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

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 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	-	2.685	10.654	15.445	0.000	15.445	-	-	-	-	-	-
6506TE: <i>Test And Evaluation Support Budget Authority</i>	-	2.685	10.654	15.445	0.000	15.445	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

Program MDAP/MAIS Code: 6506

Note

The Automatic Test System program office is responsible for developing, acquiring and sustaining 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 (BAT) will ensure the 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 SMLV leads the fleet on Cyber initiatives and is government owned and developed. CAPRE SMLV supports 45 Mission Design Series (MDS) 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.

This 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. Additionally this RDT&E effort 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 to minimize cyber vulnerabilities in weapon systems.

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The Common Armament Tester-Fighter (CAT-F) provides 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, requiring 10M annually to sustain each tester and their respective program management support structure. Availability of current testers averages 60%; legacy preload testers for A-10 & F-16 cannot meet requirements in MIL-STD-1760.

RDT&E efforts support prototype development and testing of 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 programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY19 \$0.000M, FY20 \$0.000M, and FY21 \$0.000M was expended for civilian pay expenses in this program element.

The FY22 funding request was reduced by \$0.984M to account for the availability of prior year execution balances.

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)	<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	2.787	10.673	15.506	0.000	15.506
Current President's Budget	2.685	10.654	15.445	0.000	15.445
Total Adjustments	-0.102	-0.019	-0.061	0.000	-0.061
• 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	-0.102	-0.019	-0.061	0.000	-0.061

Change Summary Explanation

No significant changes

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>Title: Bomber Armament Tester</p> <p>Description: New Common Bomber Armament Tester for B-1, B-2, and B-52. RDT&E efforts support development, testing, and producibility of the Bomber Armament Tester and Test Program Sets.</p> <p>FY 2021 Plans: Increments 1-3 (B-2, B-1, B-52)RDT&E efforts support development, testing, and producibility of the Bomber Armament Tester and Test Program Sets.</p> <p>FY 2022 Base Plans: RDT&E efforts support development, testing, and producibility of the Bomber Armament Tester and Test Program Sets.</p> <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: FY21 to FY22 decrease is due to the development of the Bomber Armament Tester nearing the completion of development and starting the early phases of production.</p>	0.000	8.265	4.438	0.000	4.438
<p>Title: Common Aircraft Portable Reprogramming Equipment (CAPRE)</p> <p>Description: Development of a common cyber secure Memory Loader Verifier for the Air Force.</p> <p>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 45 Mission Design Series (MDS). This includes software development and interfaces for the CAPRE SMLV.</p> <p>Funds are also needed to continue the development efforts and all costs associated with the development of this program, which is phased and funded incrementally.</p> <p>FY 2022 Base 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.</p>	2.685	2.389	11.007	0.000	11.007

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Funds are also needed to continue the development efforts and all costs associated with the development of this program, which is phased and funded incrementally.					
FY 2022 OCO Plans: N/A					
FY 2021 to FY 2022 Increase/Decrease Statement: Funds increased due to budget cuts that the program sustained in FY20 and 21 as a result of Un-Billed Balance Issues with the OEM on the CAPRE SMLV program and due to schedule delays and cost overruns on the BAT program, hence creating a funding shortfall for the program.					
Accomplishments/Planned Programs Subtotals	2.685	10.654	15.445	0.000	15.445

D. Other Program Funding Summary (\$ in Millions)	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 00071: <i>Replacement Support Equipment</i>	13.600	27.311	27.392	-	27.392	-	-	-	-	-	-

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

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 2022 Air Force **Date:** May 2021

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 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	-	-	-
CAPRE/CAPRE SMLV Development	PO	309th OO-ALC : UT	-	2.168	Oct 2019	2.389	Jan 2021	-		-		-	-	-	-
BAT Development / Cost Overruns	C/CPAF	Not specified. : CA	-	-		8.265	Oct 2020	3.450	Oct 2021	-		3.450	-	-	-
Subtotal			-	2.168		10.654		3.450		-		3.450	-	-	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.

Test and Evaluation (\$ 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			
Test and Evaluation	C/CPAF	Not specified. : TBD	-	-		-		3.062	Oct 2021	-		3.062	-	-	-
Development and Operation Testing support	C/CPIF	Not specified. : NV	-	-		-		8.933	Oct 2021	-		8.933	-	-	-
Subtotal			-	-		-		11.995		-		11.995	-	-	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.

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

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	Award Date			
Management Services	C/CPAF	Not specified. : TBD	-	0.000		-		-		-		-		-	-	-
BAT Travel	Various	Not specified. : NV	-	0.000		-		-		-		-		-	-	-
BAT Program Management Support	C/FFP	Not specified. : NV	-	0.000		-		-		-		-		-	-	-
CAPRE/CAPRE SMLV Travel	Various	Not specified. : NV	-	0.025	Sep 2020	-		-		-		-		-	-	-
CAPRE/ CAPRE SMLV Program Management Support	C/FFP	Not specified. : NV	-	0.492	Jun 2020	-		-		-		-		-	-	-
Subtotal			-	0.517		-		-		-		-		-	-	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.

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	2.685	10.654	15.445	-	15.445	-	-	N/A

Remarks

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force		Date: May 2021
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	4	2022	4	2022
Inc 2 EMD B-1B TPS	3	2021	1	2023
Inc 3 EMD B-52 TPS	1	2023	1	2025
TPS FIAT (PCA/FCA)	3	2021	2	2022
CAPRE Block 40/50 Design Development Gates	4	2020	4	2020
DT/OT	1	2021	4	2021
CAPRE Block 30 Design Development Gates	1	2020	1	2021

Note

Bomber Armament Tester (BAT) is a nuclear certified common tester capable of testing on-aircraft Stores Management Systems and Line Replacement Units both on- and off-aircraft. The BAT System will test functionality of the Armament Mission Equipment (AME) that is required for B-2A, B-1B, and B-52H weapons delivery. The BAT schedule reflects Increments I, II, AND III. Due to an increase in material cost and lack of access to needed Government Furnished Property (GFP) to the Original Equipment Manufacturer (OEM), the BAT program is experiencing major schedule delays which is causing the program to overrun the projected cost. Program re-baselined at the beginning of FY21 to stabilize program costs and schedule.

FY22 funds will be used for Engineering & Manufacture Design (EMD) phases for Increments I, II, and III. Without FY22 3600 funding, EMD and integration will be stopped, and BAT development and integration will be further delayed.

The Common Aircraft Portable Reprogramming Equipment (CAPRE) Secure Memory Loader Verifier (SMLV) a is government designed and developed memory loader verifier (MLV) to replace the aging F-16 unique MLV and legacy CAPRE equipment. FY22 funds will be used for Engineering & Manufacture Design (EMD) of the CAPRE SMLV to ensure a cyber-secure MLV to maximize readiness for 18 platforms.