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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0701212F / <i>Automated Test Systems</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	13.153	2.787	10.673	0.000	10.673	15.506	8.018	1.528	16.504	Continuing	Continuing
6506TE: <i>Test And Evaluation Support Budget Authority</i>	-	13.153	2.787	10.673	0.000	10.673	15.506	8.018	1.528	16.504	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Program MDAP/MAIS Code: 6506

Note
 The Automatic Test System program office is responsible for developing, acquiring and sustain Automatic Test Systems for the United States Air Force (USAF).

The Bomber Armament Tester is replacing six legacy testers and combining their capabilities into one tester. The Bomber Armament Tester will support the B-2, B-1 and B-52 platforms.

The Common Aircraft Portable Reprogramming Equipment (CAPRE) is a secure common Memory Loader Verifier (MLV) that loads operational flight programs for 32 USAF weapons systems. Weapon Systems include but are not limited to A-10, B-1, B-52, C-5, C-17, C-130, CV-22, F-15, F-16, H-60 and KC-46.

A. Mission Description and Budget Item Justification

The Bomber Armament Tester will ensure that our USAF bomber fleet can conduct nuclear deterrence, global power projection and global strike operations to support the President of the United States and Combatant Commanders by providing a reliable, cyber secure, and sustainable tester. The tasks are to develop a common bomber armament tester and the Test Program Sets (Software, Hardware, and Documentation) to test the armament release equipment on the bombers.

RDT&E efforts support development, testing, and producibility of the Bomber Armament Tester and Test Program Sets. The program will utilize an incremental development approach with B-2 as Increment 1, B-1 as Increment 2, and B-52 as Increment 3.

The Common Aircraft Portable Reprogramming Equipment (CAPRE) Secure Memory Loader Verifier (SMLV) is a secure common memory loader verifier that loads operational flight programs to the weapon systems. . CAPRE leads the fleet on Cyber initiatives and is government owned and developed. CAPRE supports 32 USAF weapon systems including but not limited to A-10, B-1, B-52, C-5, C-17, C-130, CV-22, F-15, F-16, H-60 and KC-46.

RDT&E effort includes developing a Network Interface Module (NIM) that provides additional cyber hardening to the CAPRE system and redesigning the current CAPRE system to adapt to the NIM. RDT&E effort also includes software development for NIM interfaces and new weapons systems moving to the CAPRE system from other MLV systems. The goal is to provide one common cyber secure MLV for the Air Force that minimizes cyber vulnerabilities in weapon systems.

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The Common Armament Tester-Fighter (CAT-F) provides acquisition workforce to execute new workload associated with implementation of cyber secure common armament ATS solution resulting in significant reduction in logistics footprint, reduced sustainment cost and improved testing availability for nuclear & conventional missions. This will allow for a common reliable, cyber resilient, nuclear certified and sustainable armament tester for the USAF Combat Fighter Aircraft (A-10, F-15, F-16, F-22 and MQ-9 Platforms). Currently there are 14 unique testers supporting six fighter aircraft; 1009 total testers, \$10M annually to sustain with each tester having its own life cycle program management support structure. Availability of current testers averages 60%; legacy preload testers for A-10 & F-16 cannot check MIL-STD-1760.

RDT&E efforts support development, testing, and ability to produce the Common Armament Tester Fighter and Test Program Sets.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Automatic Test Systems Program Office 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."

This program element also includes program administrative cost for the Automatic Test Systems program office and funds the cost of studies and research to support the Automatic Test Systems fleet.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full rate production.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	13.653	2.787	17.200	0.000	17.200
Current President's Budget	13.153	2.787	10.673	0.000	10.673
Total Adjustments	-0.500	0.000	-6.527	0.000	-6.527
• 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	-0.500	0.000			
• Other Adjustments	0.000	0.000	-6.527	0.000	-6.527

Change Summary Explanation

FUNDING REDUCED AS A RESULT OF ZERO BELOW THRESHOLD (ZBT) AND UNDER EXECUTION OF FUNDING

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Title: Bomber Armament Tester Description: New Common Bomber Armament Tester for B-1, B-2, and B-52. FY 2020 Plans: No FY20 funding for Bomber Armament Tester FY 2021 Plans: Increments 1-3 (B-2, B-1, B-52) FY 2020 to FY 2021 Increase/Decrease Statement: Funds need to finish the develop of the Bomber Armament Tester, Increments 1-3 (B-2, B-1, B-52)	13.153	0.000	8.284
Title: Common Aircraft Portable Reprogramming Equipment (CAPRE) Description: Development of a common cyber secure Memory Loader Verifier for the Air Force. FY 2020 Plans: Development of Aircraft Adapter Group (AAG) software and cabling to re-host F-16 Viper and legacy CAPRE groups to the NIM FY 2021 Plans: FY21/22 3600 RDT&E funds needed to complete the development of the CAPRE SMLV that allows secure transfer of operational flight program (OFP) on 32 supported aircraft. This includes software development and interfaces for the CAPRE SMLV. FY 2020 to FY 2021 Increase/Decrease Statement: FY21 cut based on past execution	0.000	2.787	2.389
Accomplishments/Planned Programs Subtotals	13.153	2.787	10.673

D. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 07 00071: <i>Replacement Support Equipment</i>	18.099	13.600	27.311	0.000	27.311	27.392	23.677	19.182	23.948	0.000	153.209

Remarks
Other program funding includes procurement funds for Bomber Armament Tester Program, the Common Aircraft Portable Reprogrammable Equipment and Aircraft Smart Weapons Test Set (ASWTS).

