. The ASOC will be aligned and integrated with the Advanced Battle Management System to ensure synergy of effort.

CASS software provides required advanced communication, advanced targeting capability, and significant interoperability improvements for mobile computing devices used by vehicle-mounted systems and stationary systems used in operations centers. TACP CASS software enables digital data communications with joint Command and Control (C2) nodes, other TACPs, strike aircraft, and Army C2 and Fire Support systems. It includes interfaces with TOC, ASOC, and JTAC radios, and targeting devices, interoperability across the Dismounted, vehicle-mounted systems, and ASOC/TOC mission sets. It also provides battlespace awareness capabilities needed to plan, request, coordinate, and control CAS in support of ground maneuver forces. The CASS software interfaces with all TACP-M components and provides interoperability with joint strike aircraft (F-35, A-10, F-16, F-15, F/A-18, AV-8B, B-52, etc.), Remotely Piloted Aircraft (RPA), artillery fire support systems, network-enabled weapons, and C2 nodes. To enable data communications with those systems / nodes, CASS incorporates several communications protocols including Variable Message Format (VMF), Link 16, Situational Awareness Data Link (SADL), Marine Tactical System (MTS), and U.S. Message Text Format (USMTF); along with emerging waveform technologies.

Funding supports Dismount, ATM, and ASOC software to address: interfaces with new dismount requirements, evolution of existing Tactical Assault Kit (TAK) software which provides a framework for the dismounted software, ASOC modernization (interoperability and hardware/ software interfaces), changes to Army fires support systems, changes to AOC Theater Battle Management Core Systems (TBMCS), updates for fielded versions, new joint Digitally-Aided CAS (DACAS) standards, technical support to operators employing the software, and system prototyping for required future ASOC/TOC/Mounted system capabilities

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such program funds would be in addition to civilian pay expenses budgeted in program element 0605831F. In FY19 (0) and FY20 (0) was expended for civilian pay expenses in this program element

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022
<b>Title:</b> Close Air Support System (CASS)	4.019	12.882	13.081
<b>Description:</b> Title: TACP-M Software System (TSS)			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207444F / <i>Tactical Air Control Party-Mod</i>	<b>Project (Number/Name)</b> 676013 / <i>Equipment Modernization</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>Description: The TACP-M Software program will modernize software for Communications, Command and Control (C3) processing systems for multiple TACP mission areas, i.e., ASOC/TOC operations, Mounted operations, and Dismounted operations</p> <p><b>FY 2021 Plans:</b> This includes, but is not limited to: -Continued to support development of Special Warfare Assault Kit (SWAK) Dismount Special Warfare software. -Established TACP common software architecture for further development to meet other battlefield airman operational needs. -Conducted investigations to provide additional feature (capabilities) for the software. -Integrated WARHAWK (previously named CASS 2.0) with ASOC Mod software acquisition. -Continued to integrate, and test CASS data communications interfaces with C2 Nodes, CAS aircraft, Army Tactical Network (ATN), Soldier Radios Waveform (SRW) networks, TBMCS, and Mobile User Objective System (MUOS) Satellite Communications (SATCOM) networks to enhance interoperability between TACPs, and other joint warfighters.</p> <p><b>FY 2022 Plans:</b> -Will continue to support development of Special Warfare Assault Kit (SWAK) Dismount Special Warfare software. -Will continue TACP common software architecture for further development to meet other battlefield Special Warfare airman operational needs. -Will conduct investigations to provide additional feature (capabilities) for the software. -Will integrate WARHAWK (previously named CASS 2.0) with ASOC Mod software acquisition. -Will continue to integrate, and test CASS data communications interfaces with C2 Nodes, CAS aircraft, Army Tactical Network (ATN), Soldier Radios Waveform (SRW) networks, TBMCS, and Mobile User Objective System (MUOS) Satellite Communications (SATCOM) networks to enhance interoperability between TACPs, and other joint warfighters.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> The increase in budget from FY21 to FY22 is due to increased mission capabilities required for ASOC and Mobile systems.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	4.019	12.882	13.081

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• OPAF 03 Line item 837100: <i>Tactical C-E Equipment</i>	35.967	50.093	52.200	-	52.200	-	-	-	-	-	-
<b>Remarks</b>											

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0207444F / Tactical Air Control Party-Mod	Project (Number/Name) 676013 / Equipment Modernization

**D. Acquisition Strategy**

TACP-M is executing agile development for the TACP-M CASS software. CASS, Dismount, and ATM software strategy continues the development and deployment process through risk reduction efforts. CASS WARHAWK software strategy is to build off pre-existing software and lessons learned in through Risk Reduction using a separate contract (awarded 1QFY21) for the full agile development of WARHAWK to meet warfighter's needs. WARHAWK will employ a Modular Open Systems Architecture (MOSA) to allow flexible development that will compliment an Agile software effort.

The ASOC modernization effort will research and investigate commercial and government available hardware and software with minimum development to support requirements by utilizing direct user feedback from other TACP-M programs, TACP innovation sites and the UES to quickly leverage capability into the existing weapons platform. The results of these efforts form the basis of the ASOC-Mod to execute prototype and develop efforts to support current requirements.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207444F / <i>Tactical Air Control Party-Mod</i>	<b>Project (Number/Name)</b> 676013 / <i>Equipment Modernization</i>
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
WARHAWK CASS System Software Dev. Dismounted	Various	GDIT : WP, OH	-	1.700	Mar 2020	2.400	Jun 2021	2.443	Jun 2022	-		2.443	-	-	-
Warhawk CASS System Software Dev. Mounted	TBD	TBD : TBD	-	-		5.997	Mar 2021	5.880	Mar 2022	-		5.880	-	-	-
ASOC MOD	Various	TBD : Pope AFB, NC	-	-		1.132	Jan 2021	1.012	Jan 2022	-		1.012	-	-	-
Warhawk CASS Risk Reduction Phase 2	SS/CPAF	GDIT : WP, OH	-	0.750	Mar 2020	-		-		-		-	-	-	-
WARHAWK CASS NSWC Crane (Naval Surface Warfare Center)	MIPR	NSWC Crane : Crane, IN	-	0.988	Jan 2020	0.633	Jan 2021	1.229	Jan 2022	-		1.229	-	-	-
<b>Subtotal</b>			-	3.438		10.162		10.564		-		10.564	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test Agency Support	MIPR	Various : Multiple, FL	-	0.581	Apr 2020	0.942	Apr 2021	0.736	Apr 2022	-		0.736	-	-	-
<b>Subtotal</b>			-	0.581		0.942		0.736		-		0.736	-	-	N/A

**Remarks**  
Development, operational and interoperability testing

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Management Services	C/CPAF	Not specified. : TBD	-	-		1.778	Jul 2021	1.781	Jul 2022	-		1.781	-	-	-
<b>Subtotal</b>			-	-		1.778		1.781		-		1.781	-	-	N/A

**Remarks**  
PMA funds MITRE, ETASS, PASS, SCS, all multiple contractors.



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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207444F / <i>Tactical Air Control Party-Mod</i>	<b>Project (Number/Name)</b> 676013 / <i>Equipment Modernization</i>

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>WARHAWK Close Air Support System(CASS)</b>																												
WARHAWK Close Air Support System (CASS) Software (v1.1) Design and Development (SWAK)	■																											
WARHAWK Close Air Support System (CASS) Software (v1.2) Design and Development (SWAK)		■	■	■																								
TACP-M Software (v1.0) Design and Development (SWAK)				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
WARHAWK Close Air Support System (CASS) Dismount Software (v1.3) Design and Development (SWAK)						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
WARHAWK Close Air Support System (CASS) Dismount Software Design and Development (SWAK)											■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
WARHAWK Close Air Support System (CASS) ATM Software Risk Reduction (1A) - Architecture	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
WARHAWK Close Air Support System (CASS) ATM Software Risk Reduction (1B)-capabilities, modem and apps						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
WARHAWK Close Air Support System (CASS) ATM Software (v2.0) Design and Development							■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
WARHAWK Close Air Support System (CASS) ATM Software (v2.1) Design and Development							■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■



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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207444F / <i>Tactical Air Control Party-Mod</i>	<b>Project (Number/Name)</b> 676013 / <i>Equipment Modernization</i>
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
WARHAWK Close Air Support System (CASS) ATM Software (v2.2) Design and Development																												
WARHAWK Close Air Support System (CASS) ATM Software (v3.1) Design and Development																												

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207444F / <i>Tactical Air Control Party-Mod</i>	<b>Project (Number/Name)</b> 676013 / <i>Equipment Modernization</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>WARHAWK Close Air Support System(CASS)</b>				
WARHAWK Close Air Support System (CASS) Software )(v1.1) Design and Development (SWAK)	1	2020	1	2020
WARHAWK Close Air Support System (CASS) Software (v1.2) Design and Development (SWAK)	2	2020	1	2021
TACP-M Software (v1.0) Design and Development (SWAK)	4	2020	4	2022
WARHAWK Close Air Support System (CASS) Dismount Software (v1.3) Design and Development (SWAK)	2	2021	1	2022
WARHAWK Close Air Support System (CASS) Dismount Software Design and Development (SWAK)	2	2022	4	2022
WARHAWK Close Air Support System (CASS) ATM Software Risk Reduction (1A) - Architecture	1	2020	2	2021
WARHAWK Close Air Support System (CASS) ATM Software Risk Reduction (1B)-capabilities, modem and apps	1	2021	2	2021
WARHAWK Close Air Support System (CASS) ATM Software (v2.0) Design and Development	2	2021	2	2022
WARHAWK Close Air Support System (CASS) ATM Software (v2.1) Design and Development	2	2021	1	2022
WARHAWK Close Air Support System (CASS) ATM Software (v2.2) Design and Development	2	2022	4	2022
WARHAWK Close Air Support System (CASS) ATM Software (v3.1) Design and Development	2	2022	4	2022

**Note**

IOC & FOC dates are based on Objective and not Threshold dates.

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207452F / DCAPES
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COST (\$ in Millions)	Prior Years <sup>(+)</sup>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	238.650	19.180	14.789	4.305	0.000	4.305	-	-	-	-	-	-
674801: <i>DCAPES INC 2B</i>	51.469	19.180	14.789	4.305	0.000	4.305	-	-	-	-	-	-

**Program MDAP/MAIS Code:** 500

<sup>(+)</sup> The sum of all Prior Years is \$187.181 million less than the represented total due to several projects ending

**A. Mission Description and Budget Item Justification**

Deliberate and Crisis Action Planning and Execution Segments (DCAPES) is the USAF system used to project air expeditionary forces (includes weapon systems, logistics, and personnel). It enables the USAF to posture mission ready and equipped forces (organized in effects-based operational capability packages) to deliver air, space and cyberspace capabilities to Joint commanders worldwide. Technical requirements planned for Increment 2B include enabling the system to support Public Key Infrastructure and elimination of Social Security Account Numbers as the primary key for identifying Air Force military and civilian members by replacing it with the Electronic Data Interchange Personal Identifier.

DCAPES funding will be executed against capabilities packaged into agile development projects for multiple releases based on the warfighter's priorities.

Funds will be used to perform studies and innovative integration efforts for common technology capabilities such as cloud migration, technology development and mobile application.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapons system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0.0M was expended for civilian pay expenses in this program element, and in FY21 \$0.0M is forecasted for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207452F / DCAPES
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	19.910	14.816	4.370	0.000	4.370
Current President's Budget	19.180	14.789	4.305	0.000	4.305
Total Adjustments	-0.730	-0.027	-0.065	0.000	-0.065
• Congressional General Reductions	0.000	-0.027			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.730	0.000			
• Other Adjustments	0.000	0.000	-0.065	0.000	-0.065

**Change Summary Explanation**

Funding decreased due to Increment 2B scheduled completion in FY22. Program was re-structured in August 2020 to continue development.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0207452F / DCAPES				<b>Project (Number/Name)</b> 674801 / DCAPES INC 2B			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
674801: DCAPES INC 2B	51.469	19.180	14.789	4.305	0.000	4.305	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

Deliberate and Crisis Action Planning and Execution Segments (DCAPES) is the USAF system used to project air expeditionary forces (includes weapon systems, logistics, and personnel). It enables the USAF to posture mission ready and equipped forces (organized in effects-based operational capability packages) to deliver air, space and cyberspace capabilities to Joint commanders worldwide. DCAPES stores planning and execution information for Air Force (AF) functional users in the four (4) main AF disciplines: 1) operations, 2) logistics, 3) manpower, and 4) personnel. These disciplines support joint, combined, and AF military operations worldwide. Technical requirements planned for Increment 2B include enabling the system to support Public Key Infrastructure and elimination of Social Security Account Numbers as the primary key for identifying Air Force military and civilian members by replacing it with the Electronic Data Interchange Personal Identifier.

Funds will be used to perform studies and innovative integration efforts for common technology capabilities such as cloud migration, technology development and mobile application.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapons system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 0.0M was expended for civilian pay expenses in this program element, and in FY21 0.0M is forecasted for civilian pay expenses in this program element.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> DCAPES INCREMENT 2B	19.180	14.789	4.305
<p><b>Description:</b> DCAPES Increment 2B includes Infrastructure Support, Business Intelligence, and the development of multiple Warfighter Capabilities (see remarks section below for capability titles). The Program continued execution of Warfighter Capabilities 1,2,4,6 during FY20. In August 2020, the Air Force restructured DCAPES Inc 2B Acquisition Program Baseline adding two and a half capability packages (second half of 6 plus 7 and 8), that had previously been deferred. DCAPES continued execution of Warfighter Capabilities 4,5,6,8 during FY21, and will execute Warfighter Capabilities 5,6,7,8, &amp; JPES during FY22.</p>			
<p><b>FY 2021 Plans:</b></p> <ul style="list-style-type: none"> <li>- Continue the development of Warfighter Capabilities 4,5,6,8</li> <li>- Continue JPES integration</li> </ul>			
<p>No OCO</p>			
<p><b>FY 2022 Plans:</b></p> <ul style="list-style-type: none"> <li>- Will continue the development of Warfighter Capabilities 5,6,7,8</li> </ul>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207452F / DCAPEs	<b>Project (Number/Name)</b> 674801 / DCAPEs INC 2B
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022
- Will continue JPES integration			
<b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> Funding decreased due to Increment 2B scheduled completion in FY22. Program was re-structured in August 2020 to continue development.			
<b>Accomplishments/Planned Programs Subtotals</b>	19.180	14.789	4.305

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

DCAPES Increment 2B Warfighter Capability Packages:  
 Capability 1 - Electronic Data Interface Personnel Identifier (EDIPI)  
 Capability 2 - Global Force Management Interoperability (GFM-DI)  
 Capability 3 - Enhanced Contingency-Rotational Air Expeditionary Force Scheduling Tool Interface (ECAST)  
 Capability 4 - Manpower & Equipment Force Packaging (MEFPAK)  
 Capability 5 - Logistics Factor File (LFF)  
 Capability 6 - Force Availability Analysis (FAA)  
 Capability 7 - Air Reserve Component (ARC) Forces  
 Capability 8 - Workflow  
 JPES - Joint Planning Execution Services

**D. Acquisition Strategy**

The DCAPES program successfully awarded the DCAPES Increment 2B Development Task Order for a one-year Base Period and four one-year Option Periods using the NETCENTS 2 Application Services Small Business Indefinite Delivery Indefinite Quantity (IDIQ) contract. The period of performance started on 6 April 2020 and ends on 5 April 2024.

DCAPES is an Evolutionary Acquisition Program using an incremental development approach (DoDI 5000.02 Model 3) to develop capabilities over several increments. To support the rapid development and delivery of capabilities, DCAPES employs a hybrid Agile acquisition strategy in which capabilities are incrementally delivered in time-phased stages based on warfighter priorities and adoption of key architecture and technology requirements as a trade-off for accelerated delivery and risk reduction.

The DCAPES Program Management Office (PMO) uses a mix of agreements (Service Level Agreements and Memorandums) with DCAPES interface partners. A Service Level Agreement is in place with the Capabilities Integration Environment (AFLCMC/HNIZ) to provide the infrastructure used to conduct software development and testing. Memorandums of Agreement with Joint Interoperability Test Command, Air Force Operational Test and Evaluation Command, and the 45th Test Squadron are in place and outline the test support required before fielding the final capability packages.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207452F / DCAPES	<b>Project (Number/Name)</b> 674801 / DCAPES INC 2B

The DCAPES Increment 2B requirements have been packaged into multiple discreet capabilities which will be developed in multiple releases. Each capability will be developed using several Sprints and with one or more fieldings to satisfy the approved requirements within each package.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date: May 2021**

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207452F / DCAPES	<b>Project (Number/Name)</b> 674801 / DCAPES INC 2B
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<b>Product Development (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
DCAPES Increment 2B/ Prime Contract	C/FFP	Array Information Technology, Inc. : Greenbelt, MD	24.202	7.998	Dec 2019	6.157	Dec 2020	1.131	Dec 2021	-		1.131	-	-	43.136
DCAPES Infrastructure/ Integration	C/FFP	DATUM Software Inc. : John Creek, GA	2.999	0.779	Feb 2020	0.800	Feb 2021	0.369	Feb 2022	-		0.369	-	-	5.152
DCAPES Architecture Documentation Development	C/FFP	Bowhead LLC : Springfield, VA	1.120	0.326	Aug 2020	0.356	Aug 2021	0.125	Aug 2022	-		0.125	-	-	13.756
DCAPES DISA Hosting	MIPR	DISA : Pensacola, FL	4.167	1.754	Oct 2019	1.496	Oct 2020	0.526	Oct 2021	-		0.526	-	-	15.166
<b>Subtotal</b>			32.488	10.857		8.809		2.151		-		2.151	-	-	N/A

<b>Support (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
DCAPES HIB Integration Contract Support	C/FFP	MacaLogic, LLC : Dayton, OH	4.567	0.749	Apr 2020	0.855	Apr 2021	0.544	Apr 2022	-		0.544	-	-	3.225
DCAPES Cost Analysis Contract Support	C/CPFF	BTAS, Inc. : Beavercreek, OH	1.131	0.317	May 2020	0.340	May 2021	0.141	May 2022	-		0.141	-	-	1.908
DCAPES Engineering Contract Support	C/CPFF	Oasis Systems, LLC : Lexington, MA	3.490	1.987	Dec 2019	1.502	Dec 2020	0.774	Dec 2021	-		0.774	-	-	5.392
DCAPES CIE Tech Support	MIPR	AFLCMC/HNIZ CIE : MAFB-Gunter Annex, AL	2.247	0.607	Mar 2020	0.608	Mar 2021	0.221	Mar 2022	-		0.221	-	-	7.390
DCAPES Development Environment HW	C/Various	Various : Various	0.879	1.720	Aug 2020	0.000	Aug 2021	0.000	Aug 2022	-		0.000	-	-	1.720
DCAPES Licenses (Software/Hardware)	C/Various	Various : Various	0.939	0.134	Feb 2020	0.245	Feb 2021	0.030	Feb 2022	-		0.030	-	-	1.573
DCAPES Oracle Licenses	C/FFP	Mythics : Vienna, VA	2.789	0.253	Aug 2020	0.258	Aug 2021	0.095	Aug 2022	-		0.095	-	-	4.560
DCAPES Government Purchase Card	Reqn	Various : Various	0.069	0.020	Oct 2019	0.020	Oct 2020	0.015	Oct 2021	-		0.015	-	-	0.209



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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207452F / DCAPES	<b>Project (Number/Name)</b> 674801 / DCAPES INC 2B
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<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
<b>Subtotal</b>			16.111	5.787		3.828		1.820		-		1.820	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
DCAPES Development Test and Evaluation	MIPR	45th Test Sqdn : Eglin AFB, FL	0.954	0.347	Dec 2019	0.367	Dec 2020	0.141	Dec 2021	-		0.141	-	-	3.519
DCAPES Interoperability Testing and Evaluation	MIPR	DISA JITC : Huachuca, AZ	0.269	0.133	Oct 2019	0.135	Oct 2020	0.128	Oct 2021	-		0.128	-	-	1.278
<b>Subtotal</b>			1.223	0.480		0.502		0.269		-		0.269	-	-	N/A

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management Assessments	Various	Various : Various	1.387	1.991	Oct 2019	1.585	Oct 2020	0.000	Oct 2021	-		0.000	-	-	4.145
DCAPES Travel	Reqn	Various : Various	0.120	0.030	Oct 2019	0.030	Oct 2020	0.030	Oct 2021	-		0.030	-	-	0.330
DCAPES Business Integration Support	Various	Various : Various	0.140	0.035	Oct 2019	0.035	Oct 2020	0.035	Oct 2021	-		0.035	-	-	0.385
<b>Subtotal</b>			1.647	2.056		1.650		0.065		-		0.065	-	-	N/A

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	51.469	19.180	14.789	4.305	-	4.305	-	-	N/A

**Remarks**

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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date: May 2021**

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207452F / DCAPES	<b>Project (Number/Name)</b> 674801 / DCAPES INC 2B
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>DCAPES Increment 2B</b>																												
DCAPES Increment 2B (Restructured)																												
- Capability 2 Global Force Management Interoperability (GFM-DI)																												
- Capability 4 Manpower & Equipment Force Packaging (MEFPAK)																												
- Capability 5 Logistics Factor File																												
- Capability 6 Force Availability Analysis																												
- Capability 7 Air Reserve Component (ARC) Forces																												
- Capability 8 Workflow																												
- JPES (Joint Planning Execution Services)																												

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**Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207452F / DCAPES	<b>Project (Number/Name)</b> 674801 / DCAPES INC 2B
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>DCAPES Increment 2B</b>				
DCAPES Increment 2B (Restructured)	1	2020	4	2022
- Capability 2 Global Force Management Interoperability (GFM-DI)	1	2020	2	2020
- Capability 4 Manpower & Equipment Force Packaging (MEFPAK)	1	2020	1	2021
- Capability 5 Logistics Factor File	1	2020	3	2022
- Capability 6 Force Availability Analysis	1	2020	4	2022
- Capability 7 Air Reserve Component (ARC) Forces	3	2022	4	2022
- Capability 8 Workflow	1	2021	4	2022
- JPES (Joint Planning Execution Services)	3	2021	4	2022

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207521F / <i>Air Force Calibration Programs</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	0.000	1.966	1.984	0.000	1.984	-	-	-	-	-	-
673326: <i>Precision Measurement &amp; Calibration</i>	-	0.000	1.966	1.984	0.000	1.984	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

This program develops, tests, and evaluates national and Air Force measurement standards (hardware) and calibration equipment in support of all Air Force programs and activities, including Precision Measurement Equipment Laboratories (PMELs) worldwide. Metrology research and development provides technology to support systems in all phases of development and acquisition, as well as Air Force R&D laboratories, test ranges, ground test facilities, and operational weapons systems support. Rapidly changing technology requires continuing research and development of measurement standards and calibration equipment to ensure modern weapon systems meet Air Force readiness objectives. This program addresses all metrology disciplines and includes the technology areas of laser, infrared, microwave, millimeter wave, optical, physical, mechanical, electrical, electronic, and ionizing radiation measurements. Metrology is a technical discipline devoted to the science of measurements and to the study and improvement of measurement technology. Measurements are the foundation of military system development, quality assurance, hardware conformance testing and system readiness tests. The integrity of these tests is assured through calibration and traceability assurance schemes.

The capability to measure and calibrate must parallel the emergence of new technology, new ranges, and new capabilities of military systems. Lack of new measurement capability impedes or blocks the successful exploitation of new technologies, especially in the movement from development laboratory to production to deployment. R&D efforts are essential within the DoD to pace these requirements, otherwise, these same new systems will suffer time delays, excessive cost, and increased risk due to unreliable test results in all phases of development, production, deployment and operation.

This program element may include necessary civilian pay expenses required to manage, execute and deliver 0207521F. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, 0605898F, and 0605833F.

Program is managed by Air Force Materiel Command, Agile Combat Support Directorate, Air Force Metrology Division (WNM).

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force				<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0207521F / <i>Air Force Calibration Programs</i>				
<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	
Previous President's Budget	0.000	1.970	2.014	0.000	2.014	
Current President's Budget	0.000	1.966	1.984	0.000	1.984	
Total Adjustments	0.000	-0.004	-0.030	0.000	-0.030	
• Congressional General Reductions	0.000	0.000				
• Congressional Directed Reductions	0.000	0.000				
• Congressional Rescissions	0.000	0.000				
• Congressional Adds	0.000	0.000				
• Congressional Directed Transfers	0.000	0.000				
• Reprogrammings	0.000	0.000				
• SBIR/STTR Transfer	0.000	0.000				
• Other Adjustments	0.000	-0.004	-0.030	0.000	-0.030	
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>				<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Weapons System Measurement Standards				0.000	0.368	0.352
<b>Description:</b> Develop national measurement standards to support Air Force infared / laser / electro-optical weapon systems and support equipment.						
<b>FY 2021 Plans:</b> Continue development of national measurement standards to support Air Force infared / laser / electro-optical weapon systems and support equipment.						
<b>FY 2022 Plans:</b> Continue development of national measurement standards to support Air Force infared / laser / electro-optical weapon systems and support equipment.						
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> The cost increase represents additional costs to ongoing efforts and inflation						
<b>Title:</b> Electrical Measurements				0.000	0.395	0.405
<b>Description:</b> Develop Standards for electrical measurements to support high accuracy electronic test equipment.						
<b>FY 2021 Plans:</b> Continue development of standards for electrical measurements to support high accuracy electronic test equipment.						
<b>FY 2022 Plans:</b>						

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0207521F / <i>Air Force Calibration Programs</i>		
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Continue development of standards for electrical measurements to support high accuracy electronic test equipment. <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> The cost increase represents additional costs to ongoing efforts and inflation				
<b>Title:</b> Calibration Standards <b>Description:</b> Develop improved calibration standards to support physical, mechanical, and electro-mechanical support equipment. <b>FY 2021 Plans:</b> Continue to develop improved calibration standards to support physical, mechanical, and electro-mechanical support equipment. <b>FY 2022 Plans:</b> Continue to develop improved calibration standards to support physical, mechanical, and electro-mechanical support equipment. <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> The cost increase represents additional costs to ongoing efforts and inflation		0.000	0.639	0.649
<b>Title:</b> Radar Support/Communications <b>Description:</b> Develop standards for radar support, RF communication, and radar cross section range measurements. <b>FY 2021 Plans:</b> Continue to develop standards for radar support, RF communication, and radar cross section range measurements. <b>FY 2022 Plans:</b> Continue to develop standards for radar support, RF communication, and radar cross section range measurements. <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> The cost increase represents additional costs to ongoing efforts and inflation		0.000	0.564	0.578
<b>Accomplishments/Planned Programs Subtotals</b>		0.000	1.966	1.984
<b>D. Other Program Funding Summary (\$ in Millions)</b> N/A				
<b>Remarks</b>				
<b>E. Acquisition Strategy</b> Primarily accomplished through intergovernmental transfer between the Department of Defense and other Federal Departments.				





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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Air Force</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207521F / Air Force Calibration Programs	<b>Project (Number/Name)</b> 673326 / Precision Measurement & Calibration

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>Precision Measurement &amp; Calibration</b>	
Precision Measurement & Calibration	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207521F / <i>Air Force Calibration Programs</i>	<b>Project (Number/Name)</b> 673326 / <i>Precision Measurement &amp; Calibration</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Precision Measurement &amp; Calibration</i></b>				
Precision Measurement & Calibration	1	2021	4	2026

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207522F I Airbase Air Defense Systems (ABADS)
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	7.392	0.000	7.392	-	-	-	-	-	-
675218: <i>Applications Development</i>	-	0.000	0.000	7.392	0.000	7.392	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Note**

This program, BA 7, PE 0207522F, project 675218, Command and Control, Incident Management, Emergency Response Application (C2IMERA), is a new start.

In FY 2022, PE 0207522F, Airbase Air Defense Systems (ABADS), Project 675218, Applications Development, friendly order of battle capability development efforts were transferred from PE 0207410F, Air & Space Operations Center (AOC), Project 674596, AOC WS Modifications, in order to improve installation commanders' and staff's ability to execute combat air operations.

**A. Mission Description and Budget Item Justification**

Command and Control, Incident Management, Emergency Response Application (C2IMERA) is a C2 system that addresses installation commanders' and staff's ability to execute combat air operations. C2IMERA funds provide enhanced installation command and control to improve decision speed, quality, and lethality by incorporating direct user feedback, connecting people, automating daily operations, and integrating data from myriad systems. C2IMERA receives input from users and system interfaces and the data is displayed on the real-time, interactive COP. C2IMERA provides automated communications via COP, emails, notifications, and alerts, alleviating the need for briefings, meetings, and radio communication.

As part of C2IMERA emergency management, Disaster Response Force Common Operating Picture (DRF COP) funds identify and/or develop, implement, and maintain a standardized, singular, and near real-time situational awareness COP for Air Force disaster response forces. DRF COP supports incidents or events at the tactical, operational, and strategic level, allowing information to be shared and exchanged across the Air Force enterprise and other relevant external agencies within the Continental United States (CONUS) and Outside the Continental United States (OCONUS) Air Force Installations.

As part of the Command and Control Operations Career Field (1C3X1) requirements, which are synergistic with DRF COP, Command Post funds Installation Command and Control of Base Operations, Mission Management and Monitoring, Higher Headquarters Information Exchange Requirements (IERS), Emergency Action Messaging, and key enablers supporting the Wing Operations Center and Agile Combat Employment.

C2IMERA FY22 funds will support the development of enhanced architecture to make C2IMERA more scalable and also to further integrate with other systems for machine to machine exchanges. This begins a transition of C2IMERA application functionality into Joint All Domain Execution System (JADES), which is a cohesive Wing C2 execution ecosystem that functions during Agile Combat Employment (ACE) operations in a peer conflict and during disconnected operations.

This program is part of the overarching Kessel Run portfolio.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207522F / <i>Airbase Air Defense Systems (ABADS)</i>
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This program element may include necessary civilian pay expenses required to manage, execute, and deliver C2IMERA weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY19 \$00.000M, in FY20 \$00.000M, and in FY21 \$00.00M was expended for civilian pay expenses in this program element.

