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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 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0207325F / <i>Joint Air-to-Surface Standoff Missile (JASSM)</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	266.077	40.933	78.498	70.792	0.000	70.792	115.792	33.374	20.554	20.933	109.735	756.688
675356: <i>JASSM Extended Range (JASSM-ER)</i>	266.077	40.933	78.498	70.792	0.000	70.792	115.792	33.374	20.554	20.933	109.735	756.688
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

Program MDAP/MAIS Code: 555

Note
This program, BA 7, PE 0207325F, project 675356, Weapon Data Link (WDL), is a new start.

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 and JASSM-ER/AGM-158D). JASSM-ER provides a long range (over twice the range of JASSM-BL), 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. The Air Force developed JASSM-ER based on a contractor-developed, government-approved System Performance Specification (SPS). The requirement is in the JASSM-ER Capability Production Document (CPD), dated 16 April 2010. Aircraft integration of JASSM-ER/AGM-158B is complete on the B-1, F-15E, and B-52. Objective aircraft are B-52, F-16, B-2, and F-15E. JASSM-ER/AGM-158D is an upgrade to the existing JASSM-ER/AGM-158B, incorporating multiple development initiatives into a single, system-level update to respond to rapidly changing threats and parts obsolescence issues. The program continues development and integration efforts to improve lethality, lengthen operational life and adjust/incorporate emerging technologies. The 2018 National Defense Strategy (NDS) increased the JASSM inventory objective by 48% which resulted in the monitoring/resolution of obsolescence on 13 subsystems. The program is also evaluating Diminishing Manufacturing Sources and Material Shortages (DMSMS) issues.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver JASSM 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. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	42.472	78.498	36.210	0.000	36.210
Current President's Budget	40.933	78.498	70.792	0.000	70.792
Total Adjustments	-1.539	0.000	34.582	0.000	34.582
• 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	-1.539	0.000			
• Other Adjustments	0.000	0.000	34.582	0.000	34.582

Change Summary Explanation

FY2019: Small Business Innovation Research -\$1.539M

FY2021: AGM-158D development effort \$34.582M

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

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Warfighting Capability Enhancement	5.120	12.270	17.310	-	17.310
Description: Design and development of software and mission planning changes to enable the missile to maintain operational effectiveness in classified scenarios.					
FY 2020 Plans: Begin flight tests and update classified software accordingly based on flight test results. Begin modification of additional classified software to enable the missile to maintain operational effectiveness in classified scenarios.					
FY 2021 Base Plans: Continue flight tests and update classified software accordingly based on the flight test results. Continue modification of classified software to enable the missile to maintain operational effectiveness in classified scenarios.					
FY 2020 to FY 2021 Increase/Decrease Statement: Funding increased due to additional classified software being developed to increase operational effectiveness in classified scenarios.					
Title: Wing Replacement/Chine Development, survivability enhancement, and integration	27.231	49.758	25.426	-	25.426

UNCLASSIFIED

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
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<p>Description: Provides increased standoff range, survivability, and improved vehicle stability/control.</p> <p>FY 2020 Plans: Continue design and development efforts for wing sub-systems to include B-1 integration.</p> <p>FY 2021 Base Plans: Begin AGM-158D flight test program to include flying test beds, ground mounts, fit checks, captive carry, free flight releases, wind tunnel tests, and other tests as required.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding decreased due to a shift from primarily development activities to Test and Integration.</p>					
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<p>Title: Electronic Safe and Arm Fuze (ESAF)</p> <p>Description: ESAF will resolve FMU-156 obsolescence and reliability issues, improve yield, and potentially lower costs.</p> <p>FY 2020 Plans: Continue ESAF environmental, safety, and qualification testing via first set of Sled Tests.</p> <p>FY 2021 Base Plans: Continue ESAF environmental, safety, and qualification testing to include additional Sled and the start of flight testing.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding decreased due to Cannon Test completion and qualification wrap-up.</p>	4.342	10.882	7.900	-	7.900
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<p>Title: M-Code and Related Development Efforts</p> <p>Description: Development and integration of a GPS receiver capable of receiving M-Code</p> <p>FY 2020 Plans: Realignment of funds to Common M-Code PE 0604201F.</p> <p>FY 2021 Base Plans: Realignment of funds to Common M-Code PE 0604201F.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement:</p>	4.073	0.000	0.000	-	0.000
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C. Accomplishments/Planned Programs (\$ in Millions)					
	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
N/A					
<p>Title: Weapon Data Link (WDL)</p> <p>Description: Provides capability to re-target the missile post-launch against time sensitive targets that have moved during mission execution or to attack critical emerging targets.</p> <p>FY 2020 Plans: N/A</p> <p>FY 2021 Base Plans: Begin missile data link interface control documentation, AGM-158D specification update, and a System Requirements Review to define technical performance parameters. Start initial trade study to physically integrate the data link in the missile.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding increased due to first year of WDL effort.</p>	-	0.000	10.400	-	10.400
<p>Title: Other Development/Safety/Survivability</p> <p>Description: Develop and integrate advanced Precision, Navigation, and Timing (PNT) capabilities (e.g. GPS, 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.</p> <p>FY 2020 Plans: Continue evaluation activity addressing JASSM's obsolescence plan directed activities to include Non-GPS Nav Joint Capability Technology Demonstration (JCTD).</p> <p>FY 2021 Base Plans: Continue evaluation activity addressing JASSM's obsolescence plan directed activities to include Non-GPS Nav JCTD. Update Inertial Measurement Unit (IMU) subsystem specification, begin GNC and auto pilot software allocations and updates.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding increased due to start of IMU efforts.</p>	0.167	5.588	9.756	-	9.756
Accomplishments/Planned Programs Subtotals	40.933	78.498	70.792	-	70.792