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force Date: February 2020

Appropriation/Budget Activity

3600: *Research, Development, Test & Evaluation, Air Force I BA 5: System Development & Demonstration (SDD)*

R-1 Program Element (Number/Name)

PE 0701212F / *Automated Test Systems*

E. Acquisition Strategy

Acquisition Strategy for the Bomber Armament Tester (BAT) was approved by AFPEO/ Agile Combat Support on 12 November 2015 . The BAT program will use an incremental approach based on customer needs to satisfy this requirement. Increment 1 includes the development of the core test set, the B-2A requirements and development of the most complex B-1B and B-52 test program sets. Increment 2 consist of the B-1B development and Increment 3 consists of the B-52H requirements. The BAT program will utilize full and open competition to award the contract. Contract awarded September 28, 2017.

The Acquisition strategy for Common Aircraft Portable Reprogrammable Equipment (CAPRE) Secure Memory Loader Verifier. (SMLV) is to use the original government manufacturer to develop the NIM , software and hardware development. Acquisition Strategy for CAPRE was approved by the Milestone Decision Authority in June 2017.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0701212F / Automated Test Systems	Project (Number/Name) 6506TE / Test And Evaluation Support Budget Authority
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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	-	-		-		-		-		-	Continuing	Continuing	-
CAPRE/CAPRE SMLV Development	PO	309th OO-ALC : UT	-	0.000		2.270	Oct 2019	1.872	Oct 2020	-		1.872	Continuing	Continuing	-
BAT Development	C/CPAF	Not specified. : CA	-	4.600	Apr 2019	-		6.358	Dec 2020	-		6.358	Continuing	Continuing	-
Subtotal			-	4.600		2.270		8.230		-		8.230	Continuing	Continuing	N/A

Remarks
Product Development Cost include the development of the Bomber Armament Test Sets (Units under test Software, hardware and Technical Data), Technical Data and maintenance of Government Furnished Equipment.

Development efforts include developing a Network Interface Module (NIM) that provides additional cyber hardening to the CAPRE system and redesigning the current CAPRE system to adapt to the NIM. Development effort also include software development for NIM interfaces and new weapons systems moving to the CAPRE system from other MLV systems. The goal is to provide one common cyber secure MLV for the Air Force.

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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
Support	C/CPAF	Not specified. : TBD	-	2.487	Sep 2019	-		-		-		-	Continuing	Continuing	-
Logistic Support	C/CPAF	Not specified. : NV	-	2.488	Sep 2019	-		-		-		-	Continuing	Continuing	-
Subtotal			-	4.975		-		-		-		-	Continuing	Continuing	N/A

Remarks
Support Cost include Independent verification and validation support, Nuclear Certification Support and Cyber Security authority support.

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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	-	-		-		0.450	Nov 2020	-		0.450	Continuing	Continuing	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force											Date: February 2020				
Appropriation/Budget Activity 3600 / 5						R-1 Program Element (Number/Name) PE 0701212F / Automated Test Systems					Project (Number/Name) 6506TE / Test And Evaluation Support Budget Authority				

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Development and Operation Testing support	C/CPIF	Not specified. : NV	-	2.000	Aug 2019	-		0.108	Mar 2021	-		0.108	Continuing	Continuing	-
Subtotal			-	2.000		-		0.558		-		0.558	Continuing	Continuing	N/A

Remarks
Environmental testing of the Bomber Armament Tester and operational testing of the test program sets for the B-2 and most complex B-1 and B-52

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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	Aug 2021	-		0.000	Continuing	Continuing	-
BAT Travel	Various	Not specified. : NV	-	0.095	Sep 2019	0.000		0.100	Sep 2021	-		0.100	Continuing	Continuing	-
BAT Program Management Support	C/FFP	Not specified. : NV	-	1.268	May 2019	0.000		1.268	Sep 2021	-		1.268	Continuing	Continuing	-
CAPRE/CAPRE SMLV Travel	Various	Not specified. : NV	-	0.015	Sep 2019	0.025	Sep 2020	0.025	Sep 2021	-		0.025	Continuing	Continuing	-
CAPRE/ CAPRE SMLV Program Management Support	C/FFP	Not specified. : NV	-	0.200	May 2019	0.492	Jun 2020	0.492	Jul 2021	-		0.492	Continuing	Continuing	-
Subtotal			-	1.578		0.517		1.885		-		1.885	Continuing	Continuing	N/A

Remarks
PMA costs include travel to support the development of the Bomber Armament Tester. PMA cost also include an Information Assurance expert, Assistance and advisory service contractors to provide support to the program office during the development of the program. The program element may include necessary civilian pay expenses required to manage, execute and deliver Automatic Test System capability.

Project Cost Totals	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
	-	13.153	2.787	10.673	-	10.673	Continuing	Continuing	N/A

Remarks

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0701212F / <i>Automated Test Systems</i>	Project (Number/Name) 6506TE / <i>Test And Evaluation Support Budget Authority</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Automatic Test Systems</i>				
BAT Milestone C Decision	2	2021	2	2021
Inc 2 EMD B-1B TPS	4	2019	3	2021
Inc 3 EMD B-52 TPS	3	2021	4	2022
TPS FIAT (PCA/FCA)	4	2020	1	2021
CAPRE Block 40/50 Design Development Gates	4	2019	2	2020
CAPRE CDR	2	2019	4	2019
CAPRE Block 30 Design Development Gates	1	2019	3	2020

Note

Schedule reflects increment one EMD. Increments two and three are currently unfunded.

CAPRE is government designed and development. Plan is to have original government manufacturer to handle this development effort.