As directed in the FY 2018 NDAA, Sec 825, amendment to PL 114-92 FY 2016 NDAA, Sec 828 Penalty for Cost Overruns, the FY 2019 Air Force penalty total is 50.0M. The calculated percentage reduction to each research, development, test and evaluation and procurement account will be allocated proportionally from all programs, projects, or activities under such account.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	0.000	0.000	0.000	0.000	0.000
Current President's Budget	0.000	0.000	7.392	0.000	7.392
Total Adjustments	0.000	0.000	7.392	0.000	7.392
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	7.392	0.000	7.392

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Command and Control, Incident Management, Emergency Response Application (C2IMERA)	-	-	7.392
<b>Description:</b> Command and Control, Incident Management, Emergency Response Application (C2IMERA) will provide enhanced installation command and control to improve decision speed, quality, and lethality by incorporating direct user feedback, connecting people, automating daily operations, and integrating data from myriad systems. C2IMERA receives input from users and system interfaces and the data is displayed on the real-time, interactive COP. C2IMERA provides automated communications via COP, emails, notifications, and alerts, alleviating the need for briefings, meetings, and radio communication.			
<b>FY 2022 Plans:</b> FY22 activities include but are not limited to the following:			

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207522F / <i>Airbase Air Defense Systems (ABADS)</i>
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>-Will continue refinement of Disaster Response Force Common Operating Picture (DRF COP) capabilities to include enhanced automated integration with local, state, and federal safety agencies solutions.</p> <p>-Will continue further development of Advanced Battle Management System (ABMS)/Joint All Domain Command and Control(JADC2) capabilities to provide critical evolving capabilities integrating Installation Command and Control (IC2) with air operations at Major Command (MAJCOM) and Higher Headquarter (HHQ) levels. This includes enhancing system and data resiliency with edge computing technologies tied into the enterprise computing infrastructure.</p> <p>-Will continue with the extension of Cross-Domain capabilities to support full data synchronization between the low side (NIPR) and high side (SIPR) C2IMERA instances to facilitate Multi-Domain Command and Control (MDC2).</p> <p>-Will continue with the enterprise employment of C2IMERA for installation and wing command and control to enhance warfighter effectiveness and impacts achieved through an overhaul of the C2IMERA data model and a consolidated/federated data access layer.</p> <p>-Will continue with architectural improvements to transition from incrementally delivered micro services to a single-tenancy implementation with support for Software as a Service (SAAS).</p> <p>-Will continue with the automated workflow and improved system integration with continued interface development focusing on the fusion of installation/base C2 node data with MAJCOM and HHQ level systems at the strategic levels.</p> <p><b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> FY22 is the first year FRoB/C2IMERA funding is in PE 0207522F.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	-	-	7.392

**D. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

**E. Acquisition Strategy**

Projects will be awarded via a sole-source contract for Agile DevOps development, fielding and support activities. The acquisition and contracting strategies were approved by the Senior Materiel Leader on 20 June 2018

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207522F / Airbase Air Defense Systems (ABADS)	<b>Project (Number/Name)</b> 675218 / Applications Development
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
C2IMERA Development	TBD	TBD : TBD	-	-		-		5.192	Jan 2022	-		5.192	-	-	-
<b>Subtotal</b>			-	-		-		5.192		-		5.192	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
C2IMERA Test Support	PO	96th Test Wing : Eglin, FL	-	-		-		0.252	Mar 2022	-		0.252	-	-	-
<b>Subtotal</b>			-	-		-		0.252		-		0.252	-	-	N/A

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
C2IMERA Program Management Administration	C/Various	Not specified. : Hanscom AFB, MA	-	-		-		1.560	Jul 2022	-		1.560	-	-	-
C2IMERA Systems Engineer	SS/ Various	Not specified. : Hanscom AFB, MA	-	-		-		0.388	Oct 2022	-		0.388	-	-	-
<b>Subtotal</b>			-	-		-		1.948		-		1.948	-	-	N/A

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	-	-	0.000	7.392	-	7.392	-	-	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Air Force</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207522F / Airbase Air Defense Systems (ABADS)	<b>Project (Number/Name)</b> 675218 / Applications Development

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>Software Development</b>	
C2IMERA Software Development	██████████
<b>Test</b>	
C2IMERA Test	██████████

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207522F / Airbase Air Defense Systems (ABADS)	<b>Project (Number/Name)</b> 675218 / Applications Development

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>Software Development</b>				
C2IMERA Software Development	1	2022	4	2022
<b>Test</b>				
C2IMERA Test	1	2022	4	2022



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**Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207573F / <i>National Technical Nuclear Forensics</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	1.723	0.395	1.971	0.000	1.971	-	-	-	-	-	-
674881: <i>Prompt Diagnostics</i>	-	1.723	0.395	1.971	0.000	1.971	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

National Technical Nuclear Forensics (NTNF) is the collection, analysis and evaluation of pre- and post-detonation radiological and nuclear materials, devices, and debris as well as the immediate effects created by a nuclear detonation.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver National Technical Nuclear Forensics weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY19 and FY20, \$0M was expended for civilian pay expenses in this program element and \$0M is forecast for FY21.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

<b>B. Program Change Summary (\$ in Millions)</b>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>
Previous President's Budget	1.788	0.396	0.000	0.000	0.000
Current President's Budget	1.723	0.395	1.971	0.000	1.971
Total Adjustments	-0.065	-0.001	1.971	0.000	1.971
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-0.065	-0.001	1.971	0.000	1.971

**Change Summary Explanation**

FY22: Added funds to increase capabilities of United States Prompt Diagnostic System within the National Technical Nuclear Forensics programs.

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>
<b>Title:</b> Nuclear Forensics - Prompt Diagnostics	1.723	0.395	1.971

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207573F / <i>National Technical Nuclear Forensics</i>
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>Description:</b> Develop diagnostic detection systems to immediately record signals resulting from a nuclear detonation. These event signature elements support weapon and event characterization analysis for the purposes of identifying the weapon classification, magnitude of the detonation (yield), and Reaction Time History (RTH) of the device. The combination of these elements with radiochemical analysis enables analysts to distinguish between wide ranges of nuclear weapon designs and origin, supporting the national attribution assessment process.</p> <p><b>FY 2021 Plans:</b> Complete development of Prompt Diagnostics detection system technical data packages and associated efforts of current system.</p> <p><b>FY 2022 Plans:</b></p> <ul style="list-style-type: none"> <li>- Completion of Technology Readiness Levels for Ground Based Optical Skyshine (GBOS).</li> <li>- Advanced Technology Development for fielded prototype sensor for form, fit, function for speed of light and speed of sound sensor technologies.</li> <li>- Analytical Tool Development for data analyst in support of Reaction Time History.</li> <li>- Analytical Tool Development for data analyst in support of Yield Determination.</li> <li>- Engineering and manufacturing systems development maturation and integration activities for the USPDS system suite.</li> <li>- Prompt Diagnostics Operational System Development for fielded systems to validated sensor production and system integration.</li> <li>- Development &amp; Implementation of backward software compatibility for system configuration to provide flexibility and operations during software or hardware upgrades.</li> </ul> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increase to technically mature new sensors and develop associated user tools.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	1.723	0.395	1.971

<b>D. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• OPAF 03 Line Item 834320: <i>National Technical Nuclear Forensics</i>	4.581	5.202	3.990	-	3.990	-	-	-	-	-	-

**Remarks**

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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Air Force Date: May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207573F / <i>National Technical Nuclear Forensics</i>
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**E. Acquisition Strategy**

The RDT&E strategy was developed in concert with the system stakeholders. The strategy is to utilize (1) Department of Energy Sensor R&D Principal Investigators (PI's) who developed the prototype systems for the USPDS program (2) Department of Energy National Security Campus who during the DSOR was identified as Engineering, Production Integration and Depot for the Life Cycle of the system (3) AFTAC Subject Matter Experts and Operator/End Users for the system. The planned acquisition will predominantly require funds transfers via Military Interdepartmental Procurement Requests (MIPRs). Prioritization and implementation of Acquisitions to support RDT&E for the system will be managed and prioritized quarterly by the USPDS R&D Requirements Review Board (RRB) and chaired by Air Combat Command (ACC/A5) as per the charter signed by the stakeholders. The strategy will utilize performance based techniques with the performance based on a statement of objectives to describe the overall output of the acquisition task.

- i. Air Combat Command (ACC) - Requirement Owner
- ii. Air Force Life Cycle Management Center - MDA, PEO, Procurement
- iii. Air Force Technical Applications Center (AFTAC) - SME, Operator, Maintainer
- iv. National Security Campus - Kansas City Plant (NSC-KCP) - Engineering, Integration, Depot

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207573F / <i>National Technical Nuclear Forensics</i>	<b>Project (Number/Name)</b> 674881 / <i>Prompt Diagnostics</i>
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<b>Product Development (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Nuclear Forensics - Prompt Diagnostics	MIPR	DOE : Kansas City, MO	-	1.346	Jan 2020	-		1.571	Apr 2022	-		1.571	-	-	-
<b>Subtotal</b>			-	1.346		-		1.571		-		1.571	-	-	N/A

**Remarks**  
Kansas City Nuclear Security Campus will work with several National Laboratories for reachback/collaboration on efforts.

<b>Management Services (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Management Services	C/CPAF	Not specified. : TBD	-	0.377	Dec 2019	0.395	Dec 2020	0.400		-		0.400	-	-	-
<b>Subtotal</b>			-	0.377		0.395		0.400		-		0.400	-	-	N/A

<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
-	1.723	0.395	1.971	-	1.971	-	-	N/A

**Remarks**



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207573F / <i>National Technical Nuclear Forensics</i>	<b>Project (Number/Name)</b> 674881 / <i>Prompt Diagnostics</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>United States Prompt Diagnostics System (USPDS)</i></b>				
- Phase 2: Complete Technical Data Package, Configuration Status Accounting, and Product Support Analysis/Logistics Product Data	1	2020	4	2021
<b><i>USPDS Sensor/User Tool Development</i></b>				
Ground Based Optical Skyshine (GBOS)	1	2022	4	2023
Speed of Light Sensor Advanced Technology Development	1	2022	4	2025
Speed of Light Sensor Advance Technology Development	1	2022	4	2025
Reaction Time History and Yield Tool Development	4	2022	4	2025

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207590F / <i>Seek Eagle</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	28.175	29.626	30.539	0.000	30.539	-	-	-	-	-	-
674037: <i>SEEK EAGLE Certifications</i>	-	28.175	29.626	30.539	0.000	30.539	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

The Air Force operates a variety of combat aircraft that carry numerous and varied stores (munitions, missiles, fuel tanks, targeting pods, range pods, electronic countermeasures pods, etc.). Stores are carried in many different loading combinations determined by operational and training scenarios, missions, tactics, and weapon development programs. Aircraft-store configurations/carriage and employment requirements change as operational plans and tactics change and as new stores are developed and fielded. Before operational, training, or test use, the Air Force must certify these configurations for safe loading, carriage, and separation (jettison and normal release), as well as verify ballistics accuracy under the user-certified carriage and employment parameters. The Air Force SEEK EAGLE program completes certification recommendations and recommended flight clearances through any combination of engineering analysis, wind tunnel testing, modeling and simulation, and ground/flight test and evaluation. The SEEK EAGLE effort encompasses eight disciplines: Fit and Function, Flutter, Structural Integrity, Stability and Control, Electromagnetic Compatibility/Interference (EMC/EMI), Separations, Ballistics, and Safe Escape.

In support of certification, the program recommends approximately 1000 aircraft/store combinations for flight each year with analysis and testing, requiring from weeks to years depending on the complexity. Integrated solutions for combat aircrew weapon delivery planning problems are developed and provided to combat forces via Combat Weapons Delivery Software (CWDS) and Joint Safe Escape Analysis Solution (JSEAS). SEEK EAGLE works in coordination with the Air Force Safety Center to provide Hazards of Electromagnetic Radiation to Ordnance (HERO) analysis and certification recommendations of ordnance systems containing electro-explosive devices. The program is also responsible for inserting new and emerging technologies into the SEEK EAGLE process as well as providing resources for the sustainment of a viable Air Force aircraft/store certification capability.

SEEK EAGLE funds are currently budgeted to support certification testing and analysis for new and inventory stores including, but not limited to: Small Diameter Bomb I and II (SDB), Laser Joint Direct Attack Munitions (LJDAM), Joint Air-to-Surface Standoff Missile (JASSM), Long-Range Anti-Ship Missile (LRASM), Air Intercept Missile (AIM-9X), Advanced Medium Range Air-to-Air Missile (AIM-120D), Miniature Air-Launched Decoy (MALD), BRU-57 (Smart Bomb Rack), BRU-61 (SDB Bomb Rack), Advanced Precision Kill Weapon System (APKWS), Sniper Targeting Pod with video data link, LITENING Targeting Pod with video data link, laser guided bombs, B61 (Mod 12), penetrator warhead upgrades, practice bombs, and aircraft instrumentation pod modifications. SEEK EAGLE funds are also used to support certification of other inventory stores on Combat Air Forces (CAF) and Special Operations Command (SOCOM) aircraft. In addition, these funds further support capability development and weapons certification efforts required by Air Combat Command to achieve Full Operational Capability (FOC) for the F-35A. Likewise, these funds also support F-22A weapons certification efforts for emerging weapons and B-21 development for critical Engineering and Manufacturing Development (EMD) milestones.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207590F / <i>Seek Eagle</i>
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This program element may include necessary civilian pay expenses required to manage, execute, and deliver SEEK EAGLE capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in Program Element 0605831F.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	28.237	29.680	30.998	0.000	30.998
Current President's Budget	28.175	29.626	30.539	0.000	30.539
Total Adjustments	-0.062	-0.054	-0.459	0.000	-0.459
• Congressional General Reductions	-0.062	-0.054			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-0.459	0.000	-0.459

**Change Summary Explanation**

N/A

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> AFSEO Warfighter Mission	18.349	20.442	21.873
<b>Description:</b> Supports the ability to rapidly meet emerging warfighter needs for global operations such as Operation INHERENT RESOLVE, Operation FREEDOM'S SENTINEL, and other ongoing world-wide operations.			
<b>FY 2021 Plans:</b> Support growing warfighter demands by expanding aircraft-store carriage envelopes and aircraft load outs. Supports F-15, F-16, A-10, B-52, B-2, B-1, MQ-9, and F-35 CAF ensuring warfighter aircraft-store requirements are met.			
<b>FY 2022 Plans:</b> Continue to support growing warfighter demands by expanding aircraft-store carriage envelopes and aircraft load outs. Supports F-15, F-16, A-10, B-52, B-2, B-1, MQ-9, and F-35 CAF ensuring warfighter aircraft-store requirements are met.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b>			



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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0207590F / <i>Seek Eagle</i>		
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Funding increased due to fielding of 5th generation aircraft while continuing to support the expanding capabilities of legacy aircraft.				
<p><b>Title:</b> 5th Generation Capability Development and Support</p> <p><b>Description:</b> Supports capability development and weapons certification efforts required by Air Combat Command to achieve Full Operational Capability (FOC) for the F-35A. Funds F-22A capability development and support for emerging weapons certification efforts in addition to B-21 capability development and EMD support.</p> <p><b>FY 2021 Plans:</b> Maintain F-22A, F-35A, and B-21 capability development and certification efforts. Begin initial F-35 wind tunnel setup and supersonic internal guided bomb unit (GBU) variant carriage/release.</p> <p><b>FY 2022 Plans:</b> Continue to maintain F-22A, F-35A, and B-21 capability development and certification efforts. Continue F-35 wind tunnel setup and supersonic internal GBU variant carriage/release.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increased due to construction task flow for F-35A wind tunnel model design and construction at Arnold Engineering Development Complex (AEDC).</p>		2.587	1.734	1.923
<p><b>Title:</b> Advanced Next Generation Weapon Capability Development and Support</p> <p><b>Description:</b> Development and certification support for advanced systems such as hypersonic weapons and other classified weapons programs; increased B-1, B-2, B-52, and potentially F-15E certification support for advanced weapons such as Joint-Air-to-Surface Standoff Missile (JASSM), Long Range Anti-Ship Missile (LRASM), and GOLDEN HORDE.</p> <p><b>FY 2021 Plans:</b> Maintain and enhance security infrastructure and tool development for next-generation weapons certification. Begin stand-up of Operating Location (OL) at Edwards AFB in support of next-generation test activities there, including bomber advanced capabilities, hypersonic weapons, and other classified programs.</p> <p><b>FY 2022 Plans:</b> Continue building upon AFSEO's Advance Analytics Artificial Intelligence (AAAI) digital transformation effort that provides predictive outcomes to rapidly determine analogy based certification recommendations. Continue to maintain and enhance security infrastructure and tool development for next-generation weapons certification. Finalize stand-up of Edwards OL in support of next-generation test activities.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b></p>		4.738	4.152	2.443

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0207590F / <i>Seek Eagle</i>		
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Funding decreased as the Edwards OL stand-up effort draws down.				
<p><b>Title:</b> Modeling and Simulation Capability</p> <p><b>Description:</b> Ensures Modeling and Simulation (M&amp;S) capability development in support of store certification. Supports cutting-edge innovation that leverages artificial intelligence to enable rapid weapons certification. In support of enhanced aircraft store 3D scanning and modeling, 6-DoF (Degrees of Freedom) store trajectory simulations, and computational fluid dynamics (CFD).</p> <p><b>FY 2021 Plans:</b> Support development and sustainment of state-of-the-art engineering &amp; business tools to support SEEK EAGLE enterprise.</p> <p><b>FY 2022 Plans:</b> Continue to support development and sustainment of state-of-the-art engineering &amp; business tools to support SEEK EAGLE enterprise.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increased due to projected increases in modeling and simulation workload.</p>		1.933	1.491	2.258
<p><b>Title:</b> Aircraft-Store Compatibility Analysis</p> <p><b>Description:</b> Evaluates aircraft/store compatibility through analysis, M&amp;S, and flight and ground test. Provides flight recommendations to airworthiness authorities.</p> <p><b>FY 2021 Plans:</b> Provide for USAF Air-to-Air and Air-to-Ground Munitions certification efforts such as towed decoys, electronic countermeasure (ECM) pods, and chaff/flare countermeasures certification efforts, and Airborne Instrumentation Systems pods, fuel tanks, and travel pod certification efforts.</p> <p><b>FY 2022 Plans:</b> Continue to provide for USAF Air-to-Air and Air-to-Ground Munitions certification efforts such as towed decoys, ECM pods, and chaff/flare countermeasures certification efforts, and Airborne Instrumentation Systems pods, fuel tanks, and travel pod certification efforts.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increased due to inflation.</p>		0.568	1.807	2.042
<b>Accomplishments/Planned Programs Subtotals</b>		28.175	29.626	30.539
<b>D. Other Program Funding Summary (\$ in Millions)</b>				
N/A				

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207590F / <i>Seek Eagle</i>
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**D. Other Program Funding Summary (\$ in Millions)**

**Remarks**

**E. Acquisition Strategy**

The SEEK EAGLE program is not an acquisition program in itself; instead it supports other acquisition programs. For initial aircraft-weapons integration, the aircraft or weapon program office is responsible for budgeting and providing the test assets to the Air Force SEEK EAGLE Office (AFSEO) for the store certification requirements. For post-integration certification requirements, AFSEO funds are used to obtain the non-inventory test assets. In addition to the above highlights, budgeting responsibilities for AFSEO are delineated in Air Force Instruction 63-101/20-101, paragraph 5.4.22.1.3, dated 30 JUNE 2020.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207590F / Seek Eagle	<b>Project (Number/Name)</b> 674037 / SEEK EAGLE Certifications
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<b>Product Development (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Advanced Data Analytics - Artificial Intelligence (AI)	SS/FP	TAMR : Cambridge, MA	-	2.810	Mar 2020	1.925	Mar 2021	0.600	Mar 2022	-		0.600	-	-	-
F-22 Capabilities	C/CPFF	Raytheon : Waltham, MA	-	0.000		-		-		-		-	-	-	-
AFSEO Mission and Planning Support (SEMATS)	C/CPFF	ERC : Ft. Walton Beach, FL	-	11.427	Mar 2020	11.222	Mar 2021	13.901	Mar 2022	-		13.901	-	-	-
F-35 Capabilities	C/CPFF	Lockheed Martin : Marietta, GA	-	2.587	Nov 2019	0.215	Nov 2020	0.100	Nov 2021	-		0.100	-	-	-
Multiple Fighter and Weapon Capability Support	C/CPFF	Multiple : Multiple	-	0.088	Mar 2020	0.159	Mar 2021	0.125	Mar 2022	-		0.125	-	-	-
F-16 Aero Sustainment	C/CPFF	Lockheed Martin : Fort Worth, TX	-	0.170	Feb 2020	0.160	Feb 2021	0.120	Feb 2022	-		0.120	-	-	-
<b>Subtotal</b>			-	17.082		13.681		14.846		-		14.846	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Flight tests and Aircraft/Store compatibility analysis	PO	96th Test Wing : Eglin AFB, FL	-	10.110	Oct 2019	12.259	Oct 2020	13.306	Oct 2021	-		13.306	-	-	-
Wind tunnel model/design and testing	PO	Arnold Engineering Dev Complex : Arnold AFB, TN	-	0.177	Jan 2020	1.382	Jan 2021	1.623	Jan 2022	-		1.623	-	-	-
<b>Subtotal</b>			-	10.287		13.641		14.929		-		14.929	-	-	N/A

<b>Management Services (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
A&AS Support (TMAS)	C/CPFF	AFTC : Eglin AFB, FL	-	0.140	Oct 2019	0.115	Oct 2020	0.155	Oct 2021	-		0.155	-	-	-



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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207590F / <i>Seek Eagle</i>	<b>Project (Number/Name)</b> 674037 / <i>SEEK EAGLE Certifications</i>
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FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>SEEK EAGLE</b>	
AFSEO Warfighter Mission	
5th Generation Capability Development and Support	
Advanced Next Generation Weapon Capability Development and Support	
Modeling and Simulation Capability	
Aircraft Store Capability Analysis	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207590F / <i>Seek Eagle</i>	<b>Project (Number/Name)</b> 674037 / <i>SEEK EAGLE Certifications</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>SEEK EAGLE</b>				
AFSEO Warfighter Mission	1	2020	4	2026
5th Generation Capability Development and Support	1	2020	4	2026
Advanced Next Generation Weapon Capability Development and Support	1	2020	4	2026
Modeling and Simulation Capability	1	2020	4	2026
Aircraft Store Capability Analysis	1	2020	4	2026

**Note** The SEEK EAGLE program supports both production stores on production aircraft and the planning for future acquisition program milestones without an anticipated end date. Current warfighter requirements trigger the SEEK EAGLE process for requested aircraft-store configurations, as work is completed in accordance with designated user priorities established through the SEEK EAGLE Prioritization List process.

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207601F / <i>USAF Modeling and Simulation</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	15.243	17.634	17.110	0.000	17.110	-	-	-	-	-	-
674567: <i>M&amp;S Foundations</i>	-	6.943	7.050	7.093	0.000	7.093	-	-	-	-	-	-
675135: <i>Warfighter Readiness</i>	-	8.300	10.584	10.017	0.000	10.017	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

Modeling and Simulation support to our Warfighter's Readiness is a United States Air Force (USAF) corporate imperative to ensure air, space, cyberspace training, and mission rehearsal activities are supported with realistic, interoperable, and readily available tools, data, services and environments. Warfighter readiness supports Department of Defense (DoD) Training Transformation (T2) and Joint National Training Capability (JNTC) along with the USAF priorities and core functions. Activities also include studies and analysis to support both current program planning, execution, and future program planning.

It includes several complimentary programs, initiatives and areas for investment: Warfighter and Joint Training Integration supports the Chief of Staff of the Air Force (CSAF) directed Live, Virtual, and Constructive (LVC) integration efforts and is a critical piece to the USAF's implementation of the Strategic Plan for Transforming DoD Training. The goal of LVC training and mission rehearsal is to prepare our warfighters for the full range of military operations and maintain the combat readiness levels required by the Combatant Commanders'. This can only be accomplished by training and rehearsing in realistic operational environments. These environments include live training ranges and virtual simulators enhanced with constructive entities. Specific training and mission rehearsal events can include some or all of these simultaneously; making the ability to integrate LVC capabilities a necessity.

The Air, Space, and Cyberspace Constructive Environment (ASCCE) is the USAF's authoritative federation of constructive training models and tools realistically representing the tactical and operational capabilities the USAF brings to the joint fight. Project 675135, Warfighter Readiness, includes the Air Force Modeling and Simulation Training Toolkit (AFMSTT) and its follow on program Command & Control Simulation Environment for Training (C2SET), which provides the authoritative representation of AF and joint theater-level air and space power and is used to train Air and Space Operations Center (AOC) personnel and Combatant Commanders' battle staffs. The primary models in the AFMSTT are the Air Warfare Simulation (AWSIM) and Air Base Simulation (ABS).

The program element also contains Project 674567, M&S Foundations, the Air, Space and Cyberspace Collaborative Environment - Information Operations Suite (ACE-IOS). ACE-IOS is a federation of constructive models for the authoritative representation of Air Force information operations. ACE-IOS is developed and operated by the Air Force Cyber Simulation Center (CSC) to support training and mission rehearsal for the Air Force, Joint Task Force commanders, and Combatant Commanders' battle staffs during Joint and Service exercises, tests, and experiments. The CSC provides cyber live-virtual-constructive (LVC) environments to support the development and fielding of offensive and defensive cyber capabilities for the AF, DoD, and national agencies. This program also supports the DoD Training Transformation Initiative.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207601F / <i>USAF Modeling and Simulation</i>
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This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 0.000M was expended for civilian pay expenses in this program element, and in FY21 0.000M is forecasted for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	15.725	17.666	19.042	0.000	19.042
Current President's Budget	15.243	17.634	17.110	0.000	17.110
Total Adjustments	-0.482	-0.032	-1.932	0.000	-1.932
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-0.482	-0.032	-1.932	0.000	-1.932

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0207601F / USAF Modeling and Simulation				<b>Project (Number/Name)</b> 674567 / M&S Foundations			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
674567: M&S Foundations	-	6.943	7.050	7.093	0.000	7.093	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

Modeling and Simulation Foundations (MSF) focuses on integrating foundational capabilities needed to improve the usefulness of Modeling and Simulation (M&S) capabilities derived from the Warfighter Readiness (WR) thrust. The efforts supporting the MSF thrust include both concept exploration and development. MSF provides the capability to rapidly and efficiently create realistic and accurate synthetic operational battlespaces to support the full spectrum of activities associated with concept development to acquisition and testing through composite training and mission rehearsals.

Air, Space and Cyberspace Constructive Environment - Information Operations Suite (ACE-IOS) project is a federation of constructive models for the authoritative representation of Air Force information operations. ACE-IOS is developed and operated by the Air Force Cyber Simulation Center (CSC) to support training and mission rehearsal for the Air Force, Joint Task Force commanders, and Combatant Commands battle staffs during Joint and Service exercises, tests and experiments.

The CSC provides cyber live-virtual-constructive (LVC) environments to support the development and fielding of offensive and defensive cyber capabilities for the AF, DoD, and national agencies. The CSC is managed by the 90th Cyberspace Operations Squadron, a unit of the 318th Cyberspace Operations Group, 67th Cyberspace Wing, 24th Air Force (AFCYBER). The Distributed Mission Operations Center for Cyberspace (DMOC-C) is a subset of the CSC focused on training and exercising tactical cyber mission forces (CMF) and cyber service providers (CSP) and operational-level command and control, intelligence, and cyber planners and operators. DMOC-C provides the ACE-IOS to support Air Force information operations. DMOC-C, using ACE-IOS, directly supports Air Force, Joint, Coalition composite training and rehearsal, concept development, and acquisition and testing for use by Major and Combatant Commands. DMOC-C thrust areas develop and modernize models and simulations covering cyberspace, intelligence and command and control activities as part of the constructive backbone of Air Force capabilities within DOD and coalition LVC environments.

DMOC-C's development and integration efforts on ACE-IOS are imperative to ensure that air, space, and cyberspace training and mission rehearsal activities are supported with realistic, interoperable, and readily available tools, data, and services. LVC environments today are used as one of the most cost effective and practical means to meet mission needs. These efforts enable more efficient delivery of effective capabilities to the warfighter while reducing the time and resources required for design, development, test and evaluation, maintainability and sustainment.

Authorization and Accreditation and Networthiness is maintained via the Information Technology (IT) systems Risk Management Framework (RMF) for seven classified systems and five supported cross domain solutions, which includes code and ruleset development, testing, and fielding, and meets AF Joint Worldwide Intelligence Communications System (JWICS) and AF Secret Internet Protocol Router Network (SIPRNET) net worthiness standards and evaluations.

This program also supports the DoD Training Transformation Initiative.

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207601F / USAF Modeling and Simulation	<b>Project (Number/Name)</b> 674567 / M&S Foundations
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This program element may include necessary civilian pay expenses required to manage, execute, and deliver ACE-IOS weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p><b>Title:</b> Air, Space and Cyberspace Constructive Environment - Information Operations Suite (ACE-IOS)</p> <p><b>Description:</b> Provides the authoritative representation of Air Force information operations. ACE-IOS is comprised of models that support training and mission rehearsal for the Air Force, Joint Task Force commanders, and Combatant Commander battle staffs during Joint and Service exercises and experimentations.</p> <p><b>FY 2021 Plans:</b></p> <ul style="list-style-type: none"> <li>- Commence and completed ACE-IOS version 5.0.22</li> <li>- Commence database population tools for all parametric data</li> <li>- Commence JNETS scenario builder</li> </ul> <p><b>FY 2022 Base Plans:</b></p> <ul style="list-style-type: none"> <li>-Will commence and deliver ACE-IOS version 5.0.23</li> <li>-Will continue model transformation to open architecture</li> <li>-Will deliver re-engineering of all apps from Web Logic app server to Docker containers</li> <li>-Will deliver the new containerized JVET service</li> <li>-Will deliver USMTF Protocol Years and specific theater reporting directives; task will continue thru 2023 until all are delivered</li> <li>-Will deliver message protocols - IBS-I, IBS-S, OTH Gold, JUNIT, CoT, CMF, and VMF; task will continue thru 2023 until all are delivered</li> <li>-Will initiate re-engineering of remaining apps and data base to Docker containers; task will continue thru 2024 until all are delivered</li> <li>-Will deliver the migration of all graphics into a single web-based graphics system</li> </ul> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase due to inflation.</p>	6.943	7.050	7.093	0.000	7.093
<b>Accomplishments/Planned Programs Subtotals</b>	6.943	7.050	7.093	0.000	7.093

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207601F / USAF Modeling and Simulation	<b>Project (Number/Name)</b> 674567 / M&S Foundations

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

N/A

**D. Acquisition Strategy**

The Acquisition goals of the Air, Space and Cyberspace Constructive Environment - Information Operations Suite (ACE-IOS) are achieved through incremental development of the project's M&S activities; all contracts are awarded using full and open competition. To meet evolving M&S technology, and the challenges of new requirements arriving almost daily, DMOC-C is an on-going, evolutionary effort to keep pace with those changes by continuously developing and upgrading environment generators, systems, and tools and to ensure integration and interoperability with other LVC systems to provide the best warfighter training possible.



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Air Force</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207601F / USAF Modeling and Simulation	<b>Project (Number/Name)</b> 674567 / M&S Foundations

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b><i>Air, Space and Cyberspace Constructive Environment - Information Operations Suite (ACE-IOS)</i></b>	
- ACE-IOS v5.0.21	
- ACE-IOS v5.0.22	
- ACE-IOS v5.0.23	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207601F / USAF Modeling and Simulation	<b>Project (Number/Name)</b> 674567 / M&S Foundations

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Air, Space and Cyberspace Constructive Environment - Information Operations Suite (ACE-IOS)</i></b>				
- ACE-IOS v5.0.21	1	2020	4	2020
- ACE-IOS v5.0.22	1	2021	4	2021
- ACE-IOS v5.0.23	1	2022	4	2022



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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207601F / USAF Modeling and Simulation	<b>Project (Number/Name)</b> 675135 / Warfighter Readiness
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
675135: <i>Warfighter Readiness</i>	-	8.300	10.584	10.017	0.000	10.017	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

Modeling and Simulation support to our Warfighter's Readiness is a United States Air Force (USAF) corporate imperative to ensure air, space, cyberspace training, and mission rehearsal activities are supported with realistic, interoperable, and readily available, tools, data, services and environments. Warfighter Readiness supports Department of Defense (DoD) Training Transformation (T2) and Joint National Training Capability (JNTC) along with the USAF priorities and core functions. Activities also include studies and analysis to support both current program planning, execution, and future program planning.