UNCLASSIFIED

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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>
• MPAF 02 0207325F: <i>JASSM</i>	602.828	483.425	475.949	30.000	505.949	750.653	758.290	758.396	761.885	1,188.000	5,809.426

Remarks

Lease temporary work space/seating for development and test management personnel, as required to support mission needs.

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 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0207325F / Joint Air-to-Surface Standoff Missile (JASSM)	Project (Number/Name) 675356 / JASSM Extended Range (JASSM-ER)
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Product Development (\$ 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			
Warfighting Capability Enhancement	SS/CPAF	Lockheed Martin : Orlando, FL	4.427	5.120	Nov 2018	12.270	Nov 2019	17.310	Nov 2020	-		17.310	29.760	68.887	67.724
Wing Replacement/Chine Development, survivability enhancements, and Integration	SS/CPFF	Lockheed Martin : Orlando, FL	7.431	27.231	Jan 2019	49.758	Nov 2019	25.326	Nov 2020	-		25.326	71.474	181.220	136.000
ESAF	SS/CPFF	Lockheed Martin : Orlando, FL	16.167	4.342	Nov 2018	10.882	Nov 2019	7.900	Nov 2020	-		7.900	0.000	39.291	18.872
M-code and Related Development Efforts	SS/CPFF	Lockheed Martin : Orlando, FL	7.466	4.073		-		-		-		-	36.974	48.513	74.610
Weapon Data Link (WDL)	C/CPAF	Lockheed Martin : Orlando, FL	0.000	-		-		10.400	Nov 2020	-		10.400	51.900	62.300	62.300
JASSM-ER Phase I/ II development Test Missile Procurement (for DT/IT), parts upgrade, software updates, product improvements, survivability enhancements, LTIK, ITIK, and obsolescence.	Various	Lockheed Martin : Orlando, FL	158.266	0.000	Mar 2018	5.488	Nov 2019	9.756	Jan 2021	-		9.756	110.072	283.582	254.909
Subtotal			193.757	40.766		78.398		70.692		-		70.692	300.180	683.793	N/A

Remarks
 -Intelligent Telemetry Instrumentation Kit (ITIK)
 -Legacy Telemetry Instrumentation Kits (LTIK)
 -Electronic Safe and Arm Fuze (ESAF)

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			
Government Test Support. Includes flight test equipment, targets,	Various	96 TW : Eglin AFB, FL	32.993	-		-		-		-		-	0.000	32.993	31.644

UNCLASSIFIED

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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			
96th Test Wing and Range support, AEDC test support, and other ground/flight test support as necessary.															
6 IT/6 OT assets	SS/CPAF	Lockheed Martin : Orlando, FL	12.733	-		-		-		-		-	0.000	12.733	12.733
12 Operational Test (OT) assets	SS/FFP	Lockheed Martin : Orlando, FL	24.642	-		-		-		-		-	0.000	24.642	24.643
Subtotal			70.368	-		-		-		-		-	0.000	70.368	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

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			
Program Management Administration (PMA). Provides program office oversight of development and upgrade activities.	Various	PMA : Eglin AFB, FL	1.952	0.167	Mar 2019	0.100	Mar 2020	0.100	Mar 2021	-		0.100	0.500	2.819	3.771
Subtotal			1.952	0.167		0.100		0.100		-		0.100	0.500	2.819	N/A

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
	266.077	40.933	78.498	70.792	-	70.792	300.680	756.980	N/A

Remarks
Test and Evaluation is incorporated within the respective RDT&E categories rather than being broken out as a separate cost.

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0207325F / <i>Joint Air-to-Surface Standoff Missile (JASSM)</i>	Project (Number/Name) 675356 / <i>JASSM Extended Range (JASSM-ER)</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>RDT&E Schedule Details</i>				
Warfighting Capability Enhancement	3	2019	4	2023
Wing Replacement/Chine Development, survivability enhancements, and Integration	1	2019	2	2023
ITIK Battery Development and Qualification (Phase 1,2, and 3)	1	2019	1	2020
ITIK Integration with JASSM and Test Equipment Development	1	2019	3	2019
Electronic Safe and Arm Fuze (ESAF)	1	2019	4	2021
ESAF Production Readiness Review (PRR)	3	2021	3	2021
M-Code Pre-EMD	1	2019	2	2022
M-Code Engineering and Manufacturing Development (EMD)	2	2021	4	2025
Weapon Data Link (WDL)	1	2021	4	2024
Diminishing Manufacture Sources and Obsolescence Evaluation/Development	1	2019	4	2025