It includes several complimentary programs, initiatives and areas for investment: Warfighter and Joint Training Integration supports the Chief of Staff of the Air Force (CSAF) directed Live, Virtual, and Constructive (LVC) integration efforts and is a critical piece to the USAF's implementation of the Strategic Plan for Transforming DoD Training. The goal of LVC training and mission rehearsal is to prepare our warfighters for the full range of military operations and maintain the combat readiness levels required by the Combatant Commands. This can only be accomplished by training and rehearsing in realistic operational environments. These environments include live training ranges and virtual simulators enhanced with constructive entities. Specific training and mission rehearsal events can include some or all of these simultaneously; making the ability to integrate LVC capabilities a necessity.

The Air, Space, and Cyberspace Constructive Environment (ASCCE) is the USAF's authoritative federation of constructive training models and tools realistically representing the tactical and operational capabilities the USAF brings to the joint fight. This presently includes the Air Force Modeling and Simulation Training Toolkit (AFMSTT) and its follow on program Command & Control Simulation Environment for Training (C2SET), which provides the authoritative representation of AF and Joint theater-level air and space power and is used to train Air and Space Operations Center (AOC) personnel and Combatant Commanders' battle staffs. The primary models in the AFMSTT are the Air Warfare Simulation (AWSIM) and Air Base Simulation (ABS). C2SET will replace the AFMSTT models with the proven core Advanced Framework for Simulation, Integration, and Modeling (AFSIM) scientific engine under a new AF Software Pathways initiative starting in FY21. The goal is toward more scientific based modeling, simulation, and training stimulation to the Combined Forces Air Component Commander (CFACC). AFMSTT will enter sustainment in FY21 with continued operational updates to maintain operational currency until C2SET fully replaces.

This program is part of the overarching Kessel Run portfolio.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver C2SET weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY19 \$00.000M and in FY20 \$00.000M was expended for civilian pay expenses in this program element

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207601F / USAF Modeling and Simulation	<b>Project (Number/Name)</b> 675135 / Warfighter Readiness

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<p><b>Title:</b> Air, Space, and Cyberspace Constructive Environment (ASCCE)/Air Force Modeling &amp; Simulation Training Toolkit (AFMSTT)</p> <p><b>Description:</b> Provides the authoritative representation of AF and joint theater-level air and space power used to train Air and Space Operations Center (AOC) personnel and Combatant Commanders' battle staffs.</p> <p><b>FY 2021 Plans:</b></p> <ul style="list-style-type: none"> <li>- Complete development, test, and fielding of AFMSTT Version 6.3</li> <li>- Continue integration with spiral Joint Staff/J7 JLVC developments</li> <li>- Continue new joint requirements and model interface changes to the Joint Federate Object Models (FOMs)</li> <li>- Complete modeling of real world environments and new C2 systems' interfaces to ensure accurate and realistic training</li> </ul> <p><b>FY 2022 Base Plans:</b> N/A</p> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreased due to work being done on C2SET.</p>	7.800	1.100	0.000	0.000	0.000
<p><b>Title:</b> Command &amp; Control Simulation Environment for Training (C2SET)</p> <p><b>Description:</b> Provides the authoritative representation of AF and joint theater-level air and space power and is used to train AOC personnel and Combat Commander's battle staffs</p> <p><b>FY 2021 Plans:</b></p> <ul style="list-style-type: none"> <li>- Initiate agile rapid C2SET development and engineering efforts</li> <li>- Develop agile requirements and prototyping to address new C2SET requirements</li> </ul> <p><b>FY 2022 Base Plans:</b></p> <ul style="list-style-type: none"> <li>- Will initiate new C2SET Software Pathways contracting</li> <li>- Will setup and operate AF M&amp;S Software Pathways consortium development effort</li> <li>- Will continue agile rapid development and engineering based on the AF AFSIM scientific modeling engine</li> <li>- Will continue agile software requirements, prototyping, and spiral development to address new C2SET AF 1067 and ever changing operational requirements</li> </ul>	0.500	9.484	10.017	0.000	10.017

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207601F / USAF Modeling and Simulation	<b>Project (Number/Name)</b> 675135 / Warfighter Readiness

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
- Will develop new Joint Federate Object Models (FOMs) and C2 System interface updates as required in support of AOC WS Block 20 field training and continued Joint and Coalition integration - Will continue modeling of real world environments and new weapons systems worldwide to ensure continued accurate and realistic training is supported  <b>FY 2022 OCO Plans:</b> N/A  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increased due to work being done on C2SET.					
<b>Accomplishments/Planned Programs Subtotals</b>	8.300	10.584	10.017	0.000	10.017

**C. Other Program Funding Summary (\$ in Millions)**  
 N/A

**Remarks**  
 N/A

**D. Acquisition Strategy**  
 The Air Force Life Cycle Management Center (AFLCMC) at Hanscom AFB, MA manages the project's acquisition process. AFLCMC develops the Air C2 constructive M&S models in direct support of AFAMS and the warfighter simulation centers. Their acquisition goals are achieved through incremental development in a sustainment and modernization through modification approach. All major contracts are awarded using full and open competition.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
3600 / 7				PE 0207601F / USAF Modeling and Simulation				675135 / Warfighter Readiness							
Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
AFMSTT	C/T&M	Cole Engineering Services, Inc : Orlando, FL	-	5.812	Mar 2020	0.322	Dec 2020	-		-		-	-	-	-
C2SET (Cole)	C/T&M	Cole Engineering Services, Inc : Orlando, FL	-	0.280	Mar 2020	1.889	Dec 2020	-		-		-	-	-	-
C2SET	C/TBD	TBD : TBD	-	-		5.738	Mar 2021	8.482	Mar 2022	-		8.482	-	-	-
<b>Subtotal</b>			-	6.092		7.949		8.482		-		8.482	-	-	N/A
Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Hanscom Collaboration and Innovation Center	C/Variou	AFLCMC : Hanscom AFB, MA	-	0.092	Oct 2019	0.000	Oct 2020	-		-		-	-	-	-
AFMSTT/C2SET Civilian Direct Cite Authorizations for Product Development	Allot	AFLCMC/FZA : TBD	-	-		0.960	Jun 2021	-		-		-	-	-	-
<b>Subtotal</b>			-	0.092		0.960		-		-		-	-	-	N/A
Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Administration	C/Variou	AFLCMC : Hanscom AFB, MA	-	1.966	Oct 2019	1.299	Oct 2020	1.153	Oct 2021	-		1.153	-	-	-
Systems Engineering	SS/ Various	MITRE : Bedford, MA	-	0.150	Oct 2019	0.376	Oct 2020	0.382	Oct 2021	-		0.382	-	-	-
<b>Subtotal</b>			-	2.116		1.675		1.535		-		1.535	-	-	N/A



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Air Force</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207601F / USAF Modeling and Simulation	<b>Project (Number/Name)</b> 675135 / Warfighter Readiness

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>Air, Space, and Cyberspace Constructive Environment (ASCCE)</b>	
AFMSTT v6.3.1.0 (formerly v6.5)	████████████████████
C2SET Software Pathways	██

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207601F / USAF Modeling and Simulation	<b>Project (Number/Name)</b> 675135 / Warfighter Readiness

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Air, Space, and Cyberspace Constructive Environment (ASCCE)</i></b>				
AFMSTT v6.3.1.0 (formerly v6.5)	2	2020	2	2021
C2SET Software Pathways	2	2021	4	2022

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207605F / <i>Wargaming and Simulation Centers</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	4.158	6.341	7.535	0.000	7.535	-	-	-	-	-	-
672888: <i>Distributed Mission Operations Center (DMOC)</i>	-	4.158	6.341	7.535	0.000	7.535	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

The Distributed Mission Operations Center (DMOC) provides comprehensive Live, Synthetic, and Blended (LSB) simulation capabilities which prepare warfighters to conduct Joint All-Domain Command & Control (JADC2) operations in air, land, sea, space, and cyber domains for theater-level, full spectrum combat training for Air Force, joint service, and coalition partners. The DMOC training capabilities reach over 30 geographically separated Live, Virtual, and Constructive (LVC) locations across 17 time zones representing such assets as real-world weapon systems, operator-in-the-loop, and constructive or computer-driven simulations. It is responsible for development and integration of scenarios, models, and databases and the integration of participating sites into Virtual Flag (VF) and other Distributed Mission Operations (DMO) training events via numerous network connections, DMOC-developed interoperability tools, and controlled interfaces in support of Air Force, joint, and coalition warfighter readiness. In addition, activities include DMO technology and capability studies/analyses which support both current and future program planning and execution by:

1. **Distributed Mission Operations Capability/Battlespace Systems Development:** The DMOC upgrades and enhances the capabilities of various systems, tools, and simulators to incorporate emerging technology and training requirements into DMO events, such as Virtual Flag (VF) and Coalition VF (CVF), to enhance the quality of warfighter training. Activities include Environment Generator development, DMO Tool Development, and Simulator Enhancement. DMOC is in partnership with the US Naval Air Warfare Center-Aircraft Division (NAWCAD) to enhance the capabilities of the Next Generation Threat System (NGTS). The NGTS is the primary environment generator for both Blue and Red Air in DMOC White Force. DMO Tool development includes: a) DMOC Replay Tool (DRT), which facilitates a more complete mission review and debrief capability of the exercises as more sites and systems are added to events; b) enhancement & improvement of the Distributed Interactive Simulation (DIS) Filter and the Doctor-J (Dr. J) tools to enable tactical datalinks to be communicated and translated between disparate simulator and operationally fielded (i.e. live aircraft) communication formats; c) Development of Intelligence, Surveillance, and Reconnaissance (ISR)/Battle Damage Assessment (BDA) to improve damage state models used by intelligence analysts in exercises; and d) development of solutions for integrating Contested Degraded Operations Gateway (CDOG, geographical and communications jamming) into DMO events; and simulator enhancement efforts to incorporate Mission Package standards upgrades into the Control and Reporting Center (CRC) Simulation Package (CSP) to allow a real-world system to be used as a simulator when needed in DMO events.

2. **Assessment & Authorization (A&A)/Software Certification:** The DMOC supports cybersecurity requirements definition, integration/test support, analysis, systems engineering support, A&A of core systems, and support software certification. The DMOC implements cybersecurity requirements and complies with the application of the Risk Management Framework (RMF) and Continuous Monitoring. Efforts include Cross-Domain Information Sharing / Multi-national Information Sharing (CDIS/ MNIS) ruleset development, load sharing, and testing; integration and testing of various newly developed / updated systems such as the DMOC Replay Tool, Dr. J, DIS Filter, and the DMOC Battlespace; support of Air Force Network Integration Center (AFNIC) software certification.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207605F / <i>Wargaming and Simulation Centers</i>
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3. Distributed Training Sites & Systems Integration: DMOC integrates over 30 geographically separated LVC training locations and 50+ systems into LSB DMO training events such as VF and CVF by resolving interoperability issues between disparate systems and networks so that all exercise participants can interact in the DMO environment. New sites and systems are incorporated into LSB DMO events each year based on higher headquarters and Combatant Commander's (CCDRs) emerging requirements.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver LSB simulation capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0.000M was expended for civilian pay expenses in this program element, and in FY21 \$0.000M is forecasted for civilian pay expenses in this program element.

The FY 2020 funding request was reduced by 1.940 million to account for the availability of prior year execution balances.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	4.316	6.353	7.648	0.000	7.648
Current President's Budget	4.158	6.341	7.535	0.000	7.535
Total Adjustments	-0.158	-0.012	-0.113	0.000	-0.113
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-0.158	-0.012	-0.113	0.000	-0.113

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<b>Title:</b> Distributed Mission Operations (DMO) Capability / Battlespace Systems Development	2.773	4.302	5.081	0.000	5.081
<b>Description:</b> Simulation software/hardware development in support of users conducting RDT&E, mission rehearsal, and concepts of operation development.					
<b>FY 2021 Plans:</b>					

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force				<b>Date:</b> May 2021	
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0207605F / <i>Wargaming and Simulation Centers</i>			
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>					
<ul style="list-style-type: none"> <li>- Continue DMO tool enhancements.</li> <li>- Continue DMOC/NAWCAD Partnership: Enhance NGTS source code to implement future Air Force DMO requirements, develop/install future versions of DMOC customized NGTS, and focus on increasing NAWCAD partnership/requirements development to better meet AF DMO needs.</li> <li>- Continue to mature and execute the proof of concept plan for battlespace virtualization and DMO tools.</li> <li>- Research and test promising emerging Modeling &amp; Simulation (M&amp;S) technologies for possible integration into DMO training.</li> <li>- Explore transitioning to cloud-based software development.</li> </ul> <p><b>FY 2022 Base Plans:</b></p> <ul style="list-style-type: none"> <li>- Will continue DMO tool enhancements.</li> <li>- Will continue DMOC/NAWCAD Partnership: Enhance NGTS source code to implement future Air Force DMO requirements, develop/install future versions of DMOC customized NGTS, and focus on increasing NAWCAD partnership/requirements development to better meet AF DMO needs.</li> <li>- Will transition battlespace virtualization into operations and explore other virtualized methods to enhance training.</li> <li>- Will continue to research and test promising emerging Modeling &amp; Simulation (M&amp;S) technologies for possible integration into DMO training.</li> <li>- Will continue to explore and transition to cloud-based software development.</li> </ul> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase will be used to increase capability of the DMOC mini-battlespace, which is used for testing of modified / upgraded systems prior to integration into DMO events.</p>					
<b>Title:</b> Assessment and Authorization (A&A)/Software (A&AS) Certification					
0.328		0.483		0.581	
<b>Description:</b> Support requirements definition, integration test support, scenario development, analysis, systems engineering support, and Certification and Accreditation (C&A) and Networthiness of core systems. Implement requirements of Cybersecurity, Risk Management Framework, and Continuous Monitoring.					
<b>FY 2021 Plans:</b>					
<ul style="list-style-type: none"> <li>- Continue testing for the following Assessment and Authorization activities:</li> <li>-- Maintain ATO from HAF/A3 for Battlespace.</li> </ul>					
0.328		0.483		0.581	
0.328		0.483		0.581	

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force			<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0207605F / <i>Wargaming and Simulation Centers</i>			
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>					
<ul style="list-style-type: none"> <li>-- Maintain ATO for Jumper Room with accompanying Systems Security Plan (SSP) modifications for event-driven needs.</li> <li>- Continue to assess DMOC software for Air Force Network Integration Center Evaluated/Approved Products Lists (AFNIC E/APL) process viability and test accordingly.</li> <li>- Provide A&amp;A support for virtualization effort.</li> <li>- Continue support of CVF and RED KITE with CDIS ruleset development, testing, and implementation</li> <li>- Continue development of Cross Domain Solutions into LSB training.</li> </ul> <p><b>FY 2022 Base Plans:</b></p> <ul style="list-style-type: none"> <li>- Will continue testing for the following Assessment and Authorization activities:</li> <li>-- Will maintain ATO from HAF/A3 for Battlespace.</li> <li>-- Will maintain ATO for Jumper Room with accompanying SSP modifications for event-driven needs.</li> <li>- Will continue to assess DMOC software for the AFNIC E/APL process viability and test accordingly</li> <li>- Will continue A&amp;A support for virtualization effort.</li> <li>- Will continue support of CVF and RED KITE with CDIS ruleset development, testing, and implementation.</li> <li>- Will continue development of Cross Domain Solutions into LSB training.</li> </ul> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase will allow for some faster A&amp;AS testing of developed systems.</p>					
<b>Title:</b> Distributed Training Sites and Systems Integration					
<b>Description:</b> Establish distributed training site system integration and interoperability between DMOC, operational units, and modeling & simulation facilities.					
<b>FY 2021 Plans:</b>					
<ul style="list-style-type: none"> <li>- Continue the development of LVC concepts in support of VF/CVF integration efforts.</li> <li>- Continue to support emerging higher headquarters/CCDR requirements.</li> <li>- Continue Virtual-into-Live integration and testing with the Nevada Test &amp; Training Range (NTTR) / Virtual Test &amp; Training Center (VTTC) / RF.</li> <li>- Expand Jumper Room support to CJCS events.</li> </ul>					
	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
	1.057	1.556	1.873	0.000	1.873

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207605F <i>I Wargaming and Simulation Centers</i>	

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
- Expand distributed operations to increase the number of small-scale, joint/coalition events. <b>FY 2022 Base Plans:</b> - Will continue the development of LVC concepts in support of VF/CVF integration efforts. - Will continue to support emerging higher headquarters/CCDR requirements. - Will continue Virtual-into-Live integration and testing with NTTR/VTTC/RF. - Will expand Jumper Room support to CJCS events. - Will expand distributed operations to increase the number of small-scale, joint/coalition events. - Will utilize the Nellis Mission Operations Network (NMON) to enable VTTC incorporation into Joint/Coalition exercises. <b>FY 2022 OCO Plans:</b> N/A <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase will allow for faster integration of some Joint and Coalition participation into DMO events.					
<b>Accomplishments/Planned Programs Subtotals</b>	4.158	6.341	7.535	0.000	7.535

**D. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

N/A

**E. Acquisition Strategy**

The DMOC supports AF/Joint/Coalition DMO and the Joint National Training Capability (JNTC) through the development and integration of DMO training and test events, networks, scenarios, and databases. Due to evolving modeling & simulation technology, the DMOC is an on-going, evolutionary effort to keep pace with those changes by continuously developing/upgrading DMO environment generators, systems, and tools and ensuring integration/interoperability of new systems into DMO to provide the best warfighter training possible.

DMOC has the following two primary contracts that manage the acquisition, development, testing, and integration of DMO standards, training, modeling and simulation, cross-domain information sharing testbed, and exercises on AF/Joint/Coalition DMO networks. Additionally, Military Interdepartmental Purchase Requests (MIPRs) are sent to other external organizations (i.e. NAWCAD) to fund development of DMO tools that support DMOC efforts.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207605F / <i>Wargaming and Simulation Centers</i>
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Infrastructure, Development, and Engineering (IDE) Contract: Develops/upgrades various DMOC tools, systems, and simulators that are needed to conduct DMO training events. Develops, implements, and tests technical solutions for the integration of sites/systems into VF, CVF, and other DMO events. IDE is a firm-fixed-price contract.

Command and Control Technical Support Contract (C2TSC): Supports government by assisting with development of technical requirements for upgrades to various systems and tools that will be developed by the IDE contractor and then performs acceptance testing of the delivered products. Develops requirements for site/system integration of sites/systems into VF, CVF, and other DMO events. C2TSC is a firm-fixed-price contract.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207605F / Wargaming and Simulation Centers	<b>Project (Number/Name)</b> 672888 / Distributed Mission Operations Center (DMOC)
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<b>Product Development (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Distributed Mission Operations (DMO) Capability / Battlespace Systems Development, Certification & Accreditation (C&A) and Networkiness, and Distributed Training Sites& Systems Integration	C/FFP	General Dynamics IT : Kirtland AFB, NM	-	2.633	Jan 2020	3.406	Nov 2020	3.779	Nov 2021	-		3.779	-	-	17.662
NAWCAD NGTS Development	MIPR	NAWCAD : Patuxent River, MD	-	0.370	Nov 2019	0.984	Nov 2020	1.050	Nov 2021	-		1.050	-	-	-
Artificial Intelligence Integration Into VF (Concept and Development)	C/CPFF	TBD : TBD	-	-		0.300	Mar 2021	0.750	Mar 2022	-		0.750	-	-	-
Global Positioning System (GPS) Jamming Integration Into VF (Concept and Development)	C/CPFF	TBD : TBD	-	-		0.300	Mar 2021	0.750	Mar 2022	-		0.750	-	-	-
<b>Subtotal</b>			-	3.003		4.990		6.329		-		6.329	-	-	N/A

<b>Support (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Technical requirements development, integration/ acceptance testing, and engineering support	C/FFP	River Tech, LLC : Kirtland AFB, NM	-	0.792	Jan 2020	1.118	Jan 2021	0.966	Mar 2022	-		0.966	-	-	4.759
<b>Subtotal</b>			-	0.792		1.118		0.966		-		0.966	-	-	N/A





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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Air Force</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207605F / <i>Wargaming and Simulation Centers</i>	<b>Project (Number/Name)</b> 672888 / <i>Distributed Mission Operations Center (DMOC)</i>

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>DMO</b>																												
DMO Capability / Battlespace Systems Development																												
<b>Virtual Flag (VF)</b>																												
Virtual Flag / Coalition Virtual Flag exercises																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207605F / <i>Wargaming and Simulation Centers</i>	<b>Project (Number/Name)</b> 672888 / <i>Distributed Mission Operations Center (DMOC)</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>DMO</b>				
DMO Capability / Battlespace Systems Development	1	2020	4	2022
<b>Virtual Flag (VF)</b>				
Virtual Flag / Coalition Virtual Flag exercises	1	2020	4	2022

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207610F / <i>Battlefield Abn Comm Node (BACN)</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	25.960	6.815	32.008	0.000	32.008	-	-	-	-	-	-
671201: <i>E-11 Development</i>	-	25.960	6.815	32.008	0.000	32.008	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

Battlefield Airborne Communications Node (BACN) enables tactical edge Joint and Coalition information interoperability via air, space, and surface systems, to include a Backbone Network for high capacity data transfer. As requirements emerge, BACN will integrate new hardware and software capabilities that improve system performance, interoperability, availability and open mission system technologies. Efforts include, but are not limited to, expansion of external time reference capabilities, Survivability Urgent Operational Need (UON) Military Global Positioning System (GPS) and other system enhancements, development and integration of advanced antennas and waveforms, ground support capabilities and assimilation of mandates levied on the BACN systems. Survivability UON is required for BACN Fleet to fly in increasingly contested Area of Responsibility (AOR). Safety of flight considerations, including performance, aircraft structural integrity, availability, and continuity of service requirements will be addressed. Efforts will include required non-recurring engineering and Diminishing Manufacturing Sources (DMS) issues, the development of simulators/trainers, development of training materials, and technical publications.

Execute risk reduction activities for development of future capabilities on BACN payload/aircraft efforts.

Beginning in FY21, to support the divestiture of the EQ-4B (a variant of the RQ-4 Block 20/30 aircraft) efforts will taper accordingly, to include BACN payload sustainment & other BACN specific efforts.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0.713M was expended for civilian pay expenses in this program element, and in FY21 \$0.843M is forecasted for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification: PB 2022 Air Force</b>				<b>Date: May 2021</b>		
<b>Appropriation/Budget Activity</b> 3600: Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development		<b>R-1 Program Element (Number/Name)</b> PE 0207610F I Battlefield Abn Comm Node (BACN)				
<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	
Previous President's Budget	26.946	6.827	34.199	0.000	34.199	
Current President's Budget	25.960	6.815	32.008	0.000	32.008	
Total Adjustments	-0.986	-0.012	-2.191	0.000	-2.191	
• Congressional General Reductions	0.000	0.000				
• Congressional Directed Reductions	0.000	0.000				
• Congressional Rescissions	0.000	0.000				
• Congressional Adds	0.000	0.000				
• Congressional Directed Transfers	0.000	0.000				
• Reprogrammings	0.000	0.000				
• SBIR/STTR Transfer	0.000	0.000				
• Other Adjustments	-0.986	-0.012	-2.191	0.000	-2.191	
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>				<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Main Base Operating Base Integration Communications Engineering				-	1.500	1.500
<b>Description:</b> Small scale enhancements to BACN ground sites to enable increased operational effectiveness and/or efficiencies						
<b>FY 2021 Plans:</b> Efforts are to support Direct Cite Civilian Pay (DCA)						
<b>FY 2022 Plans:</b> FY22 funds will support initial evaluation of sites current configuration and development of initial solutions of solutions that require minimal levels of effort to implement. Efforts are to support Direct Cite Civilian Pay (DCA)						
<b>Title:</b> Military GPS Phase II				25.960	5.315	28.110
<b>Description:</b> Effort continues Phase II of the Military GPS effort, including required testing, certification and administrative actions of all installed components to receive Full FAA certification and allow for close out of survivability UON.						
<b>FY 2021 Plans:</b> N/A						
<b>FY 2022 Plans:</b> FY22 funds support testing, certification, and miscellaneous actions to support attaining full FAA certification of E-11A MilGPS system onto the existing BACN capability.						

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0207610F / <i>Battlefield Abn Comm Node (BACN)</i>		
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>Full FAA certification delayed from FY21 to FY22, due to lack of active year funding availability. Original proposal from sole-source 52M as of May 21 contract vehicle Period of Performance (PoP) no longer supports effort; FY22 seeking open competition to drive down costs.</p> <p>FY17 - FY21: BPAC was 675383.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increase will support Survivability Urgent Operational Need(UON) Military Global Positioning System (Mil GPS) in testing, certification, and miscellaneous actions to support attaining full FAA certification of E-11A MilGPS system onto the existing BACN capability. .</p> <p>Original BPAC was 675383.</p>				
<p><b>Title:</b> Data Links / Gateway Modernization Engineering</p> <p><b>Description:</b> Development required for integration of updated enterprise terminal solutions onto the BACN Capability.</p> <p><b>FY 2021 Plans:</b> N/A</p> <p><b>FY 2022 Plans:</b> FY22 funds will support MIDS JTRS Modernization, ARC 210 Gen 6, and integration of Open Mission Systems (OMS) concepts into BACN.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding support of OMS efforts for BACN system.</p>		-	0.000	2.398
<b>Accomplishments/Planned Programs Subtotals</b>		25.960	6.815	32.008
<b>D. Other Program Funding Summary (\$ in Millions)</b>				
N/A				
<b>Remarks</b>				
<b>E. Acquisition Strategy</b>				
Provides common development, integration and interoperability of the BACN payload, platforms and supporting systems and equipment. Acquisition strategies vary by effort, will utilize all contracting options available but the majority of development and integration is normally accomplished by the weapon system prime contractor.				

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force												Date: May 2021				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
3600 / 7				PE 0207610F / Battlefield Abn Comm Node (BACN)				671201 / E-11 Development								
<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
MilGPS - 675383	SS/CPAF	NGDS : Wichita, KS	-	20.121	Jun 2020	4.413	Jan 2021	-		-		-	-	-	-	
MilGPS - 671201	C/CPAF	TBD : TBD	-	-		-		26.292	Jan 2022	-		26.292	-	-	-	
<b>Subtotal</b>			-	20.121		4.413		26.292		-		26.292	-	-	N/A	
<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Acquisition Support	Various	Various : Various, MA	-	1.732	Dec 2019	1.500	Jan 2021	1.500	Jan 2022	-		1.500	-	-	-	
<b>Subtotal</b>			-	1.732		1.500		1.500		-		1.500	-	-	N/A	
<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Test and Evaluation	C/CPAF	Not specified. : TBD	-	1.068	Jan 2020	-		0.500	Dec 2021	-		0.500	-	-	-	
<b>Subtotal</b>			-	1.068		-		0.500		-		0.500	-	-	N/A	
<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
BACN A&AS	Various	A&AS : Bedford, MA	-	1.068	Apr 2020	-		1.222	Apr 2022	-		1.222	-	-	-	
MITRE	Various	MITRE : Bedford, MA	-	1.971	Oct 2019	0.814	Oct 2020	2.400	Oct 2021	-		2.400	-	-	-	
Travel	Various	Not specified. : TBD	-	-		0.088	Oct 2020	0.094	Oct 2021	-		0.094	-	-	-	
<b>Subtotal</b>			-	3.039		0.902		3.716		-		3.716	-	-	N/A	



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Air Force</b>	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207610F / <i>Battlefield Abn Comm Node (BACN)</i>	<b>Project (Number/Name)</b> 671201 / <i>E-11 Development</i>
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FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b><i>Battlefield Airborne Communication Node (BACN)</i></b>	
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BACN MilGPS Development Testing and Certification	<div style="background-color: black; width: 100px; height: 15px; margin: 0 auto;"></div>
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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207610F / <i>Battlefield Abn Comm Node (BACN)</i>	<b>Project (Number/Name)</b> 671201 / <i>E-11 Development</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Battlefield Airborne Communication Node (BACN)</i></b>				
BACN MilGPS Development Testing and Certification	2	2022	4	2022

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207697F / <i>Distributed Training and Exercises</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	4.146	3.384	4.007	0.000	4.007	-	-	-	-	-	-
675190: <i>JFCOM Wargaming</i>	-	4.146	3.384	4.007	0.000	4.007	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

Funding supports the CSAF Title 10 wargaming efforts to test concepts, capabilities, programming choices, and plans using simulation and other techniques, otherwise known as wargaming. Based on the Department and Air Force direction, there is a concerted effort in these periods of fiscal restraint to reinvigorate, institutionalize, and systematize wargaming across the Department. This effort requires continued funding to maintain the level of effort to most effectively pursue an innovative strategy, avoid operational and technical surprise and make best use of limited resources. The Air Force continues to refine the wargame process and design to better integrate and synergize those efforts in support of the Air Force Strategy, Planning, Programming, Budget, and Execution (SPPBE) process. Specifically, in addition to maintaining a robust Title 10 Wargame series, Global Engagement, servicing Chief of Staff of the Air Force (CSAF) objectives. The HAF Wargaming Enterprise is executing on-call Wargaming in support of the AF/A5/7, the Agile series, along with quick-turning wargame support to the USAF Enterprise Capability Collaboration Team (ECCT) requirements, the Enterprise series, Plan Blue, and to service AF/A5/7 strategy and concept development objectives; all to better address the requirements of the Strategy, Planning, Programming, Budget, and Execution (SPPBE) process and cycles. Additionally, HAF Wargaming provides and coordinates Air Force representation at other Service and Joint wargames as they execute across the department. These efforts are providing decision support to senior Air Force leaders involving investment strategies and develop concepts to best employ U.S. forces in future conflicts.

The Wargame Information Environment (WIE) is a continually evolving system that provides an array of services to game players which enables the accomplishment of game objectives. The backbone of the WIE is GameNet, a deployable, standalone, Local Area Network (LAN) with servers and laptops that host applications to support virtual battlespace collaboration, decision making, three-dimensional visualizations & mapping, and services. Behind these applications are cutting edge technologies and database architectures from both commercial off-the-shelf and government developed software that assures relevance to the wargame. The modeling, simulation, and analysis applications allow participants, adjudicators, and control team members to effectively and efficiently collaborate, make decisions, present those decisions, and execute moves within the wargame; documenting each step in the process. This information capture enables discovery during the wargame and permits postgame analysis. These findings inform portfolio rebalancing exercises, concept and strategy development, and very senior leader decision making.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0M was expended for civilian pay expenses in this program element, and in FY21 \$0M is forecasted for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force				<b>Date:</b> May 2021	
<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>		<b>R-1 Program Element (Number/Name)</b> PE 0207697F / <i>Distributed Training and Exercises</i>			
<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	4.303	3.390	4.460	0.000	4.460
Current President's Budget	4.146	3.384	4.007	0.000	4.007
Total Adjustments	-0.157	-0.006	-0.453	0.000	-0.453
• Congressional General Reductions	0.000	-0.006			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.157	0.000			
• Other Adjustments	0.000	0.000	-0.453	0.000	-0.453
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<b>Title:</b> Develop/ Upgrade Modeling & Simulation (M&S) Tools for Wargaming Information Environment (WIE)	1.502	1.216	1.560	0.000	1.560
<b>Description:</b> Develop air, space and cyber space wargaming specific functionality in existing modeling and simulation and analysis tools and integrate into the latest version of the WIE					
<b>FY 2021 Plans:</b>					
<ul style="list-style-type: none"> <li>• Continue developing and assimilating tools that capture consequences of alternative force structures and capabilities employed in wargames to inform Department of the Air Force (DAF) budgeting and programming choices.</li> <li>• Continue to expand and develop the Headquarters USAF (HAF) Wargaming Information Environment (WIE) by integrating the latest technology and tools that will support of a more flexible, robust, and agile wargaming enterprise that is quicker to respond and tailorable for a wider range of wargaming. This will require analysis of the utility and functionality of additional models and analytical tools used in other wargames, and creation of custom interfaces to allow interaction within the WIE (for example, the latest iteration of Air Force Materiel Command's Integrated Sustainment and Wargaming Analysis Toolkit (ISWAT3), which assesses and reports changing logistics and supply levels across wargame moves, battle damage, resupply etc.).</li> <li>• Lastly, seek to improve the ease and effectiveness of wargame execution by developing new WIE visualizations and user/ participant interfaces in the FY21 HAF "Title 10" wargame series comprised of Futures Game 21 (FG 21) and Global Engagement 21 (GE 21)—where FG is a high-classification deep-dive into</li> </ul>					

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207697F / <i>Distributed Training and Exercises</i>
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**C. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>capabilities 15-20 years out and GE is an Ally-informed look at military theater competition between now and that period.</p> <p>Justification of work planned for FY21:</p> <ul style="list-style-type: none"> <li>• This work will take place in preparation for, and in support of, FG 21 in the Spring of 2021; a Plan Blue game in Summer '21; and major planning workshops leading up to GE 21 in the Fall.</li> <li>• The HAF is using these wargames as one of its primary means to inform budgeting and programming decisions needed to fully implement and align with the National Defense Strategy.</li> <li>• This is particularly important follow-on work to implement/solidify lessons and best practices learned during the upcoming September Futures Game 20 (FG 20), which will inform the wargaming M&amp;S, analysis, assessments, and adjudication that will be used for FG 21.                             <ul style="list-style-type: none"> <li>o FG 20 will be the Air Force's first "COVID-distributed" Title 10 wargame, and its first wargame executed under a reorganized structure that merges HAF Title 10 gaming with Air Force Warfighter Integration Capability (AFWIC) Experimentation and Data Analysis teams.</li> <li>o The WIE used for FG 20, combined with tools brought in and refined by AFWIC and RAND (and integrated with other tools we continue to refine such as ISWAT)) will directly underpin the planned follow-on FG 21 wargame—and subsequently GE 21 and FG 22.</li> <li>o Continue to develop robust wargame results (enabled by the WIE and associated M&amp;S, assessments, and analysis tools) on which it relies to inform critical planning decisions on future concepts, capabilities, and force structure—all in support of NDS requirements.</li> </ul> </li> </ul> <p><b><i>FY 2022 Base Plans:</i></b> Category Title: Develop/ Upgrade Modeling &amp; Simulation (M&amp;S) Tools for Wargaming Information Environment (WIE).</p>					

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207697F / <i>Distributed Training and Exercises</i>
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
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Description: Develop air, space and cyber space wargaming specific functionality in existing modeling and simulation and analysis tools and integrate into the latest version of the Wargame Information Environment (WIE).

FY22 Base Plan:

- Continue developing and assimilating tools that capture consequences of alternative force structures and capabilities employed in wargames to inform Department of the Air Force (DAF) budgeting and programming choices.
- Continue to expand and develop the Headquarters USAF (HAF) Wargaming Information Environment (WIE) by integrating the latest technology and tools that will support of a more flexible, robust, and agile wargaming enterprise that is quicker to respond and tailorable for a wider range of wargaming. This will require analysis of the utility and functionality of additional models and analytical tools used in other wargames, and creation of custom interfaces to allow interaction within the WIE (for example, the latest iteration of Air Force Materiel Command's Integrated Sustainment and Wargaming Analysis Toolkit (ISWAT3), which assesses and reports changing logistics and supply levels across wargame moves, battle damage, resupply etc.).
- Lastly, seek to improve the ease and effectiveness of wargame execution by developing new WIE visualizations and user/ participant interfaces in the FY22 HAF "Title 10" wargame series comprised of Futures Game 22 (FG 22) and Global Engagement 22 (GE 22)—where FG is a high-classification deep-dive into capabilities 15-20 years out and GE is an Ally-informed look at military theater competition between now and that period.

Justification of work planned for FY22:

- This work will take place in preparation for, and in support of, FG 22 in the Spring of 2022; a Plan Blue game in Summer '22; and major planning workshops leading up to GE 22 in the Fall.
- The HAF is using these wargames as one of its primary means to inform budgeting and programming decisions needed to fully implement and align with the National Defense Strategy.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207697F / <i>Distributed Training and Exercises</i>
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**C. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>• This is particularly important follow-on work to implement/solidify lessons and best practices learned during the previous Futures Game 21 (FG 21), which will inform the wargaming M&amp;S, analysis, assessments, and adjudication that will be used for FG 22.</p> <ul style="list-style-type: none"> <li>o The WIE used for FG 21, combined with tools brought in and refined by AFWIC and RAND (and integrated with other tools we continue to refine such as ISWAT) will directly underpin the planned follow-on FG 22 wargame—and subsequently GE 22 and FG 23.</li> <li>o Loss of this PE funding for FY22 would drastically undermine both FG 22 and 23, as well as Global Engagement wargaming. The Air Force would lose the robust wargame results (enabled by the WIE and associated M&amp;S, assessments, and analysis tools) on which it relies to inform critical planning decisions on future concepts, capabilities, and force structure—all in support of NDS requirements.</li> </ul> <p>-----</p> <p>Category Title: Joint Concept Development &amp; Experimentation (JCD&amp;E) Tools Description: Develop scenarios and data for future synthetic environment that are grounded in truth to support several wargames and mini-wargames.</p> <p>FY22 Base Plan:</p> <ul style="list-style-type: none"> <li>• HAF Wargaming will execute FG 22 and GE 22 lead-up events in FY22.</li> <li>• HAF Wargaming will continue to design, develop models, research concepts, and conduct workshops for FG 22 and GE 22 including post-game assessment, analysis and reporting.</li> <li>• HAF Wargaming will continue to conduct quick-turn wargames in support of senior leaders as directed including support to other service wargames to ensure Air Force interests are incorporated in a realistic manner.</li> </ul> <p>Justification of work planned for FY22:</p> <ul style="list-style-type: none"> <li>• The utility and credibility of results from all Air Force Title 10 wargaming described in the FY21 base plan is utterly reliant on the development in each game cycle of plausible and well-informed scenarios, Blue planning &amp; facilitation experts, crack Red teams, and credible Red, Green and Blue baseline data for the future game epochs.</li> </ul>					

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207697F / <i>Distributed Training and Exercises</i>
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<ul style="list-style-type: none"> <li>• These scenarios, teams, and data—and the wargame plans they generate or underpin—are achievable only through the tailored hiring and the building over time of key persons/teams, and by enabling them with the right tools and collaboration activities to plan and build.</li> <li>• Wargaming access to such individuals, teams and tools, and their development activities that underpin HAF Title 10 wargames large and small, is made possible by this PE.</li> <li>• If this PE were to be defunded for FY22, the experts who build scenarios, develop and man Red teams, and provide the latest credible data on Blue, Red and Green forces and planning, would be lost—to be replaced later only slowly and with difficulty. The people and tools that port such data into the WIE would go away, as well. HAF Title 10 wargaming that depends on these elements—and therefore the vital results from such wargaming—would be significantly impacted, to the detriment of USAF future-force decisions and development.</li> <li>• Additionally, associated joint gaming/experimentation that uses and benefits from USAF Title 10 scenarios and data would be impacted as well (e.g. the Joint Staff's Global Integrated Wargame)</li> </ul> <p><b>FY 2022 OCO Plans:</b> OCO funds are not programmed in this PE.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increased to match requirements.</p>					
<p><b>Title:</b> Joint Concept Development &amp; Experimentation (JCD&amp;E) Tools</p> <p><b>Description:</b> Develop scenarios and data for future synthetic environment that are grounded in truth to support several wargames and mini-wargames.</p> <p><b>FY 2021 Plans:</b></p> <ul style="list-style-type: none"> <li>• HAF Wargaming will execute FG 21 and GE 21 lead-up events in FY21.</li> <li>• HAF Wargaming will continue to design, develop models, research concepts, and conduct workshops for FG 21 and GE 21 including post-game assessment, analysis and reporting.</li> <li>• HAF Wargaming will continue to conduct quick-turn wargames in support of senior leaders as directed including support to other service wargames to ensure Air Force interests are incorporated in a realistic manner.</li> </ul>	2.644	2.168	2.447	0.000	2.447



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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207697F / <i>Distributed Training and Exercises</i>
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>Justification of work planned for FY21:</p> <ul style="list-style-type: none"> <li>• The utility and credibility of results from all Air Force Title 10 wargaming described in the FY21 base plan is utterly reliant on the development in each game cycle of plausible and well-informed scenarios, Blue planning &amp; facilitation experts, crack Red teams, and credible Red, Green and Blue baseline data for the future game epochs.</li> <li>• These scenarios, teams, and data—and the wargame plans they generate or underpin—are achievable only through the tailored hiring and the building over time of key persons/teams, and by enabling them with the right tools and collaboration activities to plan and build.</li> <li>• Wargaming access to such individuals, teams and tools, and their development activities that underpin HAF Title 10 wargames large and small, is made possible by this PE.</li> <li>• Associated joint gaming/experimentation that uses and benefits from USAF Title 10 scenarios and data (e.g. the Joint Staff's Global Integrated Wargame)</li> </ul> <p><b><i>FY 2022 Base Plans:</i></b> HAF Wargaming will execute Global Engagement 23 and lead up events beginning in FY22. HAF Wargaming will continue to design, develop models, research concepts, and conduct workshops for Global Engagement 23 including the Capstone event in the Fall of 2023 including its post-game analysis and report writing(USAF Foundation wargame). HAF Wargaming will continue to conduct quick-turn wargames in support of senior leaders (Agile, ECCT) as directed including support to other service wargames to advocate for Air Force equities.</p> <p><b><i>FY 2022 OCO Plans:</i></b> OCO funds are not programmed in this PE.</p> <p><b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> Increased to match requirements.</p>					
<b>Accomplishments/Planned Programs Subtotals</b>	4.146	3.384	4.007	0.000	4.007

**D. Other Program Funding Summary (\$ in Millions)**  
N/A

**Remarks**

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207697F / <i>Distributed Training and Exercises</i>
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**E. Acquisition Strategy**

In order to achieve an innovative strategy, avoid operational and technical surprise and make best use of limited resources, wargaming requires an evolutionary acquisition approach for every wargame. Contract support is required as wargame and IT specialized expertise resides with industry and is not available organically. The requirements constantly evolve and a challenge to be accurately defined at the outset of the contract; however, we will continue to pursue a firm fixed price (FFP) contract awarded under a full and open competition.



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Air Force</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207697F / <i>Distributed Training and Exercises</i>	<b>Project (Number/Name)</b> 675190 / <i>JFCOM Wargaming</i>

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b><i>Wargaming Information Environment</i></b>	
Develop and Integrate M&S Tools	
Enhance ViewPoint	
Improve GamePoint	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207697F / <i>Distributed Training and Exercises</i>	<b>Project (Number/Name)</b> 675190 / <i>JFCOM Wargaming</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Wargaming Information Environment</i></b>				
Develop and Integrate M&S Tools	1	2020	4	2026
Enhance ViewPoint	1	2020	4	2026
Improve GamePoint	1	2020	4	2026

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0208006F / <i>Mission Planning Systems</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	0.000	69.232	91.601	92.557	0.000	92.557	-	-	-	-	-	-
675302: <i>Precision Aerial Delivery Systems (PADS)</i>	0.000	7.021	3.084	1.865	0.000	1.865	-	-	-	-	-	-
675380: <i>Mission Planning Systems (MPS) Modernization</i>	0.000	62.211	88.517	90.692	0.000	90.692	-	-	-	-	-	-

**Program MDAP/MAIS Code:** 509

**Note**

- Mission Planning Systems (MPS) software is a layered software, designed with open architected standards and modular construction. The core of the MPS Legacy Joint Mission Planning Systems (JMPS) software is the Framework software (FW) used by all MPS platforms and the Navy. Common Components are distinct services that are used by a select number of platforms. An example would be weapon specific capability that fighters share. The Unique Planning Component (UPC) is the platform specific software and associated software (install etc.) that is delivered to the users in the form of a mission planning environment. Traditionally, the MPS Systems Program Office had allocated FW funding to other Platform Operational Flight Program (OFP) development programs. Beginning in FY20, FW became a separate program code within the MPS Modernization BPAC.

- As part of MPS Modernization, the Mission Planning program is updating the current JMPS architecture with an Open Mission Systems architecture to improve system extensibility, expand the suite of services to meet operational requirements for the warfighter, improve the user interface and overall user experience, improve system performance, and address security vulnerabilities and cybersecurity mandates. MPS is also transitioning its software development processes to incorporate best practice Agile DevOps methodologies which will speed the development and delivery of capabilities to the user as well as improve our ability to address changing threats and cybersecurity requirements. This transition will drive changes in organizational and programmatic structures in the future to align with the Agile DevOps processes and practices. The integration of the agile development methodology will require some program office organizational restructuring into Agile Release Trains (ARTs). This is expected to commence in the FY21 timeframe.

**A. Mission Description and Budget Item Justification**

Mission planning involves the creation of a flight plan based on multiple inputs including threats, targets, terrain, weather, aircraft performance capability, and configuration. It is an essential task that must be completed prior to any fixed- or rotary wing aircraft sortie. The planner must have the ability to plan weapon, cargo, passenger, and/or fuel delivery, calculate fuel requirements, and assess the route based on known enemy threat location and type. Mission planners must be able to optimize and de-conflict flight routes with other aircraft; review, print, and brief the plan; download pertinent flight information to on-board aircraft avionics; and, conduct dynamic/in-flight re-planning as applicable.

The MPS program is a collaborative program with the Navy to leverage technical solutions and business practices for most Department of Defense (DoD) platforms. It provides automated mission planning tools and support for fixed- and rotary wing aircraft and guided munitions. It replaces two closed architecture legacy mission

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0208006F / <i>Mission Planning Systems</i>
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planning systems (UNIX-based MPS (UNIX-MPS) and the PC-based Portable Flight Planning Software (PFPS)), with a single multi-service, open architecture system, frequently referred to as JMPS. MPS has continually compressed the mission planning cycle by providing an improved integrated planning environment, reducing the time required to respond to changing situations and urgent needs such as striking time sensitive/critical targets and conducting combat search and rescue. MPS products have the potential to support all DoD fixed-wing and rotary wing aircraft and are shared with the selected programs in the Navy. MPS delivers significant benefits to command and control performance by enhancing information superiority for the warfighter and by providing unique capabilities in support of both precision engagement and dominant maneuver.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Mission Planning System capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0.000M was expended for civilian pay expenses in this program element, and in FY21 \$0.046M is forecasted for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	71.465	91.768	93.950	0.000	93.950
Current President's Budget	69.232	91.601	92.557	0.000	92.557
Total Adjustments	-2.233	-0.167	-1.393	0.000	-1.393
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-2.233	-0.167	-1.393	0.000	-1.393



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0208006F / <i>Mission Planning Systems</i>				<b>Project (Number/Name)</b> 675302 / <i>Precision Aerial Delivery Systems (PADS)</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
675302: <i>Precision Aerial Delivery Systems (PADS)</i>	0.000	7.021	3.084	1.865	0.000	1.865	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

Mission planning involves the creation of a flight plan based on multiple inputs including threats, targets, terrain, weather, aircraft performance capability, and configuration. It is an essential task that must be completed prior to any fixed- or rotary wing aircraft sortie. The planner must have the ability to plan weapon, cargo, passenger, and/or fuel delivery, calculate fuel requirement and assess the route based on known enemy threat location and type. Mission planners must be able to optimize and de-conflict flight routes with other aircraft; review, print and brief the plan; download pertinent flight information to on-board aircraft avionics; and, conduct dynamic/in-flight re-planning as applicable.

This project continues the development of a Joint Precision Airdrop System-Mission Planner (JPADS-MP) capability in conjunction with the Army. JPADS provides a planning capability for DoD airdrop requirements. It is the primary airdrop mission planning system for all ballistic airdrop missions as well as precision guided airdrops that are required when the mission profile or surface-to-air threat assessment warrants a high-altitude and/ or standoff precision delivery. It enables high-altitude, precise airdrop delivery to forward ground forces, while mitigating surface-to-air threats, reducing risk of exposure to Improvised Explosive Devices (IEDs) and insurgent attack on ground convoys. JPADS allows the warfighter to consider weather, terrain, aircraft capabilities, threat, and other data to accurately deliver payloads to U.S. and other friendly forces.

Consolidated Airdrop Tool (CAT) is the key JPADS-MP software deliverable. It will increase the accuracy of airdrop mission planning by improving aircraft, payload, and chute specific calculations along with weather analysis visualization tools specifically adapted for airdrop. Future initiatives are designated to achieve automation of airdrop planning and execution to reduce task saturation in the cockpit and support Air Mobility Command's (AMC) objective of moving to a two-man cockpit. These efforts include the ability to automatically receive and use real-time winds in any location, calculation of a release point and airdrop in a single pass, the ability to conduct real-time objective area analysis to calculate probable damage estimates and execute dynamic re-tasking, the ability to conduct post-drop assessments, and the implementation of new technologies (e.g. Service Oriented Architecture (SOA) Touch Screen environment).

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> JPADS-MP Phase I	7.021	3.084	1.865
<b>Description:</b> Continues development of a JPADS capability for precise, high altitude delivery of material to forward ground forces.			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208006F / <i>Mission Planning Systems</i>	<b>Project (Number/Name)</b> 675302 / <i>Precision Aerial Delivery Systems (PADS)</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b><i>FY 2021 Plans:</i></b></p> <ul style="list-style-type: none"> <li>- Increase JPADS capability to meet MAJCOM critical operational needs for conventional, precision, HALO/HAHO and Dynamic High Speed airdrops. Moreover, increasing JPADS ability to support Battlefield Illumination and CSAR requirements. Requirements from the Army, Navy and Special Operation continue to add to JPADS operational capabilities. This development is for the continued tablet capabilities along with potential C-130 and C-17 data exchange of airdrop weather, navigation and flight performance information.</li> <li>- Release numbers as shown in the R-4 schedule were changed from Major releases (long term developments) to quarterly Program Increments reflecting the agile software development process</li> <li>- Will continue the refinement of precision and conventional airdrop capabilities including but not limited to, Airdrop Damage Estimate (ADE), 3D Hazard and obstruction data for guided delivery system navigation, automation for aircrew in-flight airdrop workflow, Extracted Container Delivery Systems (ExCDS), data services to multiple mission planning devices, and calculations to maximize payload impact success on drop zones.</li> </ul> <p><b><i>FY 2022 Plans:</i></b></p> <p>Continue agile development with quarterly releases. The scope of each release will be determined at a planning session based on the warfighter prioritized requirements identified in the approved requirements document as well as enhancements identified in field performance. Each release will be incorporated into a Mobility Based Mission Planning Environment (MPE) for use by Air Mobility Command and Air Combat Command Aircraft. The Micro Services Oriented Architecture evolution will evolve to align with the JOMS/NOM architecture.</p> <p><b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b></p> <p>There is a decrease in FY 22 primarily due to the timing of the cadence release cycle and completion of the primarily Agile Global Mobility requirements.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	7.021	3.084	1.865

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• OPAF 03 Line Item 833170: <i>Mission Planning Systems</i>	14.508	15.132	14.871	-	14.871	-	-	-	-	-	-
<b>Remarks</b>											

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force		Date: May 2021
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0208006F / <i>Mission Planning Systems</i>	Project (Number/Name) 675302 / <i>Precision Aerial Delivery Systems (PADS)</i>

**D. Acquisition Strategy**

The MPS PADS efforts are developed and fielded using a variety of contracting instruments. Efforts to accomplish activities such as SAFe Agile software development methodology, systems engineering and integration, training, and support are completed using competitively awarded contracts (e.g. Cost Plus Award Fee (CPAF), Fixed Price (FP)). With expiration of MPEC II in June 2021, Mission Planning will utilize established GWAC ID/IQ schedules, with a larger pool of vendors, to competitively award future Task or Delivery Orders. These vehicles will be utilized to establish agile contracts to support transformation to agile devops approach.

Program Management Administration (PMA) contracts are awarded competitively and consist of various types of contracts at various locations. MITRE, a Federally Funded Research and Development Center (FFRDC) contractor, provides technical support via a no fee for service contract. The Systems Engineering & Integration Contract (SEIC) is a competitively awarded ID/IQ. Other efforts are accomplished using Purchase Orders (PO) and Military Interdepartmental Purchase Requests (MIPR).

For the efforts listed above, the Air Force Life Cycle Management Center at Hanscom AFB (AFLCMC/HB) is the Contracting Authority and provides Contracts, Legal, and Comptroller Support.

Air Force Program Executive Officer (PEO) for Digital (AFPEO/BM) is the PEO and Milestone Decision Authority (MDA) for the PADS program.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208006F / <i>Mission Planning Systems</i>	<b>Project (Number/Name)</b> 675302 / <i>Precision Aerial Delivery Systems (PADS)</i>
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Software Development	C/CPIF	Various : Various	0.000	5.766	Nov 2019	2.543	Nov 2020	1.533	Nov 2021	-		1.533	-	-	-
Systems Engineering and Integration	C/CPAF	Leidos, Inc. : Reston, VA	0.000	0.870	Jan 2020	0.175	Jan 2021	0.090	Jan 2022	-		0.090	-	-	-
<b>Subtotal</b>			0.000	6.636		2.718		1.623		-		1.623	-	-	N/A

<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Cost Estimating	C/T&M	Quantech Services : Lexington, MA	0.000	0.015	Nov 2019	0.016	Nov 2020	0.017	Nov 2021	-		0.017	-	-	-
<b>Subtotal</b>			0.000	0.015		0.016		0.017		-		0.017	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Responsible Test Organization (RTO)	PO	96CTG: Eglin AFB, FL : TBD	0.000	0.370	Dec 2019	0.350	Dec 2020	0.225	Dec 2021	-		0.225	-	-	-
<b>Subtotal</b>			0.000	0.370		0.350		0.225		-		0.225	-	-	N/A

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>		0.000	7.021	3.084	1.865	1.865	-	-	N/A

**Remarks**



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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2022 Air Force							<b>Date:</b> May 2021						
<b>Appropriation/Budget Activity</b> 3600 / 7				<b>R-1 Program Element (Number/Name)</b> PE 0208006F / <i>Mission Planning Systems</i>				<b>Project (Number/Name)</b> 675302 / <i>Precision Aerial Delivery Systems (PADS)</i>					

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
JPADS-MP Program Increment (PI) 35																																

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208006F / <i>Mission Planning Systems</i>	<b>Project (Number/Name)</b> 675302 / <i>Precision Aerial Delivery Systems (PADS)</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Precision Aerial Delivery Systems (PADS)</i></b>				
JPADS-MP Program Increment (PI) 12	1	2021	1	2021
JPADS-MP Program Increment (PI) 13	2	2021	2	2021
JPADS-MP Program Increment (PI) 14	3	2021	3	2021
JPADS-MP Program Increment (PI) 15	4	2021	4	2021
JPADS-MP Program Increment (PI) 16	1	2022	1	2022
JPADS-MP Program Increment (PI) 17	2	2022	2	2022
JPADS-MP Program Increment (PI) 18	3	2022	3	2022
JPADS-MP Program Increment (PI) 19	4	2022	4	2022
JPADS-MP Program Increment (PI) 20	1	2023	1	2023
JPADS-MP Program Increment (PI) 21	2	2023	2	2023
JPADS-MP Program Increment (PI) 22	3	2023	3	2023
JPADS-MP Program Increment (PI) 23	4	2023	4	2023
JPADS-MP Program Increment (PI) 24	1	2024	1	2024
JPADS-MP Program Increment (PI) 25	2	2024	2	2024
JPADS-MP Program Increment (PI) 26	3	2024	3	2024
JPADS-MP Program Increment (PI) 27	4	2024	4	2024
JPADS-MP Program Increment (PI) 28	1	2025	1	2025
JPADS-MP Program Increment (PI) 29	2	2025	2	2025
JPADS-MP Program Increment (PI) 30	3	2025	3	2025
JPADS-MP Program Increment (PI) 31	4	2025	4	2025
JPADS-MP Program Increment (PI) 32	1	2026	1	2026

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208006F / <i>Mission Planning Systems</i>	<b>Project (Number/Name)</b> 675302 / <i>Precision Aerial Delivery Systems (PADS)</i>

<b>Events by Sub Project</b>	<b>Start</b>		<b>End</b>	
	<b>Quarter</b>	<b>Year</b>	<b>Quarter</b>	<b>Year</b>
JPADS-MP Program Increment (PI) 33	2	2026	2	2026
JPADS-MP Program Increment (PI) 34	3	2026	3	2026
JPADS-MP Program Increment (PI) 35	4	2026	4	2026



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0208006F / <i>Mission Planning Systems</i>				<b>Project (Number/Name)</b> 675380 / <i>Mission Planning Systems (MPS) Modernization</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
675380: <i>Mission Planning Systems (MPS) Modernization</i>	0.000	62.211	88.517	90.692	0.000	90.692	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

Mission planning involves the creation of a flight plan based on multiple inputs including threats, targets, terrain, weather, aircraft performance capability, and configuration. It is an essential task that must be completed prior to any fixed- or rotary wing aircraft sortie. The planner must have the ability to plan weapon, cargo, passenger, and/or fuel delivery, calculate fuel requirements, and assess the route based on known enemy threat location and type. Mission planners must be able to optimize and de-conflict flight routes with other aircraft; review, print and brief the plan; download pertinent flight information to on-board aircraft avionics; and conduct dynamic/in-flight re-planning as applicable. The MPS Modernization project, following a multi-year strategic roadmap to migrate mission planning capabilities as discussed above into a services-based open architecture, focuses on delivering JMPS Open Mission Systems (JOMS) environment for mission planning supporting Combat Air Forces (CAF) and Mobility Air Forces (MAF), which includes the development, test and support of Mission Planning Environments (MPEs) to support the B-1, C-5, C-17, C-130, HC-130, EC-130, E-3 DRAGON, E-3/E-8, F-15, F-22A, KC-10, KC-46, KC-135, RC-135, HH-60 other platforms, Framework (FW) and all Common Component (CCs) software tools for mission requirements. Activities also include studies and analysis to support both current program planning and execution and future program planning. MPS Modernization efforts that support modernizing the system architecture to JOMS are as follows:

1) CAF MPS Modernization: These development efforts modernize CAF Mission Planning Environments (MPEs). The modernization effort will provide new and improved mission planning capability for individual OFP requirements, such as new weapons, avionics upgrades, communications systems, etc. The OFPs requiring MPE updates under the CAF modernization effort include, but are not limited to, B-1 (Sustainment Blocks 17a, 17b, 17c, 18 and 19), F-15 (Suites 9, 9.1 and 9.2) and F-22 Increments 3.2B, update Release One, Release Two, and Release Three. CAF modernization also includes updates to mission planning capabilities supporting associated weapons including, but not limited to, Small Diameter Bomb (SDB-II), Joint Direct Attack Munitions (JDAM) and the Joint Air-to-Surface Standoff Missile (JASSM). A key piece of the CAF modernization effort involves interfacing between the CAF platforms and the weapons using tools such as, but not limited to, Universal Armament Interface (UAI) and Mission Planning Certification Tool (MPCT). Finally, CAF modernization will address required improvements to CAF related JMPS MPE CCs, including Weapon Planning Software (WPS), Electronic Warfare CC (EWCC), GPS Crypto (including GPS M-code), Weather CC, etc. CAF MPE Modernization includes, but is not limited to, the following platform efforts:

a. F-15 Modernization Phase II & III: This modernization program consists of multiple software development efforts driven by OFP updates for F-15 Suites 9, 9.1, and 9.2. Suite 9 MPE capabilities include, but are not limited to, Data Transfer Device (DTD) improvements, updates for new features in weapons such as Joint Direct Attack Munition (JDAM), Small Diameter Bomb I and II (SDB I and II), AIM-9X, AIM-120D, and Network Enable Weapon support elements (e.g. key handling, weapon data link and Link 16). It will also include enhancements to the synthetic aperture radar planning tool (SAR-PT) and the global area reference tool as well as radar modernization updates (e.g. combat identification, radar planning tool enhancements) and a variety of updates and enhancements for weapons and aircraft systems to include, but are not limited to, Eagle Passive Active Warning Survivability System (EPAWSS), a new Advanced Dual Core Process II (ADCP-II) computer as well as Digital Transfer Device/Modules (DTD/DTM) modernization.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208006F / <i>Mission Planning Systems</i>	<b>Project (Number/Name)</b> 675380 / <i>Mission Planning Systems (MPS) Modernization</i>

b. F-22 Modernization Phase I: The F-22 Modernization program includes OFP-driven software updates v13.1, v14.0, v14.1, and v14.2. These enhancements include, but are not limited to, the addition of improved capabilities for the AIM-9X and AIM-120D, the incorporation of additional electronic protection tasks, combat identification improvements, addition of an Inter-flight Data Link Gateway, Mode 5 IFF and Combat ID updates, Link 16 updates, and incorporation of the synthetic aperture radar planning tool. Additionally, other new and emerging OFP-generated requirements will be addressed as identified by the operational user(s). Other Common Component (CC) updates will also be completed as required.

c. B-1 Modernization Phase I: The B-1 Modernization program includes OFP-driven software updates for Releases 9.1.3, 11.0, 11.1 and 11.2. It will incrementally update the platform MPE and provide updates to the aircraft mission capabilities, including JASSM and LRASM weapon updates, and incorporation of the crypto modernization LINK 16 network enabled weapons. Additionally, B-1 MPE will complete migration to a native 64-bit environment, replace the mass storage unit where pre-recorded map and mission data is stored and begin transition to microservices development in JMPS Open Mission Systems (JOMS) to modernize the software architecture.

2) MAF MPS Modernization: These development efforts modernize MAF MPEs for all Air Mobility Command platforms. The modernization effort will provide new and improved mission planning capability to support Aircraft individual Operational Flight Programs (OFP), Global C2, and AMC fuel efficiency requirements incorporating Mobility Air Forces Automated Flight Planning Service into the deployed squadron mission planning suite. It includes, but is not limited to, enhanced capabilities to accommodate avionics upgrades, precision airdrop improvements for increased combat battlefield airdrop accuracy, improved communications systems, interfaces with command and control systems, and improved weather data ingestion/utilization for various MAF platforms. Development efforts also include, but are not limited to, integrating improvements to MAF related CCs. Examples of these CCs include, but are not limited to, MAF tools, such as Assault Zone CC and the Air Refueling Tool (ART) CC, Consolidated Airdrop Tool (CAT), and the Weather CC.

3) The SMACC Modernization Program includes development, testing, and fielding of MP software for the E-3 DRAGON, E-3/E-8, RC-135 and EC-130. Combat Search and Rescue (CSAR) provides enhanced stability performance over the legacy mission planning system through enhanced architecture and baseline development, such as the improved transfer of mission data from the unique planning component to the HC-130J avionics suite and the 12 critical Digital Aeronautical Flight Information Files to integrate onto the smart multifunction color display for the HH-60G, resulting in mature JMPS mission planning environment for both CSAR platforms.

4) In FY20, MPS Framework was established as an independent ACAT III Program of Record (POR). The funding for MPS Framework has historically been accomplished through an allocation to the platform budgets in Mission Planning. The Program office has segregated MPS Framework for future oversight. MPS Framework initiated a one year agile pathfinder effort that represents the basic core functions of the JMPS Software developed as microservices in a Common Development Environment (CDE). MPS Framework will be renamed to Core Mission Planning (CMP) and continue core modernization efforts utilizing the JMPS Open Mission Systems (JOMS) architecture to continuously develop and deploy core mission capabilities.

Test, Training, and Certification: Continues all MPS-related integration, test, and certification activities for all CAF and MAF platforms.

Program Support: Continues all program office management operations and support activities to ensure the timely development, testing, and delivery of mission planning systems to the warfighter.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208006F / <i>Mission Planning Systems</i>	<b>Project (Number/Name)</b> 675380 / <i>Mission Planning Systems (MPS) Modernization</i>

The platform efforts include work associated with updates to the Framework and associated services.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>Title:</b> F-15 Modernization Phase II and III</p> <p><b>Description:</b> Continues the modernization of previously fielded F-15 Mission Planning Environments (MPEs) to enable efficient use of new and improved capabilities being developed in platform Operational Flight Programs (OFPs).</p> <p><b>FY 2021 Plans:</b> - Will complete FQT, DT/OT and begin fielding v6.1 capabilities that include Data Transfer Device (DTD) improvements, updates for new features in weapons such as Joint Direct Attack Munition (JDAM), Small Diameter Bomb I and II (SDB I and II), AIM-9X, AIM-120D, and Network Enable Weapon support elements (e.g. key handling, weapon data link and Link 16). It will also include enhancements to the synthetic aperture radar planning tool (SAR-PT) and the global area reference tool as well as radar modernization updates (e.g. combat identification, radar planning tool enhancements) and a variety of updates and enhancements for weapons and aircraft systems to include, but are not limited to, Eagle Passive Active Warning Survivability System (EPAWSS), a new Advanced Dual Core Process II (ADCP-II) computer as well as Digital Transfer Device/Modules (DTD/DTM) modernization.</p> <p><b>FY 2022 Plans:</b> - Will continue quarterly builds/releases until v6.1 fielding</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Decrease due to contract award timing and implementation of agile cadence.</p>	8.396	10.734	3.018
<p><b>Title:</b> F-22 Modernization Phase I and II</p> <p><b>Description:</b> Continues the modernization of previously fielded F-22 MPEs to enable efficient use of new and improved capabilities being developed in the OFPs.</p> <p><b>FY 2021 Plans:</b> - Will complete FQT, DT/OT and begin fielding v14.2 capabilities that include the incorporation of additional electronic protection tasks, combat identification improvements and the addition of an Inter-flight Data Link Gateway. - Begin development of v14.3 capabilities that include the addition of improved capabilities for the AIM-9X and AIM-120D Weapons, Mode 5 IFF and Combat ID updates, Link 16 updates, and incorporation of the synthetic aperture radar planning tool.</p> <p><b>FY 2022 Plans:</b></p>	16.178	17.461	18.060

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208006F / <i>Mission Planning Systems</i>	<b>Project (Number/Name)</b> 675380 / <i>Mission Planning Systems (MPS) Modernization</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Complete development, FQT, DT/OT and Field v14.3 to support OFP Release 3				
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Slight increase due to program adapting agile cadence and awarding new contract.				
<b>Title:</b> B-1 Modernization Phase I and II		6.298	11.491	12.637
<b>Description:</b> Continues the modernization of previously fielded B-1 MPEs to enable efficient use of new and improved capabilities being developed in the OFPs.				
<b>FY 2021 Plans:</b> - Field B-1 Rel 11.2 capabilities that will complete migration to a native 64-bit environment, replace the mass storage unit where pre-recorded map and mission data is stored and begin transition to microservices development in JMPS Open Mission Systems (JOMS) to modernize the software architecture in support of B-1 SB18 OFP requirements. - Begin development of B-1 Rel 11.3 capabilities that provide updates to the JASSM and LRASM weapon systems, and incorporation of the crypto modernization LINK 16 network enabled weapons in support of B-1 SB19 OFP requirements.				
<b>FY 2022 Plans:</b> - Continue quarterly builds/releases until final Rel 11.3 fielding.				
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Slight increase as sustainment work will be transitioned from Industry to Organic with reach back to Industry.				
<b>Title:</b> MAF Modernization		14.155	17.387	11.531
<b>Description:</b> Continues the development, testing, and fielding of the Agile Global Mobility (AGM) effort for the modernization of the JMPS Mission Planning Environment (MPE) for the C-5, C-17, C-130, KC-10, KC 135 and KC-46 to account for changes in aircraft Operational Flight Program (OFP) and Global Command as well as operational mission requirements.				
<b>FY 2021 Plans:</b> - AGM will fully transition to agile development/operations through a new contract structure. A major release of the software will occur in the middle of the FY for Air Mobility Command (AMC). Following this release, FY 2021 activities will continue with integration of the Mobility Air Forces Automated Flight Planning Service (MAFPS) Global Flight Planning Common Component (GFPCC), Aero Advisory Common Component (AACC) as well as other prioritized AMC elements. Each software program increment within quarterly releases will provide full and/or interim capabilities made available to the using command for fielding and resolve critical software issues. The KC-46 mission planning software will be upgraded to a 64-bit capability and integrated with the other AMC aircraft into one software planning package.				
<b>FY 2022 Plans:</b>				

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208006F / <i>Mission Planning Systems</i>	<b>Project (Number/Name)</b> 675380 / <i>Mission Planning Systems (MPS) Modernization</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>Based on prioritized warfighter enhancements development of follow on releases will be conducted concurrently via agile development with multiple Program Increments (PIs) and Common Components. Major improvements include architectural updates/refactoring of current capabilities into next generation micro-services, test automation, implementation of rapid deployment processes, and instantiation of a cross-contractor integrated development environment. Each of the PIs provide full and/or interim capabilities made available to the using command for fielding. Software will be updated based on user feedback to improve usability and efficiency. Software updates will ultimately support transition to the JMPS Open Mission System (JOMS).</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding is fairly constant across FYs as capabilities are added on a set cadence. There is a decrease in FY 22 primarily due to the timing of the cadence release cycle.</p>				
<p><b>Title:</b> Special Mission ACC (SMACC)</p> <p><b>Description:</b> Continues the modernization of previously fielded mission planning software environments for the E-3 DRAGON, E-3/E-8, EC-130, and RC-135. In addition, this effort continues modernization efforts for SMACC Combat Search and Rescue (CSAR) component for the HH-60G helicopters and the HC-130J.</p> <p><b>FY 2021 Plans:</b> Software will be staged for deployment on a 3-month cadence as the system transitions to a 64 bit capability and incorporates the Global Area Reference System (GARS), Degraded Visual Environment System (DVES), advanced debrief tools, and the Situational Awareness Communications Upgrade. This is in addition to enhancement of fielded capabilities such as Bird Dog (Intel), Counter Listener Acoustical Warfare (CLAW) and Survivor Broadcast Overlay Tool (SBOT).</p> <p><b>FY 2022 Plans:</b> Software release will continue on the 3 month agile cadence and include enhanced mission planning capabilities in support of an all-glass digital cockpit upgrade. The target list of other top priority items will be finalized through program increment planning sessions with Air Combat Command based on the backlog of items identified through agile software development/operations. FY 2022 also brings the conversion to an open mission system architecture to modernize the software base for increased speed of operation and increased efficiency of software maintenance.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY22 increase due to CSAR Mission Planning Environment SW being released on a three month cadence to support HH-60G and HC-130J including ITAS, SBOT and CLAW upgrades, NOM/JOMs architecture transition to Block 8.1 upgrade on the HC-130J and MPE development to support the HH-60G transition to the W-Model (Combat Rescue Helicopter).</p>		8.506	16.299	23.913
<p><b>Title:</b> MPS Framework (FW)</p>		7.878	15.145	21.533

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208006F / <i>Mission Planning Systems</i>	<b>Project (Number/Name)</b> 675380 / <i>Mission Planning Systems (MPS) Modernization</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>Description:</b> MPS Framework, and the follow-on renamed Core Mission Planning (CMP), is the set of core Mission Planning services that all platforms and common capabilities utilize. It is the bottom layer of the software architecture. It provides the core services utilized by both MAF and CAF platforms to include transit route planning, weather services and airfield data. MPS FW includes the infrastructure and interfaces required to be integrated into the various platforms and weapons systems as well as addresses data access, services, integrity and real-time operational communication.</p> <p><b>FY 2021 Plans:</b> Will establish a follow-on program of record, known as Core Mission Planning (CMP) at the conclusion of the FY20 Pathfinder development effort. CMP will continue development of services, modernizing from legacy development to micro-services in an Open Mission Systems/Service Oriented Architecture environment and improving quality, security, and automation of data supplied to mission planning systems.</p> <p><b>FY 2022 Plans:</b> Will continue CMP development and deployment of services, modernizing from legacy development to micro-services in an Open Mission Systems/Service Oriented Architecture environment and improving quality, security, and automation of data supplied to mission planning systems. Deployments will include initial capability releases of improved transit route planning functionality, dynamic fuel usage, filing and collaborative planning functionality.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase enables building upon the Minimum Viable Product (MVP) of Transit Route Planner, the planned development will deliver capabilities for the operational Minimum Viable Capability Release (MVCR) in line with the ACC CD-1 requirements. Other capabilities driving a cost increase include Non-Flyable Route Warnings, NOTAMS, Alerts &amp; Diverts, Refueling (On-load &amp; Off-load), Full Route Editing, Electronic Filing of Flight Plans, Diplomatic Clearances, Take-Off and Landing Data (TOLD), Common Forms/Cards, Weight &amp; Balance Form, FLIP, FPMs for all operational aircrafts and Weather Forecast Overlays.</p>			
<p><b>Title:</b> MAF Automated Flight Planning Service (MAFPS)Phase II</p> <p><b>Description:</b> Develops a centralized/net-centric global mobility flight planning capability, which will provide significant fuel savings through automated flight route, airspeed, and altitude optimization utilizing aircraft performance, air traffic management, weather, and other data. The Web-based Global Flight Planning (Web-GFP) portion modernizes a second MAFPS client enabling GM MPE users with access to the same MAFPS capabilities in order to facilitate fuel and cost efficiencies across the MAF.</p> <p><b>FY 2021 Plans:</b> Program will be in sustainment with no more development funding required.</p> <p><b>FY 2022 Plans:</b></p>	0.800	0.000	0.000

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208006F / <i>Mission Planning Systems</i>	<b>Project (Number/Name)</b> 675380 / <i>Mission Planning Systems (MPS) Modernization</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
N/A			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> N/A			
<b>Accomplishments/Planned Programs Subtotals</b>	62.211	88.517	90.692

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• OPAF 03 Line Item 833170: <i>Mission Planning Systems</i>	14.508	15.132	14.871	-	14.871	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

MPS Modernization consists of multiple capability upgrades across multiple platforms that are developed and fielded using a variety of contracting instruments. The Air Force Life Cycle Management Center at Hanscom AFB AFLCMC/HB) competitively awarded multiple (Indefinite Delivery/Indefinite Quantities) (ID/IQ) contracts for software development. Currently there are five (5) contractors, one of which is Small Business set aside, who are qualified sources. Each Delivery Order (DO) is competed among the five contractors. With expiration of this ID/IQ in June 2021, Mission Planning will utilize established GWAC ID/IQ schedules, with a larger pool of vendors, to competitively award future Task or Delivery Orders. These vehicles will be utilized to establish agile contracts to support transformation to agile devops approach. Efforts to accomplish program activities such as software development, systems engineering and integration, training, and support are competitively awarded using a variety of contract types to support agile development efforts.

Program Management Administration (PMA) contracts are awarded competitively and consist of various types of contracts at various locations. MITRE, a Federally Funded Research and Development Center (FFRDC) contractor provides technical support on a no fee for service contract.

The Systems Engineering & Integration Contract (SEIC) is a competitively awarded ID/IQ. Other efforts are accomplished via Purchase Orders (PO) and Military Interdepartmental Purchase Requests (MIPR). For the efforts listed above, the Air Force Life Cycle Management Center at Hanscom AFB (AFLCMC/HB) provides the program management, contracts, legal, and financial management support. The Air Force Program Executive Officer (PEO) for Digital (AFPEO/HB) is the Milestone Decision Authority (MDA) for all MPS Modernization projects. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208006F / <i>Mission Planning Systems</i>	<b>Project (Number/Name)</b> 675380 / <i>Mission Planning Systems (MPS) Modernization</i>
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<b>Product Development (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Product Development	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	-	-	-
Mission Planning Software Development	C/Various	Various : Various	0.000	23.763	Nov 2019	35.287	Nov 2020	29.427	Nov 2021	-		29.427	-	-	-
A-10 Modernization	PO	Organic : Hill AFB, UT	0.000	-		-		-		-		-	-	-	-
F-16 Modernization	PO	Organic : Hill AFB, UT	0.000	-		-		-		-		-	-	-	-
EC-130H Modernization	PO	Organic : Robins AFB, GA	0.000	0.775	Jan 2020	0.850	Jan 2021	0.702	Jan 2022	-		0.702	-	-	-
F-22 MiCloud SIL	MIPR	GSA : Washington, DC	0.000	-		-		-		-		-	-	-	-
MAF AMC Transition Tools	MIPR	AMCOM : Redstone Arsenal, AL	0.000	-		-		-		-		-	-	-	-
SMACC CSAR Tools	MIPR	Various : Various	0.000	0.514	Jan 2020	0.529	Jan 2021	0.544	Jan 2022	-		0.544	-	-	-
Systems Engineering and Integration	C/CPAF	Leidos, Inc. : Reston, VA	0.000	9.178	Jan 2020	10.484	Jan 2021	13.262	Jan 2022	-		13.262	-	-	-
Framework	C/FPIF	Northrop Grumman : Herndon, VA	0.000	10.479	Jan 2020	15.490	Jan 2021	21.533	Jan 2022	-		21.533	-	-	-
Common Components	C/Various	Various : Various	0.000	8.046	Nov 2019	15.395	Nov 2020	14.396	Nov 2021	-		14.396	-	-	-
<b>Subtotal</b>			0.000	52.755		78.035		79.864		-		79.864	-	-	N/A

<b>Support (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Support	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	-	-	-
Software Engineering	C/T&M	SEI : Pittsburgh, PA	0.000	-		-		-		-		-	-	-	0.080
Cost Estimating	C/T&M	Tecolote Inc : Goleta, CA	0.000	0.140	Nov 2019	0.145	Nov 2020	0.164	Nov 2021	-		0.164	-	-	-
<b>Subtotal</b>			0.000	0.140		0.145		0.164		-		0.164	-	-	N/A



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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208006F / <i>Mission Planning Systems</i>	<b>Project (Number/Name)</b> 675380 / <i>Mission Planning Systems (MPS) Modernization</i>
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<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test and Evaluation	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	-	-	-
Responsible Test Organization (RTO)	PO	96CTG : Eglin AFB, FL	0.000	4.126	Dec 2019	4.511	Dec 2020	4.943	Dec 2021	-		4.943	-	-	-
Certification and Accreditation	MIPR	JITC : Fort Huachuca, AZ	0.000	0.089	Feb 2020	0.092	Feb 2021	0.094	Feb 2022	-		0.094	-	-	-
Type I Training	PO	96CTG : Eglin AFB, FL	0.000	1.545	Jul 2020	1.825	Jul 2021	2.149	Jul 2022	-		2.149	-	-	-
Field Representative Hardware	C/Various	Various : Various	0.000	0.302	Nov 2019	0.374	Nov 2020	0.453	Nov 2021	-		0.453	-	-	-
<b>Subtotal</b>			0.000	6.062		6.802		7.639		-		7.639	-	-	N/A

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Management Services	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	-	-	-
Engineering and Technical Support	RO	MITRE Corp : Bedford, MA	0.000	3.254	Oct 2018	3.535	Oct 2020	3.025	Oct 2021	-		3.025	-	-	-
<b>Subtotal</b>			0.000	3.254		3.535		3.025		-		3.025	-	-	N/A

<b>Project Cost Totals</b>	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
	0.000	62.211	88.517	90.692	-	90.692	-	-	N/A

**Remarks**



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208006F / <i>Mission Planning Systems</i>	<b>Project (Number/Name)</b> 675380 / <i>Mission Planning Systems (MPS) Modernization</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Mission Planning Systems (MPS) Modernization</i></b>				
F-15 v6.1 Fielding	3	2021	2	2023
F-22 v14.1 Fielding	2	2021	2	2021
F-22 v14.2 Fielding	1	2022	1	2022
B-1 Release 11.1 Fielding	3	2021	3	2021
CAF Modernization Continued Integration, Test, and Fielding	3	2020	4	2026
MAF Modernization (to include AGM) continued Integration, Test, and Fielding (on quarterly release cadence)	1	2021	4	2026
SMACC (E-3/E-8, E-3 Dragon and CSAR-Pedro King(HH-60G/HC-130J)) Releases	1	2021	4	2026
MAFPS Rel 2 Web-GFP Agile Development, Integration, Test, and Release	1	2020	4	2020
MPS Framework/Core Mission Planning Agile Development, Integration, Test & Release	1	2020	3	2026

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force / BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0208007F / <i>Tactical Deception</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	7.173	0.000	0.489	0.000	0.489	-	-	-	-	-	-
674550: <i>Air Base Resiliency</i>	-	7.173	0.000	0.489	0.000	0.489	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

Military Deceptions mission is to execute actions to deliberately mislead adversary military, paramilitary, or violent extremist organization decision makers, thereby causing the adversary to take specific actions (or inactions) that will contribute to the accomplishment of the friendly mission.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	7.446	2.370	0.496	0.000	0.496
Current President's Budget	7.173	0.000	0.489	0.000	0.489
Total Adjustments	-0.273	-2.370	-0.007	0.000	-0.007
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-2.370			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.273	0.000			
• Other Adjustments	0.000	0.000	-0.007	0.000	-0.007

**Change Summary Explanation**

FY21 funding decreased due to non-kinetic air base defense forward financing

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Non-Kinetic Air Base Defense	7.173	0.000	0.489
<b>Description:</b> Provide non-kinetic air base defense capabilities to include military and civilian personnel to support planning, concept development, experimentation, and operational employment of emerging air base defense capabilities.			

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0208007F / <i>Tactical Deception</i>
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022
<b><i>FY 2021 Plans:</i></b> Non-kinetic Air Base Defense			
<b><i>FY 2022 Plans:</i></b> Non-kinetic Air Base Defense			
<b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> Decreased program efforts			
<b>Accomplishments/Planned Programs Subtotals</b>	7.173	0.000	0.489

**D. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

**E. Acquisition Strategy**

N/A



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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208007F / <i>Tactical Deception</i>	<b>Project (Number/Name)</b> 674550 / <i>Air Base Resiliency</i>
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b><i>Non-Kinetic Air Base Defense Development</i></b>	
Non-Kinetic Defense Development	[REDACTED]



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208007F / <i>Tactical Deception</i>	<b>Project (Number/Name)</b> 674550 / <i>Air Base Resiliency</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Non-Kinetic Air Base Defense Development</i></b>				
Non-Kinetic Defense Development	2	2020	4	2026

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0208064F / <i>OPERATIONAL HQ - CYBER</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	7.335	5.493	2.115	0.000	2.115	-	-	-	-	-	-
676002: <i>Cyber Systems Modernization</i>	-	7.335	5.493	2.115	0.000	2.115	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

Cyber Command and Control Mission System (C3MS) Mission Description: Provides the AFCYBER Commander with the tools necessary to effectively and efficiently plan, monitor, and execute missions in the cyber domain. This includes development and dissemination of Cyberspace Tasking Orders to ensure commander's intent is supported through the application of cyber forces using the latest intelligence. C3MS provides a common operational picture to maintain cyberspace threat activities and integrates cyberspace indications and warnings, analysis, and other actionable intelligence products into overall situational awareness, planning, and execution.

C3MS will continue modernization efforts based on a backlog of validated requirements to automate battle management capabilities and provide comprehensive cyber situational awareness. Developmental Activities include: machine-to-machine interfaces to dynamically interoperate with Air Operations Center (AOC) systems, enabling the 616 OC to conduct Command and Control (C2) and Situational Awareness (SA) at the operational level, publish AF Cyber Tasking Orders (CTOs), and quickly facilitate collaboration and mutual situational awareness; capabilities to present weapon system operators with near-real-time force location, mission, effect, and linked information, including a standardized, dynamic, map-based, situational awareness interface to display, manipulate, and manage units, missions, network elements, and effects; and multi-level security capabilities to support full-spectrum operations.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 0.000M was expended for civilian pay expenses in this program element, and in FY21 0.000M is forecasted for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification: PB 2022 Air Force</b>				<b>Date: May 2021</b>		
<b>Appropriation/Budget Activity</b> 3600: Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development		<b>R-1 Program Element (Number/Name)</b> PE 0208064F I OPERATIONAL HQ - CYBER				
<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	
Previous President's Budget	7.602	5.527	2.263	0.000	2.263	
Current President's Budget	7.335	5.493	2.115	0.000	2.115	
Total Adjustments	-0.267	-0.034	-0.148	0.000	-0.148	
• Congressional General Reductions	0.000	-0.010				
• Congressional Directed Reductions	0.000	0.000				
• Congressional Rescissions	0.000	0.000				
• Congressional Adds	0.000	0.000				
• Congressional Directed Transfers	0.000	0.000				
• Reprogrammings	0.000	0.000				
• SBIR/STTR Transfer	-0.267	0.000				
• Other Adjustments	0.000	-0.024	-0.148	0.000	-0.148	
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>			
<b>Title:</b> Cyber Command and Control Mission System (C3MS) Modernization	7.335	5.493	2.115			
<b>Description:</b> Perform development activities to automate processes and ingest & visualize data in support of Air Force specific cyber command and control requirements. Funding includes agile/continuous software development, test, and evaluation.						
<b>FY 2021 Plans:</b>						
- Develop automated battle management processes to define and provide cyber situational awareness to improve Air Force cyber command and control.						
- Develop multi-level security capabilities.						
- Develop man-to-machine interface to dynamically interoperate with Air Operations Center (AOC) systems.						
<b>FY 2022 Plans:</b>						
- Will continue development of automated battle management processes to define and provide cyber situational awareness to improve Air Force cyber command and control.						
- Will continue development of multi-level security capabilities.						
- Will continue development of man-to-machine interface to dynamically interoperate with Air Operations Center (AOC) systems.						
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b>						
Funding decreased from initial start up to stabilized software development activities.						
<b>Accomplishments/Planned Programs Subtotals</b>				7.335	5.493	2.115

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0208064F / OPERATIONAL HQ - CYBER
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**D. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• OPAF 03 831010: <i>Comsec Equipment</i>	9.582	0.000	0.000	-	0.000	-	-	-	-	-	-
• OPAF 03 834320: <i>C3 Countermeasures</i>	0.000	4.794	4.882	-	4.882	-	-	-	-	-	-

**Remarks**

Beginning in FY21 associated OPAF realigned from COMSEC Equipment WSC to C3 Countermeasures WSC for clarity in reporting.

**E. Acquisition Strategy**

The Cyber Command and Control Mission System (C3MS) weapon system program office will lead development of new capabilities to provide automated battle management capabilities to plan, monitor, and execute missions in the cyber domain. The program office will develop solutions based on a backlog of validated requirements. To meet these requirements, the C3MS program office will utilize various contractual vehicles when necessary, such as Government-Wide Acquisition Contract, Solutions for Enterprise-Wide Procurement IV, and General Services Administration Federal Supply Schedules, Network-Centric Solutions, Responsive Cyber Indefinite Delivery/Indefinite Quantity (IDIQ), Blanket Ordering Agreements (BOA) and competitive contract (if required). The use of multiple-award contractual vehicles will provide a wide range of commercially-available products and services that will be able to meet emerging requirements related to Air Force Cyber Command and Control.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208064F / OPERATIONAL HQ - CYB ER	<b>Project (Number/Name)</b> 676002 / Cyber Systems Modernization
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
C3MS Software Development	Various	Multiple : Various	-	5.935	Jan 2020	4.177	Jan 2021	1.315	Jan 2022	-		1.315	-	-	-
<b>Subtotal</b>			-	5.935		4.177		1.315		-		1.315	-	-	N/A

<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
C3MS Architecture and Modeling Support	Various	FFRDC : JBSA	-	1.000	Jan 2020	1.000	Jan 2021	-		-		-	-	-	-
<b>Subtotal</b>			-	1.000		1.000		-		-		-	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
C3MS Software Test and Evaluation	Various	Multiple : Various	-	0.400	Apr 2020	0.316	Apr 2021	0.800	Jun 2022	-		0.800	-	-	-
<b>Subtotal</b>			-	0.400		0.316		0.800		-		0.800	-	-	N/A

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>		-	7.335	5.493	2.115	-	-	2.115	N/A

**Remarks**  
C3MS Architecture and Modeling Support completes in FY21. Planned transition to Commercial Cloud Services (C2S) environment, incorporates requirement into C3MS Software Development contracts in future years.

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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208064F / OPERATIONAL HQ - CYB ER	<b>Project (Number/Name)</b> 676002 / Cyber Systems Modernization
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>Automated Battle Management and Cyber SA</b>	
Architecture and Modeling Support	
Software Development	
Test and Evaluation	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208064F / OPERATIONAL HQ - CYB ER	<b>Project (Number/Name)</b> 676002 / Cyber Systems Modernization

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>Automated Battle Management and Cyber SA</b>				
Architecture and Modeling Support	2	2020	4	2021
Software Development	2	2020	4	2022
Test and Evaluation	3	2020	4	2022



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**Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0208087F / <i>Distributed Cyber Warfare Operations</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	67.725	68.154	72.487	0.000	72.487	-	-	-	-	-	-
674540: <i>Cyber Tech Products - Payloads</i>	-	41.901	44.226	0.000	0.000	0.000	-	-	-	-	-	-
674541: <i>Cyber Tech Projects - Platforms</i>	-	14.189	8.378	0.000	0.000	0.000	-	-	-	-	-	-
674542: <i>Cyber Tech Projects - Access/Infrastructure</i>	-	11.635	15.550	0.000	0.000	0.000	-	-	-	-	-	-
674543: <i>AF Offensive Cyber Operations</i>	-	0.000	0.000	72.487	0.000	72.487	-	-	-	-	-	-

**Note**

In FY2020, PE 0305251F, Cyberspace Operations Forces and Force Support, Project 646008, US Cyber Command Technology Development efforts were transferred to PE 0208087F, Distributed Cyber Warfare Operations, Project 674540, Cyber Tech Products - Payloads, to consolidate prototyping and development of cyber payload capabilities.

**A. Mission Description and Budget Item Justification**

Distributed Cyber Warfare Operations (DCWO) provides advanced offensive cyber warfare capabilities to the 16th Air Force in direct support of US Cyber Command (USCYBERCOM), AF Major Commands (MAJCOMs), unified commands, and national agency cyber warfighting requirements. DCWO efforts directly support the Joint Network Attack Initial Capabilities Document (ICD), the National Military Strategy for Cyberspace Operations (NMS-CO), Department of Defense Cyber Strategy, USCYBERCOM operational directives, MAJCOM directive and guidance documentation, and other formal requirements documents in the delivery of offensive cyber effects.

Activities within the DCWO deliver operations-ready cyberspace superiority capabilities through the research, development, testing, evaluation, accelerated prototyping, demonstration, and fielding of advanced offensive cyber technologies and capabilities. The ongoing development of peculiar support equipment, facilities, operations, fielding, maintenance, and logistical support of fielded systems permits the rapid adaptation of current cyber capabilities to capitalize on emerging opportunities and mitigate adversary actions. This portfolio of capabilities permits Combatant Commanders the ability to operate in and through cyberspace to manipulate, disrupt, deny, degrade, or destroy targeted computers, information systems, or networks, and actively gather information from computers, information systems, and networks.

DCWO effectiveness comes from balancing three modular and interoperable elements necessary for the successful presentation of offensive cyber capabilities: Platforms, Access/Infrastructure, and Payloads. When unified, these three elements combine to form a cyber mission thread capable of delivering cyber effects to Combatant Commanders, to include cyber operational preparation of the environment, offensive counter-cyber, cyber-attack, electronic warfare operations, mission

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0208087F / <i>Distributed Cyber Warfare Operations</i>
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planning, intelligence, cybersecurity products and services and Command and Control/Situational Awareness (C2SA) tools needed to attack enemy networks, telephony, Integrated Air Defense Systems (IADS), command and control systems, and create cyber effects through the Electromagnetic Spectrum (EMS).

Efforts within DCWO may include the expedited development of innovative solutions for existing and emerging technologies required for the continued superiority within the cyber domain.

This program element may include necessary emergent or unanticipated civilian pay expenses required to manage, execute, and deliver Air Force Distributed Cyber Warfare Operations for emergent or unanticipated weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605829F.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	35.178	68.279	105.450	0.000	105.450
Current President's Budget	67.725	68.154	72.487	0.000	72.487
Total Adjustments	32.547	-0.125	-32.963	0.000	-32.963
• Congressional General Reductions	0.000	-0.125			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	35.000	0.000			
• SBIR/STTR Transfer	-2.453	0.000			
• Other Adjustments	0.000	0.000	-32.963	0.000	-32.963

**Change Summary Explanation**

Reprogramming occurred in FY2020, PE 0305251F, Cyberspace Operations Forces and Force Support, Project 646008, US Cyber Command Technology Development efforts were transferred to PE 0208087F, Distributed Cyber Warfare Operations, Project 674540, Cyber Tech Products - Payloads, to consolidate prototyping and development of cyber payload capabilities.

In FY2022, -32.963M from PE 0208087F, Distributed Cyber Warfare Operations - Robust Infrastructure development was realigned to the US Army as the designated program office for the Joint Cyber Access Platform (JCAP).

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0208087F / <i>Distributed Cyber Warfare Operations</i>				<b>Project (Number/Name)</b> 674540 / <i>Cyber Tech Products - Payloads</i>			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
674540: <i>Cyber Tech Products - Payloads</i>	-	41.901	44.226	0.000	0.000	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

In FY2020, PE 0305251F, Cyberspace Operations Forces and Force Support, Project 646008, US Cyber Command Technology Development efforts were transferred to PE 0208087F, Distributed Cyber Warfare Operations, Project 674540, Cyber Tech Products - Payloads, to consolidate prototyping and development of cyber payload capabilities.

In FY2022, PE 0208087F, Distributed Cyber Warfare Operations, Project 674540, Cyber Tech Products - Payloads efforts were transferred to PE 0208087F, Distributed Cyber Warfare Operations, Project 674543, AF Offensive Cyber Operations, to consolidate prototyping and development of offensive cyber operations capabilities.

**A. Mission Description and Budget Item Justification**

Distributed Cyber Warfare Operations (DCWO) conducts Research, Development, Testing and Evaluation (RDT&E) leading to operations-ready cyberspace superiority capabilities including the transition of efforts from laboratory, industry, and academia via studies, accelerated prototyping, and technology demonstrations. DCWO consists of a portfolio of programs and projects providing the rapid acquisition of operational cyber capabilities. DCWO effectiveness comes from balancing funding among three capability thrust areas required for cyber warfare operations: Air Force Platforms, Access and Payloads. The DCWO portfolio provides capabilities by combining these three areas to provide cyber effects to Combatant Commanders. Cyber payload capabilities and foundational tools are required to deliver cyber effects through the DCWO platform and access.

The payloads capability develops and fields cyber tools and payloads leveraging industry and other Government/non-Government mission partnered applications and programs.

Some aspects of the effort are classified and will be provided on a need to know basis. For further information please contact AFLCMC/HNCO, 210-925-6614.

This program element may include necessary emergent or unanticipated civilian pay expenses required to manage, execute, and deliver Air Force Distributed Cyber Warfare Operations for emergent or unanticipated weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605829F. In FY20 \$0.0M and in FY21 \$0.0M was expended for civilian pay expenses in this program element.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<b>Title:</b> Payloads	41.901	44.226	0.000	0.000	0.000

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208087F / <i>Distributed Cyber Warfare Operations</i>	<b>Project (Number/Name)</b> 674540 / <i>Cyber Tech Products - Payloads</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<p><b>Description:</b> The payloads capability develops and fields cyber tools and payloads leveraging industry and other Government/non-Government mission partnered applications and programs.</p> <p>Some aspects of the effort are classified and will be provided on a need to know basis. For further information please contact AFLCMC/HNCO, 210-925-6614.</p> <p><b>FY 2021 Plans:</b></p> <ul style="list-style-type: none"> <li>- Continue the development of cyber tools and payloads by leveraging industry and other government/non-Government mission partnered developed applications and programs.</li> <li>- Continue the development and transition of cyber tool and payload quick reaction capabilities for current and next-generation DCWO weapon systems supporting requirements from DCWO Mission Threads.</li> <li>- Continue to expand USCYBERCOM-funded efforts to produce prioritized family of foundational tools.</li> <li>- Continue to develop additional tool development software teams.</li> <li>- Continue to transition and integrate available prototype tool kits to DCWO portfolio.</li> <li>- Continue to deliver prototype tools into USCYBERCOM architecture to ensure interoperability.</li> <li>- Continue to develop automated testing and information assurance support tools.</li> </ul> <p><b>FY 2022 Base Plans:</b> Refer to Project Number 674543. - FY21 was last year to use Project# 674540. Project# 674540 was consolidated to New Project# 674543 starting in FY22.</p> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> N/A</p>					
<b>Accomplishments/Planned Programs Subtotals</b>	41.901	44.226	0.000	0.000	0.000

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208087F / <i>Distributed Cyber Warfare Operations</i>	<b>Project (Number/Name)</b> 674540 / <i>Cyber Tech Products - Payloads</i>

**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>			<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u>	
			<u>Base</u>	<u>OCO</u>	<u>Total</u>					<u>Complete</u>	<u>Total Cost</u>
• OPAF 03 Line Item 831010: <i>COMSEC Equipment</i>	2.790	0.000	0.000	0.000	0.000	-	-	-	-	-	-
• OPAF 03 Line Item 834320: <i>C3 Countermeasures</i>	25.036	18.782	0.000	0.000	0.000	-	-	-	-	-	-

**Remarks**

In FY21, all OPAF funds for the DCWO portfolio have been consolidated to Line Item 834320.

In FY22, all OPAF funds for the DCWO portfolio support Project# 674543.

**D. Acquisition Strategy**

The Distributed Cyber Warfare Operations program office will utilize Concept, Development, Risk Management, Production, or Deployment Plans as part of a streamlined approach to acquisition planning. All plans will contain sufficient information for the Milestone Decision Authority (MDA) to determine readiness to enter into the applicable phase of the acquisition process. Distributed Cyber Warfare Operations will utilize both new and existing contractual vehicles, such as Government-Wide Acquisition Contract (GWAC) vehicles (Alliant, Encore II, Solutions for Enterprise-Wide Procurement IV (SEWP IV)), and General Services Administration (GSA) Federal Supply Schedules and a Cyber Indefinite Delivery Indefinite Quantity (IDIQ) contract. The use of multiple-award contractual vehicles will provide a wide range of commercially-available products and services that should be able to meet many requirements related to Offensive Cyberspace Operations. These multiple-award contractual vehicles have already met the statutory requirements of the Competition in Contracting Act (CICA), which requires a fair opportunity to all contract holders, in accordance with Federal Acquisition Regulation (FAR) 16.505, unless an exception to fair opportunity applies.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208087F / <i>Distributed Cyber Warfare Operations</i>	<b>Project (Number/Name)</b> 674540 / <i>Cyber Tech Products - Payloads</i>
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Payload Development	Various	Various : Various	-	4.832	Nov 2019	4.613	Oct 2020	-		-		-	-	-	-
CMF Foundational Tool Development	Various	Various : Various	-	22.000	Jan 2020	27.284	Oct 2020	-		-		-	-	-	-
CMF Interoperability Development	Various	Various : Various	-	3.100	Feb 2020	3.800	Nov 2020	-		-		-	-	-	-
CMF Automated Test Development	Various	Various : Various	-	3.000	Jan 2020	3.700	Oct 2020	-		-		-	-	-	-
<b>Subtotal</b>			-	32.932		39.397		-		-		-	-	-	N/A

<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
DCA - Payloads and Effects	TBD	USAF : Hanscom AFB, MA	-	-		1.100	Oct 2020	-		-		-	-	-	-
<b>Subtotal</b>			-	-		1.100		-		-		-	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Payload Test and Evaluation	PO	47 CTS : San Antonio, TX	-	0.200	Dec 2019	0.154	Dec 2020	-		-		-	-	-	-
CMF Foundational Tool Testing	MIPR	47 CTS : San Antonio, TX	-	2.900	Jan 2020	0.600	Oct 2020	-		-		-	-	-	-
<b>Subtotal</b>			-	3.100		0.754		-		-		-	-	-	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208087F / <i>Distributed Cyber Warfare Operations</i>	<b>Project (Number/Name)</b> 674540 / <i>Cyber Tech Products - Payloads</i>
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<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PSC - Engineering & Technical Assistance Support Services (Various)	C/FFP	Various : San Antonio, TX	-	2.069	Apr 2020	1.118	Oct 2020	-		-		-	-	-	-
CMF Foundational Tool PSC (A&AS, FFRDC)	C/Various	Various : Various	-	3.800	Jan 2020	1.857	Oct 2020	-		-		-	-	-	-
<b>Subtotal</b>			-	5.869		2.975		-		-		-	-	-	N/A

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>		-	41.901	44.226	-	-	-	-	N/A

**Remarks**

In FY20, PE 0305251F, Cyberspace Operations Force and Force Support, Project 646008, US Cyber Command Technology Development efforts were transferred to PE 0208087F, Distributed Cyber Warfare Operations, Project 674540, Cyber Tech Projects - Payloads, to consolidate prototyping and development of cyber payload capabilities.

In FY22, PE 0208087F, Distributed Cyber Warfare Operations, Project 674540, Cyber Tech Products - Payloads efforts were transferred to PE 0208087F, Distributed Cyber Warfare Operations, Project 674543, AF Offensive Cyber Operations, to consolidate prototyping and development of offensive cyber operations capabilities.

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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208087F / <i>Distributed Cyber Warfare Operations</i>	<b>Project (Number/Name)</b> 674540 / <i>Cyber Tech Products - Payloads</i>

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>Neptune Rumble</b>																												
CMF Foundational Tool Development																												
Interoperability Development																												
Automated Test																												
<b>Saturn Crash</b>																												
Tool Development																												



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208087F / <i>Distributed Cyber Warfare Operations</i>	<b>Project (Number/Name)</b> 674540 / <i>Cyber Tech Products - Payloads</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>Neptune Rumble</b>				
CMF Foundational Tool Development	2	2020	4	2021
Interoperability Development	2	2020	4	2021
Automated Test	2	2020	4	2021
<b>Saturn Crash</b>				
Tool Development	1	2020	4	2021

**Note**

Neptune Rumble and Saturn Crash each develop payloads against a specific series of targets. These aspects are classified and will be provided on a need to know basis. For further information please contact AFLCMC/HNCO, 210-925-6614.

In FY2022, PE 0208087F, Distributed Cyber Warfare Operations, Project 674540, Cyber Tech Products - Payloads efforts were transferred to PE 0208087F, Distributed Cyber Warfare Operations, Project 674543, AF Offensive Cyber Operations, to consolidate prototyping and development of offensive cyber operations capabilities.

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208087F / <i>Distributed Cyber Warfare Operations</i>	<b>Project (Number/Name)</b> 674541 / <i>Cyber Tech Projects - Platforms</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
674541: <i>Cyber Tech Projects - Platforms</i>	-	14.189	8.378	0.000	0.000	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Note**

In FY2022, PE 0208087F, Distributed Cyber Warfare Operations, Project 674541, Cyber Tech Projects - Platforms efforts were transferred to PE 0208087F, Distributed Cyber Warfare Operations, Project 674543, AF Offensive Cyber Operations, to consolidate prototyping and development of offensive cyber operations capabilities.

**A. Mission Description and Budget Item Justification**

DCWO conducts Research, Development, Testing and Evaluation (RDT&E) leading to operations-ready cyberspace superiority capabilities including the transition of efforts from laboratory, industry, and academia via studies, accelerated prototyping, and technology demonstrations. DCWO consists of a portfolio of programs and projects providing the rapid acquisition of operational cyber capabilities. DCWO effectiveness comes from balancing funding among three capability thrust areas required for cyber warfare operations: Air Force Platforms, Access and Payloads. The DCWO portfolio provides capabilities by combining these three areas to provide cyber effects to Combatant Commanders. Cyber platforms serve as the primary operator interface in the DCWO portfolio and projects encompass hardware and software development.

The platform capability provides user interface and controls by leveraging industry and other Government/non-Government mission partners' applications and programs.

Some aspects of the effort are classified and will be provided on a need to know basis. For further information please contact AFLCMC/HNCO, 210-925-6614.

This program element may include necessary emergent or unanticipated civilian pay expenses required to manage, execute, and deliver Air Force Distributed Cyber Warfare Operations for emergent or unanticipated weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605829F. In FY20 0.0M and in FY21 0.0M was expended for civilian pay expenses in this program element.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<b>Title:</b> Platforms	14.189	8.378	0.000	0.000	0.000
<b>Description:</b> The Cyber Mission Platform (CMP) program is an ACAT III program of record that provides a modular, configurable framework for Cyber Operations. The CMP framework is currently being applied to offensive cyber operations and may also be applied to defensive cyber operations in the future as prioritized by CMP stakeholders. CMP uses an Agile acquisition strategy that allows the USAF to dynamically prioritize the delivery of operational capabilities. CMP develops capability enhancements on a regular cadence and delivers					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208087F / <i>Distributed Cyber Warfare Operations</i>	<b>Project (Number/Name)</b> 674541 / <i>Cyber Tech Projects - Platforms</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>them to operations based on operational need and acceptance timelines. The platform project also includes platform integration development activities necessary to integrate CMP into DCWO mission threads.</p> <p>Some aspects of the effort are classified and will be provided on a need to know basis. For further information please contact AFLCMC/HNCO, 210-925-6614.</p> <p><b>FY 2021 Plans:</b></p> <ul style="list-style-type: none"> <li>- Continue enhancements to the CMP Platform to satisfy prioritized requirements from USAF Distributed Cyber Warfare Operations Mission Threads.</li> <li>- Continue to conduct delta accreditation and fielding of updated CMP software.</li> <li>- Continue to execute a continuous delivery program structure.</li> </ul> <p><b>FY 2022 Base Plans:</b> Refer to Project Number 674543. - FY21 was last year to use Project# 674541. Project# 674541 was consolidated to New Project# 674543 starting in FY22.</p> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> N/A</p>					
<b>Accomplishments/Planned Programs Subtotals</b>	14.189	8.378	0.000	0.000	0.000

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• OPAF 03 Line Item 831010: <i>COMSEC Equipment</i>	2.790	0.000	0.000	0.000	0.000	-	-	-	-	-	-
• OPAF 03 Line Item 834320: <i>C3 Countermeasures</i>	25.036	18.782	0.000	0.000	0.000	-	-	-	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208087F / <i>Distributed Cyber Warfare Operations</i>	<b>Project (Number/Name)</b> 674541 / <i>Cyber Tech Projects - Platforms</i>

**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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**Remarks**

In FY21, all OPAF funds for the DCWO portfolio have been consolidated to Line Item 834320.

In FY22, all OPAF funds for the DCWO portfolio support Project# 674543.

**D. Acquisition Strategy**

The Distributed Cyber Warfare Operations program office will utilize Concept, Development, Risk Management, Production, or Deployment Plans as part of a streamlined approach to acquisition planning. All plans will contain sufficient information for the Milestone Decision Authority (MDA) to determine readiness to enter into the applicable phase of the acquisition process. Distributed Cyber Warfare Operations will utilize both new and existing contractual vehicles, such as Government-Wide Acquisition Contract (GWAC) vehicles (Alliant, Encore II, Solutions for Enterprise-Wide Procurement IV (SEWP IV)), and General Services Administration (GSA) Federal Supply Schedules and a Cyber Indefinite Delivery Indefinite Quantity (IDIQ) contract. The use of multiple-award contractual vehicles will provide a wide range of commercially-available products and services that should be able to meet many requirements related to Offensive Cyberspace Operations. These multiple-award contractual vehicles have already met the statutory requirements of the Competition in Contracting Act (CICA), which requires a fair opportunity to all contract holders, in accordance with Federal Acquisition Regulation (FAR) 16.505, unless an exception to fair opportunity applies.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208087F / <i>Distributed Cyber Warfare Operations</i>	<b>Project (Number/Name)</b> 674541 / <i>Cyber Tech Projects - Platforms</i>
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Platform Development	C/Various	Various : Various	-	11.104	Nov 2019	4.303	Nov 2020	-		-		-	-	-	-
<b>Subtotal</b>			-	11.104		4.303		-		-		-	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Platform Test and Evaluation	PO	47 CTS : San Antonio, TX	-	0.750	Dec 2019	0.150	Dec 2020	-		-		-	-	-	-
<b>Subtotal</b>			-	0.750		0.150		-		-		-	-	-	N/A

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PSC - Advisory & Assistance Services (A&AS & FFRDC Support)	C/Various	Various : San Antonio, TX	-	2.335	Oct 2019	3.925	Oct 2020	-		-		-	-	-	-
<b>Subtotal</b>			-	2.335		3.925		-		-		-	-	-	N/A

			Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>			-	14.189	8.378	-	-	-	-	-	N/A

**Remarks**  
 In FY2022, PE 0208087F, Distributed Cyber Warfare Operations, Project 674541, Cyber Tech Projects - Platforms efforts were transferred to PE 0208087F, Distributed Cyber Warfare Operations, Project 674543, AF Offensive Cyber Operations, to consolidate prototyping and development of offensive cyber operations capabilities.

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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208087F / <i>Distributed Cyber Warfare Operations</i>	<b>Project (Number/Name)</b> 674541 / <i>Cyber Tech Projects - Platforms</i>

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>Cyber Mission Platform (CMP)</b>	
CMP-H (Incrementally Delivered Each Quarter)	████████████████████
Build Infrastructure Tracking System (BITS)	████████████████████

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208087F / <i>Distributed Cyber Warfare Operations</i>	<b>Project (Number/Name)</b> 674541 / <i>Cyber Tech Projects - Platforms</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>Cyber Mission Platform (CMP)</b>				
CMP-H (Incrementally Delivered Each Quarter)	1	2020	4	2021
Build Infrastructure Tracking System (BITS)	1	2020	4	2021

**Note**

In FY2022, PE 0208087F, Distributed Cyber Warfare Operations, Project 674541, Cyber Tech Projects - Platforms efforts were transferred to PE 0208087F, Distributed Cyber Warfare Operations, Project 674543, AF Offensive Cyber Operations, to consolidate prototyping and development of offensive cyber operations capabilities.

Each project delivers increments on a quarterly frequency. Increments 12 thru 20 are planned through FY 2022.

- Neptune Shield transitioned to sustainment.
- BITS realigned as platform development

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208087F / <i>Distributed Cyber Warfare Operations</i>	<b>Project (Number/Name)</b> 674542 / <i>Cyber Tech Projects - Access/Infrastructure</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
674542: <i>Cyber Tech Projects - Access/Infrastructure</i>	-	11.635	15.550	0.000	0.000	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Note**

In FY2022, PE 0208087F, Distributed Cyber Warfare Operations, Project 674542, Cyber Tech Projects - Access/Infrastructure efforts were transferred to PE 0208087F, Distributed Cyber Warfare Operations, Project 674543, AF Offensive Cyber Operations, to consolidate prototyping and development of offensive cyber operations capabilities.

**A. Mission Description and Budget Item Justification**

Distributed Cyber Warfare Operations (DCWO) conducts Research, Development, Testing and Evaluation (RDT&E) leading to operations-ready cyberspace superiority capabilities including the transition of efforts from laboratory, industry, and academia via studies, accelerated prototyping, and technology demonstrations. DCWO consists of a portfolio of programs and projects providing the rapid acquisition of operational cyber capabilities. DCWO effectiveness comes from balancing funding among three capability thrust areas required for cyber warfare operations: Air Force Platforms, Access and Payloads. The DCWO portfolio provides capabilities by combining these three areas to provide cyber effects to Combatant Commanders. Cyber access capabilities enables a variety of DCWO missions and projects encompass hardware and software development.

The Access capability provides connectivity and required infrastructure by leveraging industry and other Government/non-Government mission partners' applications and programs.

Some aspects of the effort are classified and will be provided on a need to know basis. For further information please contact AFLCMC/HNCO, 210-925-6614.

This program element may include necessary emergent or unanticipated civilian pay expenses required to manage, execute, and deliver Air Force Distributed Cyber Warfare Operations for emergent or unanticipated weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605829F. In FY20 0.0M and in FY21 0.0M was expended for civilian pay expenses in this program element.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<b>Title:</b> Access	11.635	15.550	0.000	0.000	0.000
<b>Description:</b> The Access capability provides connectivity and required infrastructure by leveraging industry and other Government/non-Government mission partners' applications and programs.					



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208087F / <i>Distributed Cyber Warfare Operations</i>	<b>Project (Number/Name)</b> 674542 / <i>Cyber Tech Projects - Access/Infrastructure</i>

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
- Some aspects of the effort are classified and will be provided on a need to know basis. For further information please contact AFLCMC/HNCO, 210-925-6614.					
<b>FY 2021 Plans:</b> - Continue to develop Air Force unique connectivity and required infrastructures across multiple spectrums leveraging industry and other Government/non-Government mission partner's applications and programs.  - Continue to develop and transition Offensive Cyber Operations (OCO) quick reaction capabilities for next-generation DCWO weapon system supporting requirements from DCWO Mission Threads.					
<b>FY 2022 Base Plans:</b> Refer to Project Number 674543. - FY21 was last year to use Project# 674542. Project# 674542 was consolidated to New Project# 674543 starting in FY22.					
<b>FY 2022 OCO Plans:</b> N/A					
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> N/A					
<b>Accomplishments/Planned Programs Subtotals</b>	11.635	15.550	0.000	0.000	0.000

**C. Other Program Funding Summary (\$ in Millions)**

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• OPAF 03 Line Item 831010: <i>COMSEC Equipment</i>	2.790	0.000	0.000	0.000	0.000	-	-	-	-	-	-
• OPAF 03 Line Item 834320: <i>C3 Countermeasures</i>	25.036	18.782	0.000	0.000	0.000	-	-	-	-	-	-

**Remarks**

In FY21, all OPAF funds for the DCWO portfolio have been consolidated to Line Item 834320.

In FY22, all OPAF funds for the DCWO portfolio support Project# 674543.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208087F / <i>Distributed Cyber Warfare Operations</i>	<b>Project (Number/Name)</b> 674542 / <i>Cyber Tech Projects - Access/ Infrastructure</i>

**D. Acquisition Strategy**

The Distributed Cyber Warfare Operations program office will utilize Concept, Development, Risk Management, Production, or Deployment Plans as part of a streamlined approach to acquisition planning. All plans will contain sufficient information for the Milestone Decision Authority (MDA) to determine readiness to enter into the applicable phase of the acquisition process. Distributed Cyber Warfare Operations will utilize both new and existing contractual vehicles, such as Government-Wide Acquisition Contract (GWAC) vehicles (Alliant, Encore II, Solutions for Enterprise-Wide Procurement IV (SEWP IV)), and General Services Administration (GSA) Federal Supply Schedules and a Cyber Indefinite Delivery Indefinite Quantity (IDIQ) contract. The use of multiple-award contractual vehicles will provide a wide range of commercially-available products and services that should be able to meet many requirements related to Offensive Cyberspace Operations. These multiple-award contractual vehicles have already met the statutory requirements of the Competition in Contracting Act (CICA), which requires a fair opportunity to all contract holders, in accordance with Federal Acquisition Regulation (FAR) 16.505, unless an exception to fair opportunity applies.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
3600 / 7				PE 0208087F / Distributed Cyber Warfare Operations				674542 / Cyber Tech Projects - Access/Infrastructure							
Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Access Development	Various	Various : Various	-	6.512	Nov 2019	11.534	Nov 2020	-		-		-	-	-	-
<b>Subtotal</b>			-	6.512		11.534		-		-		-	-	-	N/A
Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
DCA - Access Development	TBD	USAF : Hanscom AFB, MA	-	-		1.600	Oct 2020	-		-		-	-	-	-
<b>Subtotal</b>			-	-		1.600		-		-		-	-	-	N/A
Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Access Test and Evaluation	PO	47 CTS : San Antonio, TX	-	0.760	Dec 2019	0.255	Dec 2020	-		-		-	-	-	-
<b>Subtotal</b>			-	0.760		0.255		-		-		-	-	-	N/A
Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
PSC - Acquisition Support (Various)	Various	Various : San Antonio, TX	-	4.363	Oct 2019	2.161	Oct 2020	-		-		-	-	-	-
<b>Subtotal</b>			-	4.363		2.161		-		-		-	-	-	N/A
<b>Project Cost Totals</b>			-	11.635		15.550		-		-		-	-	-	N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2022 Air Force							<b>Date:</b> May 2021			
<b>Appropriation/Budget Activity</b> 3600 / 7			<b>R-1 Program Element (Number/Name)</b> PE 0208087F / <i>Distributed Cyber Warfare Operations</i>			<b>Project (Number/Name)</b> 674542 / <i>Cyber Tech Projects - Access/Infrastructure</i>				
	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>	

**Remarks**  
 In FY2022, PE 0208087F, Distributed Cyber Warfare Operations, Project 674542, Cyber Tech Projects - Access/Infrastructure efforts were transferred to PE 0208087F, Distributed Cyber Warfare Operations, Project 674543, AF Offensive Cyber Operations, to consolidate prototyping and development of offensive cyber operations capabilities.

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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2022 Air Force			<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208087F / <i>Distributed Cyber Warfare Operations</i>	<b>Project (Number/Name)</b> 674542 / <i>Cyber Tech Projects - Access/Infrastructure</i>	

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b><i>Hydra - AF Unique Access</i></b>	
Development	
<b><i>Next-Gen Network Attack</i></b>	
Development	
<b><i>Coral Series - AF Infrastructure</i></b>	
Development	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208087F / <i>Distributed Cyber Warfare Operations</i>	<b>Project (Number/Name)</b> 674542 / <i>Cyber Tech Projects - Access/Infrastructure</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>Hydra - AF Unique Access</b>				
Development	1	2020	4	2021
<b>Next-Gen Network Attack</b>				
Development	1	2020	4	2021
<b>Coral Series - AF Infrastructure</b>				
Development	1	2020	4	2021

**Note**

Ongoing development to provide continuously updated access for D5 operations.

- Cloud Network Transport System (CNeTS) transitioned to sustainment.
- Neptune Zephyr no longer under developed in DCWO portfolio.
- Build Infrastructure Tracking Systems(BITS) development transferred to Platforms thrust under Project #674543.
  
- Robust Infrastructure expansion transferred to US Army as MDA for Joint Cyber Access Platform (JCAP).

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0208087F / <i>Distributed Cyber Warfare Operations</i>				<b>Project (Number/Name)</b> 674543 / <i>AF Offensive Cyber Operations</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
674543: <i>AF Offensive Cyber Operations</i>	-	0.000	0.000	72.487	0.000	72.487	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

In FY2022, PE 0208087F, Distributed Cyber Warfare Operations, Project 674540, Cyber Tech Products - Payloads; Project 674541, Cyber Tech Projects - Platforms; and Project 674542, Cyber Tech Projects - Access/Infrastructure efforts were all transferred to PE 0208087F, Distributed Cyber Warfare Operations, Project 674543, AF Offensive Cyber Operations, to consolidate prototyping and development of offensive cyber operations capabilities.

**A. Mission Description and Budget Item Justification**

Distributed Cyber Warfare Operations (DCWO) conducts Research, Development, Testing and Evaluation (RDT&E) leading to operations-ready cyberspace superiority capabilities including the transition of efforts from laboratory, industry, and academia via studies, accelerated prototyping, and technology demonstrations. DCWO consists of a portfolio of programs and projects providing the rapid acquisition of operational cyber capabilities. DCWO effectiveness comes from balancing funding among three capability thrust areas required for cyber warfare operations: Air Force Platforms, Access and Payloads. The DCWO portfolio provides capabilities by combining these three areas to provide cyber effects to Combatant Commanders.

The platform capability provides user interface and controls, the access/infrastructure capability provides connectivity and the payloads capability develops and fields cyber tools and payloads all leveraging industry and other Government/non-Government mission partnered applications and programs.

Some aspects of the effort are classified and will be provided on a need to know basis. For further information please contact AFLCMC/HNCO, 210-925-6614.

This program element may include necessary emergent or unanticipated civilian pay expenses required to manage, execute, and deliver Air Force Distributed Cyber Warfare Operations for emergent or unanticipated weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605829F. In FY20 0.0M and in FY21 0.0M was expended for civilian pay expenses in this program element.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<b>Title:</b> AF Cyber Mission Platform (CMP)	0.000	0.000	16.767	0.000	16.767
<b>Description:</b> The Cyber Mission Platform (CMP) program is an ACAT III program of record that provides a modular, configurable framework for Cyber Operations. The CMP framework is currently being applied to offensive cyber operations and may also be applied to defensive cyber operations in the future as prioritized by CMP stakeholders. CMP uses an Agile acquisition strategy that allows the USAF to dynamically prioritize the					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208087F / <i>Distributed Cyber Warfare Operations</i>	<b>Project (Number/Name)</b> 674543 / <i>AF Offensive Cyber Operations</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<p>delivery of operational capabilities. CMP develops capability enhancements on a regular cadence and delivers them to operations based on operational need and acceptance timelines. The platform project also includes platform integration development activities necessary to integrate CMP into DCWO mission threads.</p> <p>Some aspects of the effort are classified and will be provided on a need to know basis. For further information please contact AFLCMC/HNCO, 210-925-6614.</p> <p><b>FY 2021 Plans:</b> N/A</p> <p><b>FY 2022 Base Plans:</b> - Will continue enhancements to the CMP Platform to satisfy prioritized requirements from USAF Distributed Cyber Warfare Operations Mission Threads.</p> <p>- Will continue to conduct delta accreditation and fielding of updated CMP software.</p> <p>- Will continue to execute a continuous delivery program structure.</p> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increased funding will deliver capabilities to remote cyber operations squadrons and upgrade weapons system infrastructure to cloud and cross domain solution (CDS) services framework. This modernization addresses data flow issues with aging CDS and supports integration in DoD elements such as Unified Platform and big data platforms.</p>					
<p><b>Title:</b> Access/Infrastructure</p> <p><b>Description:</b> The Access capability provides connectivity and required infrastructure by leveraging industry and other Government/non-Government mission partners' applications and programs.</p> <p>- Some aspects of the effort are classified and will be provided on a need to know basis. For further information please contact AFLCMC/HNCO, 210-925-6614.</p> <p><b>FY 2021 Plans:</b></p>	-	0.000	14.574	0.000	14.574



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208087F / <i>Distributed Cyber Warfare Operations</i>	<b>Project (Number/Name)</b> 674543 / <i>AF Offensive Cyber Operations</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
N/A					
<p><b>FY 2022 Base Plans:</b></p> <ul style="list-style-type: none"> <li>- Will continue to develop Air Force unique connectivity and required infrastructures across multiple spectrums leveraging industry and other Government/non-Government mission partner's applications and programs.</li> <li>- Will continue to develop and transition Offensive Cyber Operations (OCO) quick reaction capabilities for next-generation DCWO weapon system supporting requirements from DCWO Mission Threads.</li> <li>- Will begin to develop and transition data analytic tools supporting access capabilities.</li> </ul> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> N/A</p>					
<p><b>Title:</b> Payloads</p> <p><b>Description:</b> The payloads capability develops and fields cyber tools and payloads leveraging industry and other Government/non-Government mission partnered applications and programs.</p> <ul style="list-style-type: none"> <li>- Some aspects of the effort are classified and will be provided on a need to know basis. For further information please contact AFLCMC/HNCO, 210-925-6614.</li> </ul> <p><b>FY 2021 Plans:</b> N/A</p> <p><b>FY 2022 Base Plans:</b></p> <ul style="list-style-type: none"> <li>- Will continue the development of cyber tools and exploits by leveraging industry and other government/non-Government mission partnered developed applications and programs.</li> <li>- Will continue to expand USCYBERCOM-funded efforts to produce prioritized family of foundational tools.</li> </ul> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b></p>	0.000	0.000	41.146	0.000	41.146

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208087F / <i>Distributed Cyber Warfare Operations</i>	<b>Project (Number/Name)</b> 674543 / <i>AF Offensive Cyber Operations</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
N/A					
<b>Accomplishments/Planned Programs Subtotals</b>	0.000	0.000	72.487	0.000	72.487

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• OPAF 03 Line Item 834320: <i>C3 Countermeasures</i>	0.000	0.000	16.848	0.000	16.848	-	-	-	-	-	-

**Remarks**  
In FY21, all OPAF funds for the DCWO portfolio have been consolidated to Line Item 834320.

**D. Acquisition Strategy**  
The Distributed Cyber Warfare Operations program office will utilize Concept, Development, Risk Management, Production, or Deployment Plans as part of a streamlined approach to acquisition planning. All plans will contain sufficient information for the Milestone Decision Authority (MDA) to determine readiness to enter into the applicable phase of the acquisition process. Distributed Cyber Warfare Operations will utilize both new and existing contractual vehicles, such as Government-Wide Acquisition Contract (GWAC) vehicles (Alliant, Encore II, Solutions for Enterprise-Wide Procurement IV (SEWP IV)), and General Services Administration (GSA) Federal Supply Schedules and a Cyber Indefinite Delivery Indefinite Quantity (IDIQ) contract. The use of multiple-award contractual vehicles will provide a wide range of commercially-available products and services that should be able to meet many requirements related to Offensive Cyberspace Operations. These multiple-award contractual vehicles have already met the statutory requirements of the Competition in Contracting Act (CICA), which requires a fair opportunity to all contract holders, in accordance with Federal Acquisition Regulation (FAR) 16.505, unless an exception to fair opportunity applies.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208087F / <i>Distributed Cyber Warfare Operations</i>	<b>Project (Number/Name)</b> 674543 / <i>AF Offensive Cyber Operations</i>
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Platform Development	Various	Various : Various	-	-		-		12.500	Nov 2021	-		12.500	-	-	-
Access Development	Various	Various : Various	-	-		-		10.419	Nov 2021	-		10.419	-	-	-
Payload Development	Various	Various : Various	-	-		-		34.446	Nov 2021	-		34.446	-	-	-
<b>Subtotal</b>			-	-		-		57.365		-		57.365	-	-	N/A

<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
DCA - AF Offensive Cyber Operations Development	TBD	USAF : Hanscom AFB, MA	-	-		-		2.360	Oct 2021	-		2.360	-	-	-
<b>Subtotal</b>			-	-		-		2.360		-		2.360	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Platform Test and Evaluation	PO	47 CTS : San Antonio, TX	-	-		-		0.300	Dec 2021	-		0.300	-	-	-
Access Test and Evaluation	PO	47 CTS : San Antonio, TX	-	-		-		0.308	Dec 2021	-		0.308	-	-	-
Payload Test and Evaluation	PO	47 CTS : San Antonio, TX	-	-		-		2.492	Dec 2021	-		2.492	-	-	-
<b>Subtotal</b>			-	-		-		3.100		-		3.100	-	-	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208087F / <i>Distributed Cyber Warfare Operations</i>	<b>Project (Number/Name)</b> 674543 / <i>AF Offensive Cyber Operations</i>
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<b>Management Services (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
PSC - Acquisition Support (Various)	Various	Various : San Antonio, TX	-	-		-		9.662	Nov 2021	-		9.662	-	-	-
<b>Subtotal</b>			-	-		-		9.662		-		9.662	-	-	N/A
<b>Project Cost Totals</b>			-	-		0.000		72.487		-		72.487	-	-	N/A

**Remarks**  
 In FY2022, PE 0208087F, Distributed Cyber Warfare Operations, Project 674540, Cyber Tech Products - Payloads, Project 674541, Cyber Tech Projects - Platforms, and Project 674542, Cyber Tech Projects - Access/Infrastructure efforts were transferred to PE 0208087F, Distributed Cyber Warfare Operations, Project 674543, AF Offensive Cyber Operations, to consolidate prototyping and development of offensive cyber operations capabilities.

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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208087F / <i>Distributed Cyber Warfare Operations</i>	<b>Project (Number/Name)</b> 674543 / <i>AF Offensive Cyber Operations</i>

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>Cyber Mission Platform (CMP)</b>	
CMP-H (Incrementally Delivered Each Quarter)	██████████
Build Infrastructure Tracking System (BITS)	██████████
<b>Access/Infrastructure</b>	
Hydra - AF Unique Access	██████████
Next-Gen Network Attack	██████████
Data Analytics	██████████
<b>Payloads</b>	
Payloads - Neptune Rumble	██████████
Payloads - Saturn Crash	██████████

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208087F / <i>Distributed Cyber Warfare Operations</i>	<b>Project (Number/Name)</b> 674543 / <i>AF Offensive Cyber Operations</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>Cyber Mission Platform (CMP)</b>				
CMP-H (Incrementally Delivered Each Quarter)	1	2022	4	2022
Build Infrastructure Tracking System (BITS)	1	2022	3	2022
<b>Access/Infrastructure</b>				
Hydra - AF Unique Access	1	2022	4	2022
Next-Gen Network Attack	1	2022	4	2022
Data Analytics	1	2022	4	2022
<b>Payloads</b>				
Payloads - Neptune Rumble	1	2022	4	2022
Payloads - Saturn Crash	1	2022	4	2022

**Note**

Cyber Mission Platform (Delivers increments on a quarterly frequency)

- Increments 12 thru 15 are planned through FY 2022
- Cloud Network Transport System (CNeTS) transitioned to sustainment.
- Neptune Zephyr is no longer under development in the AF DCWO portfolio, efforts transition to US Army as the Joint Cyber Access Platform (JCAP) program office.
- BITS realigned as a platform project and will transition to sustainment in FY22.

Access/Infrastructures:

- DCWO Infrastructure is no longer under development in the AF DCWO portfolio, efforts transition to US Army as the JCAP program office.
- Access projects are classified and will be provided on a need to know basis. For further information please contact AFLCMC/HNCO, 210-925-6614.

Payloads

- Neptune Rumble and Saturn Crash each develop payloads against a specific series of targets.
- Payload projects are classified and will be provided on a need to know basis. For further information please contact AFLCMC/HNCO, 210-925-6614.

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0208088F / <i>AF Defensive Cyberspace Operations</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	37.309	30.108	18.449	0.000	18.449	-	-	-	-	-	-
677820: <i>Computer Security RDTE: Firestarter</i>	-	24.413	21.467	8.527	0.000	8.527	-	-	-	-	-	-
677821: <i>Cyberspace Vulnerability Assessment</i>	-	11.350	7.015	8.288	0.000	8.288	-	-	-	-	-	-
677822: <i>Cyber Defense Analysis</i>	-	0.265	0.279	0.281	0.000	0.281	-	-	-	-	-	-
677823: <i>AFCERT</i>	-	1.281	1.347	1.353	0.000	1.353	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

AF Defensive Cyberspace Operations (AF DCO) provides defensive cyber capabilities that protect the AFNET and DoD network enclaves, to include their associated computer systems, software applications and sensitive operational information against unauthorized intrusion, corruption, and/or destruction. The emphasis of the program is directed toward defensive cyberspace capabilities, computer and network systems security, damage assessment and recovery, cyber threat recognition, attribution, and mitigation, and active response methodologies in response to evolving threats and changes to cyber environment. These areas of emphasis are realized through research and development, test and acquisition in the areas of proactive defense, defensive counter cyberspace, cyberspace intelligence, surveillance and reconnaissance, command and control situational awareness, persistent network operations, as well as decision support, recovery, and digital forensics.

Firestarter utilizes cyber and Information Assurance (IA) technology investments by US Cyber Command, the Defense Advanced Research Projects Agency (DARPA), the National Security Agency (NSA), Director of National Intelligence (DNI), Intelligence Advanced Research Projects Activity (IARPA), the Department of Homeland Security (DHS), and various government research laboratories, to jump-start its development of solutions to existing Air Force cyber and IA requirements. This program supports AF Cyberspace strategic direction in support of Cyber Defense which provides capabilities to 16th AF, as AF component to US Cyber Command (USCYBERCOM), Defense Information Systems Agency (DISA), National Security Agency (NSA), and other services to ensure Global Information Grid (GIG) cyber and IA requirements are being met. Activities performed include those designed to identify, analyze, test, rapidly acquire, and integrate emerging IA and cyber technology and defensive cyberspace weapons systems and capabilities into all regions of the GIG - terrestrial, airborne, and space systems. In addition, this effort will support implementation of DoD Enterprise-wide IA & Computer Network Defense (CND) Solutions Steering Group (ESSG) solutions. Current Air Force systems, such as the AFNET NIPRNet Gateways, SIPRNet Modernization program, and Host Based Security System leverage this technology to meet their information assurance and defensive cyberspace needs/requirements.

Cyberspace Vulnerability Assessment/Hunter Team (CVA/H) weapon system develops new capabilities to provide Air Force Cyber Command (AFCYBER) and Combatant Commanders additional mobile precision in addition to currently fielded protection capabilities to identify, pursue, and mitigate cyberspace threats. The CVA/H weapon system performs defensive sorties world-wide via remote or on-site access. CVA/H executes vulnerability, compliance, defense and non-technical assessments, best practice reviews, penetration testing, and Hunter missions of AF and DoD networks and systems. Hunter operations characterize and then eliminate threats for the purpose of mission assurance. The Hunter mission focuses on the capability to find, fix, track, target, engage, and assess (F2T2EA) the advanced

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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Air Force Date: May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0208088F / <i>AF Defensive Cyberspace Operations</i>
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persistent threat (APT). This effort funds the development efforts to enhance command and control situational awareness and to expand the capability of the current weapon system to meet the scope and scale of USCYBERCOM directed Cyber Protection Teams and AF Mission Defense Teams.

Cyberspace Defense Analysis (CDA) is an assessment of non-secure telecommunications to determine type and amount of sensitive and/or classified information that may have been disclosed to our adversaries and encompasses several mission subsets, including: Telephony Communications, Radio Frequency (RF) Communications, Email Communications, Internet based Capabilities (IbC), and Cyber Operations Risk Assessment (CORA). CDA is the cyberspace weapon system that is used to conduct assessments during peace time and contingency operations. The CDA weapon system protects the AF's critical information such as PII, OPSEC, and other sensitive information through passive monitoring and active Data Loss Protection (DLP). CDA shows its true capability in the force protection realm and helps ensure our adversaries are not provided early warning of our plans, capabilities, or limitations. Continued funding is essential in developing new capabilities to combat the rapidly evolving cyber threat.

Cyberspace Defense Analysis (CDA): The CDA weapon system conducts Defensive Cyberspace Operations (DCO) and network defense by monitoring, collecting, analyzing, and reporting sensitive information transiting or residing on the AFNet. Without proper funding the CDA Operators will not be able to determine potential impacts and operational adjustments resulting from information disclosures or identify compromised information from network intrusions. There will be a decreased assurance of network defense and an increase in the amount of lost PII, OPSEC, and other sensitive information. The CDA mission subsets include: Telephony Communications, Radio Frequency (RF) Communications, Email Communications, Internet based Capabilities (IbC), and Cyber Operations Risk Assessment (CORA). CDA is the cyberspace weapon system that is used to conduct assessments during peace time and contingency operations. CDA shows its true capability in the force protection realm, OPSEC, Data Loss Prevention, etc. and helps ensure our adversaries are not provided early warning of our plans, capabilities, or limitations. Continuing funding is essential in developing new capabilities to combat the rapidly evolving cyber threats.

The Cyberspace Defense Analysis (CDA) weapon system must development new capabilities to provide additional information protection capabilities to monitor, collect, analyze, and report cyberspace threats and identify compromised data. These capabilities encompass the support to OPSEC protection and Data Loss Prevention. The CDA program will utilize various contractual vehicles when necessary such as Solutions for Enterprise-Wide Procurement IV (SEWP IV), General Services Administration (GSA) Federal Supply Schedules, Network-Centric Solutions (NETCENTS), and other competitive contracts (if required). The use of multiple-award contractual vehicles provide access to a wide range of commercially-available products and services required to meet Defensive Cyber Operations requirements related to combat the rapidly evolving cyber threats.

The AF Cyberspace Defense (ACD) weapon system is designed to prevent, detect, and respond to adversarial penetration into AF unclassified and classified networks. ACD supports Air Force and Combatant Commanders by conducting synchronized Defensive Cyber Operations (DCO) and providing 24/7/365 monitoring and defense of USAF and US Central Command Secure/Non-secure Internet Protocol Router Network (SIPRNET/NIPRNET) systems against hostile attack. Daily intrusions to the AF network are analyzed in a forensics manner to identify a multitude of counter defensive and defensive tools and techniques that are required to truly strengthen cyber security. The Air Force Research Laboratory (AFRL), Air Force CyberWorx and other Federal R&D entities often have cutting edge solutions, that, with Research and Development funding, can be taken to the technology readiness level (TRL) needed for rapid deployment as new capability to counter critical cyber weapon system vulnerabilities. Funding for this effort will focus on development of capability, capacity, and potential modifications to increase the utility of the ACD weapon system to the warfighter as well as testing requirements for new capabilities.



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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0208088F / <i>AF Defensive Cyberspace Operations</i>
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Activities include studies and analysis to support both current program planning and execution and future program planning.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0.075M was expended for civilian pay expenses in this program element, and in FY21 \$0.103M is forecasted for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	38.609	15.165	18.726	0.000	18.726
Current President's Budget	37.309	30.108	18.449	0.000	18.449
Total Adjustments	-1.300	14.943	-0.277	0.000	-0.277
• Congressional General Reductions	0.000	-0.055			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	15.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-1.300	0.000			
• Other Adjustments	0.000	-0.002	-0.277	0.000	-0.277

**Congressional Add Details (\$ in Millions, and Includes General Reductions)**

**Project:** 677820: *Computer Security RDTE: Firestarter*

    Congressional Add: *Critical Infrastructure Cyber Security*

    Congressional Add: *Cyber Resilient Space Architecture*

Congressional Add Subtotals for Project: 677820

Congressional Add Totals for all Projects

	<b>FY 2020</b>	<b>FY 2021</b>
	10.000	15.000
	12.000	-
Congressional Add Subtotals for Project: 677820	22.000	15.000
Congressional Add Totals for all Projects	22.000	15.000

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0208088F / AF Defensive Cyberspace Operations				<b>Project (Number/Name)</b> 677820 / Computer Security RDTE: Firestarter			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
677820: Computer Security RDTE: Firestarter	-	24.413	21.467	8.527	0.000	8.527	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Firestarter program provides newly improved capabilities and technical transition opportunities for Cyber Defense and Information Assurance (IA) technologies and tools needed to defend Air Force Command, Control, Communications, Computer, and Intelligence (C4I) systems from cyber attacks, while ensuring recovery in the event of an attack. The emphasis of the program is directed toward defensive cyberspace capabilities; computer and network systems security; damage assessment and recovery; cyber threat recognition, attribution, and mitigation; and active response methodologies in response to evolving threats and changes to cyber environment. These areas of emphasis are realized through research and development, test and acquisition in the areas of proactive defense, defensive counter cyberspace, cyberspace intelligence, surveillance and reconnaissance & situational awareness, persistent network operations, as well as decision support, recovery, and digital forensics. Current Air Force systems, such as the AFNET NIPRNet Gateways, SIPRNet Modernization program, and Host Based Security System leverage this technology to meet their information assurance and defensive cyberspace needs/requirements.

Firestarter utilizes cyber and IA technology investments by US Cyber Command, the Defense Advanced Research Projects Agency (DARPA), the National Security Agency (NSA), Director of National Intelligence (DNI), Intelligence Advanced Research Projects Activity (IARPA), and the Department of Homeland Security (DHS), and various government research laboratories, to jump-start its development of solutions to existing Air Force cyber and IA requirements. This program supports AF Cyberspace strategic direction in support of Cyber Defense which provides capabilities to 16th AF, as AF component to US Cyber Command (USCYBERCOM), Defense Information Systems Agency (DISA), National Security Agency (NSA), and other services to ensure Global Information Grid (GIG) cyber and IA requirements are being met. Activities performed include those designed to identify, analyze, test, rapidly acquire, and integrate emerging IA and cyber technology and defensive cyberspace weapons systems and capabilities into all regions of the GIG - terrestrial, airborne, and space systems. In addition, this effort will support implementation of DoD Enterprise-wide Information Assurance (IA) & Computer Network Defense (CND) Solutions Steering Group (ESSG) solutions.

This program element may include necessary emergent or unanticipated civilian pay expenses required to manage, execute, and deliver Firestarter for emergent or unanticipated weapon system capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Cyber Forensic Tools & Methodologies	0.512	1.400	-
<b>Description:</b> Cyber forensic tools & methodologies. Includes initial metrics for reliable info assurance; secure coalition cyber data management, collaboration and visualization; analysis of cyber security bots			
<b>FY 2021 Plans:</b>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208088F / AF Defensive Cyberspace Operations	<b>Project (Number/Name)</b> 677820 / Computer Security RDTE: Firestarter		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>- Continue the development, enhancement, and transition of incident response data gathering and attack attribution technologies</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreased due to consolidation of activities into Transition of Cyber Information Assurance Technologies to more accurately represent program efforts.</p>				
<p><b>Title:</b> Cyber Threat Recognition</p> <p><b>Description:</b> Enhancing cyber platform technology to identify zero-day threats in real time.</p> <p><b>FY 2021 Plans:</b> - Continue to normalize and automate methods and procedures to identify zero day cyber threats prior to system compromise</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreased due to consolidation of activities into Transition of Cyber Information Assurance Technologies to more accurately represent program efforts.</p>		0.526	1.599	-
<p><b>Title:</b> Cyber Threat Attribution &amp; Mitigation</p> <p><b>Description:</b> Includes risk mitigation techniques for wireless networks and systems; active response, dynamic policy enforcement and computer/net attack attribution efforts.</p> <p><b>FY 2021 Plans:</b> - Continue to mature, enhance, and integrate developmental concepts to attribute cyber patterns, techniques, behaviors, and signatures to specific threat actors and identify mitigation strategies for each</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreased due to consolidation of activities into Transition of Cyber Information Assurance Technologies to more accurately represent program efforts.</p>		0.500	0.815	-
<p><b>Title:</b> Transition of Cyber and Information Assurance Technologies</p> <p><b>Description:</b> Transition of advanced cyber defense technologies that support AF Defensive Cyber Operations architecture. Includes space systems cyber solutions; terrestrial net defense technology development; airborne IP network cyber and IA tools; IA/cyber modeling &amp; simulation; secure interoperable distributed agent computing, and others that relate to defending the AF networks.</p> <p><b>FY 2021 Plans:</b></p>		0.875	2.653	8.527

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208088F / AF Defensive Cyberspace Operations	<b>Project (Number/Name)</b> 677820 / Computer Security RDTE: Firestarter
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022
- Continue enhancing and transitioning customer funded cyber and IA technology to operational USAF components in accordance with rapid requirements documentation  <b>FY 2022 Plans:</b> - Will continue enhancing and transitioning customer funded cyber and IA technology to operational USAF components in accordance with rapid requirements documentation  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increased due to consolidation of activities to more accurately represent program efforts.			
<b>Accomplishments/Planned Programs Subtotals</b>	2.413	6.467	8.527

	FY 2020	FY 2021
<b>Congressional Add:</b> Critical Infrastructure Cyber Security  <b>FY 2020 Accomplishments:</b> - Craft and execute Critical Infrastructure Cyber Security research and development plan  - Perform research; develop test plans, exercises, and security configurations; conduct assessments; and complete technical reports on a variety of Air Force critical infrastructure and interfaces  <b>FY 2021 Plans:</b> - Continue to craft and execute Critical Infrastructure Cyber Security research and development plan  - Continue to perform research; develop test plans, exercises, and security configurations; conduct assessments; and complete technical reports on a variety of Air Force critical infrastructure and interfaces	10.000	15.000
<b>Congressional Add:</b> Cyber Resilient Space Architecture  <b>FY 2020 Accomplishments:</b> - Craft and execute cyber resilient space architecture research and development plan  - Perform research; develop security profiles, integrate developmental concepts and enhance security configurations; conduct assessments; and complete technical reports on a variety of space system architectures  - Transition cyber technologies for use in space enterprise	12.000	-
<b>Congressional Adds Subtotals</b>	22.000	15.000

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208088F / AF Defensive Cyberspace Operations	<b>Project (Number/Name)</b> 677820 / Computer Security RDTE: Firestarter

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

Beginning in FY22, planned programs realigned to Transition of Cyber and Information Assurance Technologies in order to more accurately represent planned activities.

**D. Acquisition Strategy**

Firestarter conducts late stage Science and Technology (S&T) for tech demo and tech transition to warfighter employment. All contracts within this project are awarded using full and open competition and utilize evolutionary capability and incremental development. Where appropriate, collaborative efforts are conducted with services and agencies within the USAF to result in more robust and cost effective solutions. Contracting activities are primarily done through other agencies when deemed more advantageous. All aspects of the Firestarter project are managed by the Air Force Research Laboratory.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208088F / AF Defensive Cyberspace Operations	<b>Project (Number/Name)</b> 677820 / Computer Security RDTE: Firestarter
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Firestarter Development	C/CPFF	Various : Various	-	22.859	Jan 2020	18.370	Jan 2021	4.511	Jan 2022	-		4.511	-	-	-
Firestarter Integration	C/CPFF	Various : Various	-	0.638	Jan 2020	1.499	Jan 2021	1.929	Jan 2022	-		1.929	-	-	-
<b>Subtotal</b>			-	23.497		19.869		6.440		-		6.440	-	-	N/A

**Remarks**  
Multiple contractors and multiple universities reflect on-going efforts with over a dozen contractors and universities. Each has a different contract date depending on when that particular contract was awarded.

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Firestarter Testing	C/CPFF	Various : Various	-	0.691	Jan 2020	1.373	Jan 2021	1.862	Jan 2022	-		1.862	-	-	-
<b>Subtotal</b>			-	0.691		1.373		1.862		-		1.862	-	-	N/A

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Firestarter PMA	C/CPFF	Various : Various	-	0.225	Jan 2020	0.225	Jan 2021	0.225	Jan 2022	-		0.225	-	-	-
<b>Subtotal</b>			-	0.225		0.225		0.225		-		0.225	-	-	N/A

			Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>			-	24.413	21.467	8.527	-	8.527	-	-	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208088F / AF Defensive Cyberspace Operations	<b>Project (Number/Name)</b> 677820 / Computer Security RDTE: Firestarter

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>Firestarter</b>	
Cyber Forensic Tools & Methodologies	
Cyber Threat Recognition	
Cyber Threat Attribution & Mitigation	
Transition of Cyber/IA Technologies	
Internet of Things Research	
Transportation Research	
Critical Infrastructure Cyber Security	
Cyber Resilient Space Architecture	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208088F / AF Defensive Cyberspace Operations	<b>Project (Number/Name)</b> 677820 / Computer Security RDTE: Firestarter

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>Firestarter</b>				
Cyber Forensic Tools & Methodologies	1	2020	4	2021
Cyber Threat Recognition	1	2020	4	2021
Cyber Threat Attribution & Mitigation	1	2020	4	2021
Transition of Cyber/IA Technologies	1	2020	4	2022
Internet of Things Research	1	2020	2	2020
Transportation Research	1	2020	2	2020
Critical Infrastructure Cyber Security	2	2020	3	2022
Cyber Resilient Space Architecture	2	2020	3	2021



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0208088F / AF Defensive Cyberspace Operations				<b>Project (Number/Name)</b> 677821 / Cyberspace Vulnerability Assessment			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
677821: <i>Cyberspace Vulnerability Assessment</i>	-	11.350	7.015	8.288	0.000	8.288	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

This requirement supports the Cyberspace Vulnerability Assessment/Hunter Team (CVA/H) weapon system development of new capabilities to provide Air Force Cyber Command (AFCYBER) and Combatant Commanders additional mobile precision in addition to currently fielded protection capabilities to identify, pursue, and mitigate cyberspace threats. The CVA/H weapon system performs defensive sorties world-wide via remote or on-site access. CVA/H executes Hunter missions on AF and DoD networks & systems. Hunter operations characterize and then eliminate threats for the purpose of mission assurance. The Hunter mission focuses on the capability to find, fix, track, target, engage, and assess (F2T2EA) the advanced persistent threat (APT). This effort funds development efforts to enhance command and control situational awareness and to expand the capability of the current weapon system to meet scope and scale of the USCYBERCOM directed Cyber Protection Teams and AF Mission Defense Teams.

This program element may include necessary emergent or unanticipated civilian pay expenses required to manage, execute, and deliver Cyberspace Vulnerability Assessment/Hunter for emergent or unanticipated weapon system capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605829F. In FY2020(PY) 0.075M was expended for civilian pay expenses in this program element.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Cyber Threat Mitigation	0.800	0.400	0.718
<b>Description:</b> Cyber Threat Mitigation includes vulnerability, compliance, defense and non-technical assessments, best practice reviews, penetration testing and supports Cyberspace Vulnerability Assessment/Hunter (CVA/H) missions in support of Air Force Cyber Command and Combatant Commanders.			
<b>FY 2021 Plans:</b> Continue development and integration of technologies to conduct vulnerability assessments, network intrusion analysis and systems vulnerability analysis			
<b>FY 2022 Plans:</b> Will continue development and integration of technologies to conduct vulnerability assessments, network intrusion analysis and systems vulnerability analysis			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208088F / AF Defensive Cyberspace Operations	<b>Project (Number/Name)</b> 677821 / Cyberspace Vulnerability Assessment		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Funding increased due to additional cyber threat recognition requirements.				
<p><b>Title:</b> Defensive Next Generation Development</p> <p><b>Description:</b> Development and integration of solutions supporting defensive cyber modernization and AF Cyber Needs Forms in the area of DCO capabilities and technologies to meet capability gaps required by Cyber Protection Teams and Mission Defense Teams.</p> <p><b>FY 2021 Plans:</b> Continue development and integration to support modernization of DCO capabilities and technologies to support Cyber Protection Teams and Mission Defense Teams</p> <p><b>FY 2022 Plans:</b> Will continue development and integration to support modernization of DCO capabilities and technologies to support Cyber Protection Teams and Mission Defense Teams</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding Increase due to additional support requirements for Cyber CPT and MDT Priorities</p>		9.550	5.615	6.570
<p><b>Title:</b> Test &amp; Evaluation</p> <p>Description: Test and Evaluation</p> <p><b>Description:</b> Test and Evaluation provides both developmental testing of new capabilities and the test environments for validating the capabilities.</p> <p><b>FY 2021 Plans:</b> Continue development testing for DCO capability products and technologies prior to fielding</p> <p><b>FY 2022 Plans:</b> Will continue development testing for DCO capability products and technologies prior to fielding</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> N/A</p>		1.000	1.000	1.000
<b>Accomplishments/Planned Programs Subtotals</b>		11.350	7.015	8.288

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208088F / AF Defensive Cyberspace Operations	<b>Project (Number/Name)</b> 677821 / Cyberspace Vulnerability Assessment
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• OPAF 03 831010: <i>Comsec Equipment</i>	12.654	-	-	-	-	-	-	-	-	-	-
• OPAF 03 834320: <i>C3 Countermeasures</i>	-	22.616	27.770	-	27.770	-	-	-	-	-	-

**Remarks**

Beginning in FY21 associated OPAF realigned from COMSEC Equipment WSC to C3 Countermeasures WSC for clarity in reporting.

**D. Acquisition Strategy**

The Cyberspace Vulnerability Assessment Hunter (CVA/H) program office will utilize Concept, Development, Risk Management, or Production and Deployment Plans as part of a phased approach to acquisition planning. All plans will contain sufficient information for the Milestone Decision Authority (MDA) to determine readiness to enter into the applicable phase of the acquisition process. CVA/H Program office will utilize both new and existing contractual vehicles, in addition to existing Government-Wide Acquisition Contract (GWAC) vehicles such as Alliant, Encore II, Solutions for Enterprise-Wide Procurement IV (SEWP IV), and General Services Administration (GSA) Federal Supply Schedules, Network-Centric Solutions (NETCENTs).

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208088F / AF Defensive Cyberspace Operations	<b>Project (Number/Name)</b> 677821 / Cyberspace Vulnerability Assessment
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Cyber Threat Mitigation - Threat Intelligence	C/CPFF	Various : Various	-	0.800	Jan 2020	0.400	Jan 2021	0.680	Jan 2022	-		0.680	-	-	-
Defensive Next Gen - Data & Analysis	C/CPFF	Various : Various	-	0.850	Mar 2020	0.716	Mar 2021	0.800	Mar 2022	-		0.800	-	-	-
Defensive Next Gen - Sensor Optimization	C/FFP	Various : Various	-	2.649	May 2020	1.105	May 2021	1.100	May 2022	-		1.100	-	-	-
Defensive Next Gen - Training Simulator	C/FFP	Various : Various	-	2.550	Apr 2020	0.670	Apr 2021	1.440	Apr 2022	-		1.440	-	-	-
Defensive Next Gen - Data Collection and Correlation	C/FFP	Various : Various	-	1.031	Mar 2020	0.666	Mar 2021	0.648	Mar 2022	-		0.648	-	-	-
Defensive Next Gen - Intrusion Prevention Capabilities	C/FFP	Various : Various	-	0.690	Aug 2020	0.656	Aug 2021	0.700	Aug 2022	-		0.700	-	-	-
<b>Subtotal</b>			-	8.570		4.213		5.368		-		5.368	-	-	N/A

<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Direct Cite Authority Civilian Pay	TBD	USAF : Hanscom AFB, MA	-	0.075	Oct 2019	0.103	Oct 2020	0.228	Oct 2021	-		0.228	-	-	-
<b>Subtotal</b>			-	0.075		0.103		0.228		-		0.228	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test Support	MIPR	46 Test Squadron : Eglin, FL	-	1.000	Oct 2019	1.000	Oct 2020	1.000	Oct 2021	-		1.000	-	-	-
<b>Subtotal</b>			-	1.000		1.000		1.000		-		1.000	-	-	N/A



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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208088F / AF Defensive Cyberspace Operations	<b>Project (Number/Name)</b> 677821 / Cyberspace Vulnerability Assessment

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>Cyber Vulnerability Assessment</b>	
Test and Evaluation	
Cyber Threat Mitigation	
Defensive Next Generation Development (Data & Analysis)	
Defensive Next Generation (Data Collection and Correlation)	
Defensive Next Generation Sensor Optimization	
Defensive Next Generation (Training Simulator)	
Defensive Next Generation (Cloudshield Capabilities)	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208088F / AF Defensive Cyberspace Operations	<b>Project (Number/Name)</b> 677821 / Cyberspace Vulnerability Assessment

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>Cyber Vulnerability Assessment</b>				
Test and Evaluation	1	2020	4	2022
Cyber Threat Mitigation	1	2020	4	2022
Defensive Next Generation Development (Data & Analysis)	1	2020	4	2022
Defensive Next Generation (Data Collection and Correlation)	1	2020	4	2022
Defensive Next Generation Sensor Optimization	1	2020	4	2022
Defensive Next Generation (Training Simulator)	1	2020	4	2022
Defensive Next Generation (Cloudshield Capabilities)	1	2020	4	2022

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208088F / AF Defensive Cyberspace Operations	<b>Project (Number/Name)</b> 677822 / Cyber Defense Analysis
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
677822: <i>Cyber Defense Analysis</i>	-	0.265	0.279	0.281	0.000	0.281	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

Cyberspace Defense Analysis (CDA) is an assessment of non-secure telecommunications to determine type and amount of sensitive and/or classified information that may have been disclosed to our adversaries and encompasses several mission subsets, including: Telephony Communications, Radio Frequency (RF) Communications, Email Communications, Internet based Capabilities (IbC), and Cyber Operations Risk Assessment (CORA). CDA is the cyberspace weapon system that is used to conduct assessments during peace time and contingency operations. The CDA weapon system protects the AF's critical information such as PII, OPSEC, and other sensitive information through passive monitoring and active Data Loss Protection (DLP). CDA shows its true capability in the force protection realm and helps ensure our adversaries are not provided early warning of our plans, capabilities, or limitations. Continued funding is essential in developing new capabilities to combat the rapidly evolving cyber threat.

Cyberspace Defense Analysis (CDA): The CDA weapon system conducts Defensive Cyberspace Operations (DCO) and network defense by monitoring, collecting, analyzing, and reporting sensitive information transiting or residing on the AFNet. Without proper funding the CDA Operators will not be able to determine potential impacts and operational adjustments resulting from information disclosures or identify compromised information from network intrusions. There will be a decreased assurance of network defense and an increase in the amount of lost PII, OPSEC, and other sensitive information. The CDA mission subsets include: Telephony Communications, Radio Frequency (RF) Communications, Email Communications, Internet based Capabilities (IbC), and Cyber Operations Risk Assessment (CORA). CDA is the cyberspace weapon system that is used to conduct assessments during peace time and contingency operations. CDA shows its true capability in the force protection realm, OPSEC, Data Loss Prevention, etc. and helps ensure our adversaries are not provided early warning of our plans, capabilities, or limitations. Continuing funding is essential in developing new capabilities to combat the rapidly evolving cyber threats.

The Cyberspace Defense Analysis (CDA) weapon system must development new capabilities to provide additional information protection capabilities to monitor, collect, analyze, and report cyberspace threats and identify compromised data. These capabilities encompass the support to OPSEC protection and Data Loss Prevention. The CDA program will utilize various contractual vehicles when necessary such as Solutions for Enterprise-Wide Procurement IV (SEWP IV), General Services Administration (GSA) Federal Supply Schedules, Network-Centric Solutions (NETCENTS), and other competitive contracts (if required). The use of multiple-award contractual vehicles provide access to a wide range of commercially-available products and services required to meet Defensive Cyber Operations requirements related to combat the rapidly evolving cyber threats.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022
<b>Title:</b> Cyber Defense Analysis	0.265	0.279	0.281
<b>Description:</b> Engineering support to conduct Cyberspace Defense Analysis (CDA) assessment of non-secure telecommunications during peace time and contingency operations.			



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208088F / AF Defensive Cyberspace Operations	<b>Project (Number/Name)</b> 677822 / Cyber Defense Analysis

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>FY 2021 Plans:</b> Continue support of development of data loss prevention technologies and support to insider threat detection capabilities. Support technology areas that prevent adversaries' attempts to get into our networks.</p> <p><b>FY 2022 Plans:</b> Will continue support of development of data loss prevention technologies and support to insider threat detection capabilities. Support technology areas that prevent adversaries' attempts to get into our networks.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increased due to inflation adjustment</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	0.265	0.279	0.281

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• OPAF 03 Line Item 831010: COMSEC Equipment	1.698	-	-	-	-	-	-	-	-	-	-
• OPAF 03 834320: C3 Countermeasures	-	1.699	10.374	-	10.374	-	-	-	-	-	-

**Remarks**  
Beginning in FY21 associated OPAF realigned from COMSEC Equipment WSC 831010 to C3 Countermeasures WSC 834320 for clarity in reporting.

**D. Acquisition Strategy**  
The Cyberspace Defense Analysis (CDA) Weapon System development of new capabilities to provide additional information protection capabilities to monitor, collect, analyze, and report cyberspace threats and compromised data. These capabilities encompass the support to OPSEC protection as well. The CDA program will utilize various contractual vehicles when necessary such as Government-Wide Acquisition Contract (GWAC), Alliant, Encore II, Solutions for Enterprise-Wide Procurement IV (SEWP IV), and General Services Administration (GSA) Federal Supply Schedules, Network-Centric Solutions (NETCENTS) and competitive contract (if required). The use of multiple-award contractual vehicles will provide a wide range of commercially-available products and services that should be able to meet requirements related to Defensive Cyberspace Operations.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208088F / AF Defensive Cyberspace Operations	<b>Project (Number/Name)</b> 677822 / Cyber Defense Analysis
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<b>Management Services (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
CDA PMA - Engineering & Technical Assistance Support Services (ETASS & FFRDC)	Various	AFLCMC/PZ : Hanscom, MA	-	0.265	Jan 2020	0.279	Jan 2021	0.281	Jan 2022	-		0.281	-	-	-
<b>Subtotal</b>			-	0.265		0.279		0.281		-		0.281	-	-	N/A

**Remarks**  
Provides program office subject matter expertise, engineering continuity, technical maturation and expertise, and access to an extensive professional network for future capabilities.

	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>	-	0.265	0.279	0.281	-	0.281	-	-	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208088F / AF Defensive Cyberspace Operations	<b>Project (Number/Name)</b> 677822 / Cyber Defense Analysis

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>Cyber Defense Analysis</b>	
Cyber Defense Analysis (FFRDC)	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208088F / AF Defensive Cyberspace Operations	<b>Project (Number/Name)</b> 677822 / Cyber Defense Analysis

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>Cyber Defense Analysis</b>				
Cyber Defense Analysis (FFRDC)	1	2020	4	2022

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208088F / AF Defensive Cyberspace Operations	<b>Project (Number/Name)</b> 677823 / AFCERT
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
677823: AFCERT	-	1.281	1.347	1.353	0.000	1.353	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

The AF Cyberspace Defense (ACD) weapon system is designed to prevent, detect, and respond to adversarial penetration into AF unclassified and classified networks. ACD supports Air Force and Combatant Commanders by conducting synchronized Defensive Cyber Operations (DCO) and providing 24/7/365 monitoring and defense of USAF and US Central Command Secure/Non-secure Internet Protocol Router Network (SIPRNET/NIPRNET) systems against hostile attack. Daily intrusions to the AF network are analyzed in a forensics manner to identify a multitude of counter defensive and defensive tools and techniques that are required to truly strengthen cyber security. The Air Force Research Laboratory (AFRL), Air Force CyberWorx, and other Federal R&D entities often have cutting edge solutions, that, with Research and Development funding, take them to the technology readiness level (TRL) needed for rapid deployment as new capabilities to counter critical cyber weapon system vulnerabilities. AFCERT funding for this effort will focus on development of capability, capacity, and potential modifications to increase the utility of the ACD weapon system to the warfighter as well as testing requirements for new capabilities.

This program element may include necessary emergent or unanticipated civilian pay expenses required to manage, execute, and deliver AF Cyberspace Defense for emergent or unanticipated weapon system capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2020	FY 2021	FY 2022
<b>Title:</b> Cyberspace Defense Development	1.281	1.347	1.353
<b>Description:</b> AF Cyberspace Defense (ACD) weapon system to prevent, detect, and respond to adversarial penetration in AF networks			
<b>FY 2021 Plans:</b> - Develop and test technologies for the AF Cyberspace Defense (ACD) weapon system to prevent, detect, and respond to adversarial penetration in AF networks			
<b>FY 2022 Plans:</b> - Will continue to develop and test technologies for the AF Cyberspace Defense (ACD) weapon system to prevent, detect, and respond to adversarial penetration in AF networks			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> N/A			
<b>Accomplishments/Planned Programs Subtotals</b>	1.281	1.347	1.353

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208088F / AF Defensive Cyberspace Operations	<b>Project (Number/Name)</b> 677823 / AFCERT
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• OPAF 03 Line Item 835080: AFNET	16.883	-	-	-	-	-	-	-	-	-	-
• OPAF 03 834320: C3 Countermeasures	-	23.860	35.463	-	35.463	-	-	-	-	-	-

**Remarks**

Beginning in FY21 associated OPAF realigned from AFNET WSC 835080 to C3 Countermeasures WSC 834320 for clarity in reporting.

**D. Acquisition Strategy**

The AF Cyberspace Defense (ACD) weapon system office will utilize existing contractual vehicles such as Massachusetts Institute of Technology Research and Engineering (MITRE), General Services Administration (GSA) Federal Supply Schedules, Air Force Research Laboratory (AFRL), Advisory and Assistance Services (A&AS) as well as various Test and Evaluation Enterprises. The ACD weapon system office also intends to utilize the commercial contracting community to lead the Development, Test and Integration of future Cyberspace Defense capabilities. The use of multiple-award contractual vehicles will provide a wide range of commercially-available products and services that should be able to meet many requirements related to the ACD mission.



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Air Force</b>		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208088F / AF Defensive Cyberspace Operations	<b>Project (Number/Name)</b> 677823 / AFCERT

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b><i>Integrated Cyber Aggregation Tool</i></b>	
Cyberspace Defense Development	
Test and Evaluation	



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208088F / AF Defensive Cyberspace Operations	<b>Project (Number/Name)</b> 677823 / AFCERT

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Integrated Cyber Aggregation Tool</i>				
Cyberspace Defense Development	1	2020	4	2022
Test and Evaluation	1	2020	4	2022

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0208097F I <i>Joint Cyber Command and Control (JCC2)</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	11.306	38.410	79.079	0.000	79.079	-	-	-	-	-	-
676045: <i>Foundational Efforts</i>	-	11.306	38.410	79.079	0.000	79.079	-	-	-	-	-	-

**Note**

In FY20, PE 0306250F, Cyber Operations Technology Development efforts were transferred to PE 0208097F, Joint Cyber Command and Control (JCC2) efforts in order to enable Executive Agent oversight and management and to provide adequate governance and Service stakeholder transparency.

**A. Mission Description and Budget Item Justification**

Joint Cyber Command and Control (JCC2) provides Combatant Commanders, Joint Force Commanders and Service Component Commanders with enhanced situational awareness and battle management for cyberspace operations missions and forces. JCC2 establishes congressionally directed focal point to provide integrated JCC2 solutions to all echelons for execution of cyberspace operations to enable and accelerate planning/collaboration between Cyber Mission Forces and Combatant Commands (CCMD).

It will integrate Cyber Command and Control (C2) with Joint, Coalition and inter-agency C2 to enhance multi-domain operations, reduce planning time, improve decision quality and speed resulting in a shorter kill chain. Capabilities will be developed to address the Cyber Mission Forces used to conduct cyber operations. Additionally, it will leverage and utilize a Continuous Infrastructure/Continuous Development (CI/CD) Framework to pace development with warfighter need. JCC2 development activities include, but are not limited to: rapid prototyping, development of software/hardware systems; integration and transition of lab developed cyber capabilities to the warfighter; testing and evaluation; program management, studies, analysis, pilots, and demonstrations; risk reduction for emerging technologies; and development and assessment of operational systems for inclusion into JCC2 to meet capability requirements. The increase in funds will enable greater capacity to react to emerging requirements.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 1.416M was expended for civilian pay expenses in this program element, and in FY21 1.792M is forecasted for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0208097F <i>I Joint Cyber Command and Control (JCC2)</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	11.603	38.480	51.486	0.000	51.486
Current President's Budget	11.306	38.410	79.079	0.000	79.079
Total Adjustments	-0.297	-0.070	27.593	0.000	27.593
• Congressional General Reductions	0.000	-0.070			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.297	0.000			
• Other Adjustments	0.000	0.000	27.593	0.000	27.593

**Change Summary Explanation**

In FY 2022, PE 0604250D8Z, Advanced Innovative Technologies, Project IKE requirements and funding were transferred to PE 0208097F, Joint Cyber Command and Control (JCC2), Project 676045, Foundational Efforts, in order to operationalize prototype battlespace management capabilities into JCC2 program.

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208097F / Joint Cyber Command and Control (JCC2)	<b>Project (Number/Name)</b> 676045 / Foundational Efforts
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
676045: Foundational Efforts	-	11.306	38.410	79.079	0.000	79.079	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Note**

In FY 2020, PE 0306250F, Cyber Operations Technology Development efforts were transferred to PE 0208097F, Joint Cyber Command and Control (JCC2) efforts in order to enable Executive Agent oversight and management, and to provide adequate governance and Service stakeholder transparency.

In FY 2022, PE 0604250D8Z, Advanced Innovative Technologies, Project IKE requirements and funding were transferred to PE 0208097F, Joint Cyber Command and Control (JCC2), Project 676045, Foundational Efforts, in order to operationalize prototype battlespace management capabilities into JCC2 program.

**A. Mission Description and Budget Item Justification**

Joint Cyber Command and Control (JCC2) provides Combatant Commanders, Joint Force Commanders and Service Component Commanders with enhanced situational awareness and battle management for cyberspace operations missions and forces. JCC2 establishes congressionally directed focal point to provide integrated JCC2 solutions to all echelons for execution of cyberspace operations to enable and accelerate planning/collaboration between Cyber Mission Forces and Combatant Commands (CCMD).

It will integrate Cyber Command and Control (C2) with Joint, Coalition and inter-agency C2 to enhance multi-domain operations, reduce planning time, improve decision quality and speed resulting in a shorter kill chain. Capabilities will be developed to address the Cyber Mission Forces used to conduct cyber operations. Additionally, it will leverage and utilize a Continuous Infrastructure/Continuous Development (CI/CD) Framework to pace development with warfighter need. JCC2 development activities include, but are not limited to: rapid prototyping, development of software/hardware systems; integration and transition of lab developed cyber capabilities to the warfighter; testing and evaluation; program management, studies, analysis, pilots, and demonstrations; risk reduction for emerging technologies; and development and assessment of operational systems for inclusion into JCC2 to meet capability requirements.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 1.416M was expended for civilian pay expenses in this program element, and in FY21 1.792M is forecasted for civilian pay expenses in this program element.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Foundational Efforts	11.306	38.410	79.079
<b>Description:</b> Foundational Efforts are program activities, at multiple operating locations, supporting development and evaluations activities and JCC2 baseline efforts to provide capability. Actions include system and software engineering, risk management, developmental framework management, and the execution of acquisition activities.			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208097F / <i>Joint Cyber Command and Control (JCC2)</i>	<b>Project (Number/Name)</b> 676045 / <i>Foundational Efforts</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>FY 2021 Plans:</b></p> <ul style="list-style-type: none"> <li>- Incrementally develop JCC2 capabilities using the DevSecOps approach</li> <li>- Continue to integrate existing situational awareness and battle management capabilities to the JCC2 solution</li> <li>- Continue to build the backlog of requirements through Joint Working Groups and the JCC2 Governance Process</li> </ul> <p><b>FY 2022 Plans:</b></p> <ul style="list-style-type: none"> <li>- Will incrementally expand and develop JCC2 capabilities using the DevSecOps approach</li> <li>- Will continue to integrate and expand existing situational awareness and battle management capabilities to the JCC2 solution</li> <li>- Will continue to expand the backlog of requirements through Joint Working Groups and the JCC2 Governance Process</li> </ul> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increased due to the transfer of Project IKE requirements and funding from PE 0604250D8Z, Advanced Innovative Technologies, into JCC2 program baseline in FY22. Additionally, funding increase supports program transition from the Planning Phase into the Execution Phase of Software development.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	11.306	38.410	79.079

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

JCC2 is in the Software Acquisition Execution Phase which enables continuous integration and delivery of software capability at the speed of relevance. JCC2 will apply agile acquisition tenants to the programmatic, design/engineering, test and delivery aspects to provide an ability to deliver Situational Awareness/C2 capabilities to the warfighter in a rapid manner. JCC2 is transitioning from a collection of distinct, special-purpose tools to an integrated joint C2 capability to reduce overall lifecycle costs, improve interoperability, and increase information sharing across the CCMDs.

The JCC2 program office is utilizing new and existing contract vehicles and concept, development, risk management, production, or deployment plans as part of a streamlined approach. The JCC2 program office has established a continuous integration/continuous development pipeline to facilitate the rapid development, integration, and fielding of capabilities to remain responsive to evolving warfighter requirements. The JCC2 program will execute the agile development requirements provided by the Army, Navy, Marine Corps, Air Force, and USCYBERCOM stakeholders in accordance with the prioritization provided by the multi-Service JCC2 governance structure.

The JCC2 program office is integrating several C2 mission systems for battle management and situational awareness. Most of the programs are using Agile development efforts, making rapid changes and upgrades to the applications and/or prototypes. In addition to converging the contracting efforts, the multiple mission

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208097F / <i>Joint Cyber Command and Control (JCC2)</i>	<b>Project (Number/Name)</b> 676045 / <i>Foundational Efforts</i>

systems, or applications, will eventually converge onto a shared C2 hosting and transit cloud infrastructure created by the PMO under the new Software Acquisition Pathway program. This approach will deliver an integrated JCC2 capability for Battle Management (BM) and Situational Awareness (SA). The JCC2 baseline capability relies on extensive development and evaluation efforts to analyze integration constraints and opportunities of Service-specific cyber capabilities.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208097F / Joint Cyber Command and Control (JCC2)	<b>Project (Number/Name)</b> 676045 / Foundational Efforts
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
JCC2 CI/CD Infrastructure	Various	Multiple : Multiple	-	-		2.720	Apr 2021	3.604	Mar 2022	-		3.604	-	-	-
JCC2 Agile Capability Development	Various	Multiple : Multiple	-	9.822	Mar 2020	32.118	Mar 2021	69.300	Mar 2022	-		69.300	-	-	-
<b>Subtotal</b>			-	9.822		34.838		72.904		-		72.904	-	-	N/A

<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Direct Cite Authority Civilian Pay	TBD	USAF : Hanscom AFB, MA	-	1.416	Oct 2019	1.792	Oct 2020	3.700	Oct 2021	-		3.700	-	-	-
<b>Subtotal</b>			-	1.416		1.792		3.700		-		3.700	-	-	N/A

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
JCC2 Acquisition Support	Various	Multiple : Multiple	-	0.068	Nov 2019	1.780	Nov 2020	2.475	Nov 2021	-		2.475	-	-	-
<b>Subtotal</b>			-	0.068		1.780		2.475		-		2.475	-	-	N/A

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>		-	11.306	38.410	79.079	-	-	-	N/A

**Remarks**  
 CI/CD - Continuous Integration/Continuous Development  
  
 Transition DOD pilot systems to USAF references that the USAF was designated the lead service via being named the Executive Agent. The pilot systems transferred currently have operational users and are being evaluated for best of breed features and architecture to be further developed into the overarching JCC2 capability requirements.



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Air Force</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208097F / <i>Joint Cyber Command and Control (JCC2)</i>	<b>Project (Number/Name)</b> 676045 / <i>Foundational Efforts</i>

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>Foundational Events</b>																												
Transition DOD pilot systems to USAF																												
JCC2 CI/CD Infrastructure																												
JCC2 Agile Capability Development																												
JCC2 Acquisition Support																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208097F / <i>Joint Cyber Command and Control (JCC2)</i>	<b>Project (Number/Name)</b> 676045 / <i>Foundational Efforts</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>Foundational Events</b>				
Transition DOD pilot systems to USAF	1	2020	4	2021
JCC2 CI/CD Infrastructure	1	2020	4	2022
JCC2 Agile Capability Development	1	2020	4	2022
JCC2 Acquisition Support	1	2020	4	2022

**Note**

Transition DOD pilot systems to USAF references that the USAF was designated the lead service via being named the Executive Agent. The pilot systems transferred currently have operational users and are being evaluated for best of breed features and architecture to be further developed into the overarching JCC2 capability requirements.

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0208099F / <i>Unified Platform (UP)</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	90.002	84.491	101.893	0.000	101.893	-	-	-	-	-	-
672281: <i>Foundational Efforts</i>	-	90.002	84.491	101.893	0.000	101.893	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

Unified Platform provides the Cyber Mission Forces, U.S. Cyber Command (USCYBERCOM), AF Major Commands, and Service cyber components a Joint cyber operations infrastructure enabling full spectrum cyberspace operations at the operational through tactical levels of warfare as part of USCYBERCOM (JCWA) Joint Cyber Warfare Architecture. The DoD, AF, and the Cyber Mission Force require an interconnected and interoperable cyber infrastructure to conduct integrated planning and execution of cyberspace operations to meet Combatant Commander requirements. Unified Platform delivers this capability through the integration of disparate firing platforms, existing or evolving systems, infrastructure, mission capabilities, data analytics, and programs used for military cyber operations to build interoperable and scalable network for cyber capabilities. A common, Unified Platform allows the DoD to achieve and maintain decision and operational superiority, the key to successful cyber operations within the highly dynamic cyberspace domain.

Foundational Efforts provide for the research, development, prototype maturation, integration, enhancement, delivery, and enduring product support of the Unified Platform capability to ensure responsiveness to warfighter requirements within operationally relevant timeframes. With the government as the lead integrator, Unified Platform Foundational Efforts provide a flexible—yet disciplined—agile development/security/operations (DevSecOps) capability to generate new capabilities, integrate existing and emerging technologies, incorporate rapid prototyping efforts, and evolve the Unified Platform baseline on an agile basis. Foundational efforts include both the management of the DevSecOps capabilities including systems engineering, risk management, contracting, test, and program management as well as the active research and capability development to be conducted for the Unified Platform baseline.

The Secretary of the Air Force leads the Unified Platform effort as Executive Agent on behalf of the Department of Defense. Unified Platform directly supports the Joint Network Attack Initial Capabilities Document (ICD), the National Military Strategy for Cyberspace Operations (NMS-CO), USCYBERCOM operational directives, the latest MAJCOM Offensive Cyberspace Operations System Flight Plan, and other formal requirements documents.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 1.382M was expended for civilian pay expenses in this program element, and in FY21 2.102M is forecasted for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0208099F / <i>Unified Platform (UP)</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	84.702	84.645	106.550	0.000	106.550
Current President's Budget	90.002	84.491	101.893	0.000	101.893
Total Adjustments	5.300	-0.154	-4.657	0.000	-4.657
• Congressional General Reductions	0.000	-0.154			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	8.400	0.000			
• SBIR/STTR Transfer	-3.100	0.000			
• Other Adjustments	0.000	0.000	-4.657	0.000	-4.657

**Change Summary Explanation**

In FY20, Platform One core capabilities funded by the USAF via \$8.4M Below Threshold Reprogramming (BTR) into PE 020899F (Unified Platform). This "payback" BTR is a temporary measure as the Air Force works to establish a separate funding line.

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>Title:</b> Foundational Efforts</p> <p><b>Description:</b> Foundational Efforts ensure the perpetual capability development, integration, and delivery of the Unified Platform capability through the rapid and agile development of requirements via a DevSecOps pipeline. Unified Platform requirements are warfighter-derived under the framework of validated Unified Platform requirement documents and met using agile development teams, integration of Service and U.S. Cyber Command capabilities, or external prototyping activities.</p> <p>Unified Platform capabilities are developed within the government-lead Unified Platform Continuous Integration/Continuous Deployment DevSecOps pipeline, leveraging a common pipeline baseline maintained by Platform One. This pipeline provides a common system development, integration, and staging environment to permit collaborative development. Developmental efforts will be continuously verified for security compliance and continually tested to ensure development meets established security and performance criteria.</p> <p>Foundational Efforts also include program office expertise at multiple operating locations in the areas of cyberspace, systems engineering, risk management framework, scaled agile framework, contracting, and program management to ensure that agile acquisition development planning and frequent customer engagement is accomplished.</p>	90.002	84.491	101.893

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0208099F / <i>Unified Platform (UP)</i>
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
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FY 20 Accomplishments:  
 Provided USCYBERCOM, Army, Air Force, and Marine Corps operators with a single sign-on that enabled them to share and query data, analytics, and analysis across multiple classifications and across multiple Service.

In support of USCYBERCOM's Election 2020 Mission, UP executed distributed query between National Guard systems and USCYBERCOM BDP to allow for data analysis and established a Malware Information Sharing Platform to support ingestion of technical indicators of compromise.

Implemented operational Single Access Request Initiative (SARI) capability for Marine CHAOS and designing new data flow for AF ELICSAR. The operational capability will allow for new users accessing the Marine CHAOS BDP to automatically populate a DD2875 via information coming from their CAC, Active Directory, Training Databases (e.g. ETMS), and Security Databases (e.g.DMDC IWS, JPAS, Scattered Castles).

Integrated delivery pipeline through Platform One, providing updates and patches more efficiently to end users.

Provided Platform One core capabilities including Personnel, rent, equipment, and travel, funded by Air Force FY20 BTR.

**FY 2021 Plans:**

- Continue to scale and deliver capability through an agile development model, delivering operational capability on-demand.
- Continue to integrate existing Service capabilities, developed new capabilities, and modernized existing infrastructure while also leveraging prototyping activities from the Services and U.S. Cyber Command.
- Continue to maintain Distribute Common Development/Integration and Staging environments allowing for continuous integration and continuous delivery of capability.

**FY 2022 Plans:**

- Will continue to scale and deliver capability through an agile development model, delivering operational capability on-demand.
- Will continue to integrate existing Service capabilities, develop new capabilities, and modernize existing infrastructure while also leveraging prototyping activities from the Services and U.S. Cyber Command.
- Will maintain Distributed Common Development/Integration and Staging environments allowing for continuous integration and continuous delivery of capability.

**FY 2021 to FY 2022 Increase/Decrease Statement:**

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0208099F / <i>Unified Platform (UP)</i>
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022
Funding increase due to program transition from rapid prototyping into the Execution Phase of the Software Acquisitions Pathway. Budget Authority 04 Funding was realigned into Budget Authority 07 in FY 2022.			
<b>Accomplishments/Planned Programs Subtotals</b>	90.002	84.491	101.893

<b>D. Other Program Funding Summary (\$ in Millions)</b>											
Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• RDTE 04 0208099F: <i>Unified Platform (UP)</i>	9.623	5.979	0.000	-	0.000	-	-	-	-	-	-
• OPAF 03 835080: <i>AFNET</i>	4.963	0.000	0.000	-	0.000	-	-	-	-	-	-
• OPAF 03 834320: <i>C3 Countermeasures</i>	0.000	4.956	4.904	-	4.904	-	-	-	-	-	-

**Remarks**  
Beginning in FY21 associated OPAF realigned from AFNET WSC to C3 Countermeasures WSC for clarity in reporting.

BA4 Prototyping effort ends in FY21.

**E. Acquisition Strategy**  
Unified Platform represents a flexible, interoperable, and scalable warfighter capability to be employed by the Army, Navy, Marine Corps, and Air Force in conjunction with U.S. Cyber Command (USCYBERCOM). In order to match the speed of need of the highly dynamic cyberspace domain, the Service-agnostic Unified Platform implements an agile development framework to facilitate the rapid development, integration, and fielding of capabilities to remain responsive to evolving warfighter requirements. The Unified Platform program develops capability in response to requirements provided by the Army, Navy, Marine Corps, Air Force, and USCYBERCOM stakeholders in accordance with the prioritization provided by the multi-Service Unified Platform governance structure.

The initial Unified Platform capability delivered a minimum viable product (MVP) for immediate deployment and operational use by the Cyber Mission Force. Subsequent build iterations continue to deliver enhanced capabilities, incrementally building the Unified Platform capability to match warfighter needs and requirements to achieve cyberspace dominance. Development of the Unified Platform baseline capability relies agile software sprints to analyze integration constraints and opportunities of Service-specific cyber capabilities to realize the Unified Platform MVP and inform the future Unified Platform baseline an enduring foundational Unified Platform thrust area supports the development and maturation of Unified Platform baseline, integrates successful prototyping activities, and implements an agile development/security/operations (DevSecOps) construct to rapidly evolve and enhance the Unified Platform capability to match warfighter requirements.

The Unified Platform program office utilizes Concept, Development, Risk management, Production, and Deployment Plans as part of a streamlined approach to agile acquisition planning. All plans contain sufficient information to inform acquisition decisions (i.e., authorities to proceed), within the agile framework, to determine

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0208099F / <i>Unified Platform (UP)</i>
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readiness to enter into the applicable phase of the acquisition process. Unified Platform will utilize both new and existing contractual vehicles, such as Government-Wide Acquisition Contract (GWAC) vehicles (Alliant, Encore II, Solutions for Enterprise-Wide Procurement IV (SEWP IV), and General Services Administration (GSA) Federal Supply Schedules, a Cyber Indefinite Delivery Indefinite Quantity (IDIQ) contract, Other Transaction Authority (OTA), DoD Enterprise Software Initiative (ESI), Commercial Solution Openings (CSO), Partnership Intermediary Agreements (PIA), Small Business Innovative Research (SBIR) contracts, and Small Disadvantaged Business 8(a) contracts. The use of multiple-award contractual vehicles will provide a wide range of commercially-available products and services that will meet any future requirements related to Unified Platform.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208099F / <i>Unified Platform (UP)</i>	<b>Project (Number/Name)</b> 672281 / <i>Foundational Efforts</i>
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
UP System Technical Coordination	C/T&M	Northrop Grumman : San Antonio, TX	-	16.697	Oct 2019	12.950	Oct 2020	-		-		-	-	-	29.647
Agile Capability Development	Various	Multiple: Various : TBD	-	39.655	Oct 2019	41.643	Oct 2020	63.843	Oct 2021	-		63.843	-	-	169.123
Distributed Common Computing Environment	Various	Multiple: Various : TBD	-	8.400	Feb 2020	9.744	Feb 2021	12.258	Feb 2022	-		12.258	-	-	30.402
<b>Subtotal</b>			-	64.752		64.337		76.101		-		76.101	-	-	N/A

<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Direct Cite Authority Civilian Pay	TBD	Not specified. : TBD	-	2.102	Oct 2019	5.942	Oct 2020	8.077	Oct 2021	-		8.077	-	-	-
Platform One Core Capabilities	Various	Multiple Various : TBD	-	8.400	Oct 2019	-		-		-		-	-	-	-
<b>Subtotal</b>			-	10.502		5.942		8.077		-		8.077	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test and Evaluation	Various	Multiple: Various : TBD	-	3.593	Jan 2020	1.400	Jan 2021	1.600	Jan 2022	-		1.600	-	-	6.593
<b>Subtotal</b>			-	3.593		1.400		1.600		-		1.600	-	-	N/A

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Systems Engineering	Various	Various : TBD	-	7.955	Dec 2019	9.100	Dec 2020	11.449	Dec 2021	-		11.449	-	-	28.504
Acquisition Support	Various	Various : TBD	-	2.168	Dec 2019	2.515	Dec 2020	3.163	Dec 2021	-		3.163	-	-	7.846





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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208099F / <i>Unified Platform (UP)</i>	<b>Project (Number/Name)</b> 672281 / <i>Foundational Efforts</i>
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FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b><i>Foundational Efforts</i></b>	
UP System Technical Coordination	
UP Agile Capability Development	
Distributed Common Computing Environment	

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208099F / <i>Unified Platform (UP)</i>	<b>Project (Number/Name)</b> 672281 / <i>Foundational Efforts</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Foundational Efforts</i></b>				
UP System Technical Coordination	1	2020	4	2022
UP Agile Capability Development	1	2020	4	2022
Distributed Common Computing Environment	1	2020	4	2022

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0208288F / <i>Intel Data Applications</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	1.156	1.224	0.493	0.000	0.493	-	-	-	-	-	-
67A051: <i>Space Superiority - Advanced Intelligence Systems</i>	-	1.156	1.224	0.493	0.000	0.493	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

Funds the application of Intelligence data as datasets/databases, model and simulations, and analysis for combat and combat support users. Provides for the communications infrastructures required to support Intelligence data applications. May include software and contract assistance to ensure system interoperability for Intelligence data discovery, retrieval, and dissemination. Includes manpower, procurement, and operations and maintenance funding.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

**B. Program Change Summary (\$ in Millions)**

	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>
Previous President's Budget	1.200	1.224	1.137	0.000	1.137
Current President's Budget	1.156	1.224	0.493	0.000	0.493
Total Adjustments	-0.044	0.000	-0.644	0.000	-0.644
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-0.044	0.000	-0.644	0.000	-0.644

**C. Accomplishments/Planned Programs (\$ in Millions)**

	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>
<b>Title:</b> Radar Dynamic Cueing	1.156	1.224	0.493
<b>Description:</b> Develop algorithm to dynamically cue radar assets to increase collection capability and data relevance.			
<b>FY 2021 Plans:</b>			

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0208288F / <i>Intel Data Applications</i>
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Dynamic radar targeting			
<b><i>FY 2022 Plans:</i></b> Dynamic radar targeting			
<b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> Decrease in requirement			
<b>Accomplishments/Planned Programs Subtotals</b>	1.156	1.224	0.493

**D. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

**E. Acquisition Strategy**

This effort will be supported via the NASIC ATEP II contract. The project will be delivered 12 months from the date of obligation (approximately May 2019).



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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208288F / <i>Intel Data Applications</i>	<b>Project (Number/Name)</b> 67A051 / <i>Space Superiority - Advanced Intelligence Systems</i>

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b><i>Radar Dynamic Cueing</i></b>	
Algorithm Development	



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0208288F / <i>Intel Data Applications</i>	<b>Project (Number/Name)</b> 67A051 / <i>Space Superiority - Advanced Intelligence Systems</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Radar Dynamic Cueing</i></b>				
Algorithm Development	1	2020	4	2026

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