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Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Air Force **Date:** March 2024

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 0207327F I <i>Small Diameter Bomb (SDB)</i>
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COST (\$ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
Total Program Element	-	37.988	37.518	29.910	0.000	29.910	24.918	25.419	25.817	26.326	0.000	207.896
675191: <i>SDB Increment II</i>	-	37.988	37.518	29.910	0.000	29.910	24.918	25.419	25.817	26.326	0.000	207.896
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

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 (APB) 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. DoN's first production lot (Lot 4/FY19) supports F/A-18E/F Initial Operating Capability (IOC). The Milestone Decision Authority approved an APB update May 2022 to incorporate the new Air Force inventory objective and adjust for new F-35B/C software schedules.

Implements tenets of Open, Agile, and Digital acquisition for any new subsystem hardware or software development. Integrates the system in weapon portfolio trade space studies by conducting trade studies, system engineering, test activities, and system modeling and simulation. Builds and refines a mission modeling framework by incorporating higher-fidelity weapon system designs and updates to the threat landscape to conduct ongoing assessment of weapon system performance against the authoritative threat. Leverages common component development, in collaboration with other weapon systems, to reduce redundant costs between systems with similar subsystems requirements. Invests in analytical, information management, data management, digital environments, networks, facilities, and security infrastructure upgrades directly supporting development and sustainment of this program's capabilities, while leveraging Department of Defense (DoD) and Department of Air Force (DAF) enterprise Information Technology (IT) solutions.

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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 0605827F, 0605828F, 0605829F, 0605831F, 0605832F, 0605833F, 0605898F, 0606398F. In PY (FY2023) \$0.604M was expended for civilian pay expenses in this program element, and CY (FY2024) \$0.855M is forecasted for civilian pay expenses in this program element.

This program element may include necessary emergent or unanticipated civilian pay expenses required to manage, execute, and deliver Small Diameter Bomb Increment II (SDB II) 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 0207327F.

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)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	32.713	37.518	29.857	0.000	29.857
Current President's Budget	37.988	37.518	29.910	0.000	29.910
Total Adjustments	5.275	0.000	0.053	0.000	0.053
• 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	6.331	0.000			
• SBIR/STTR Transfer	-1.056	0.000			
• Other Adjustments	0.000	0.000	0.053	0.000	0.053

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

Project: 675191: *SDB Increment II*

Congressional Add: *Precise Navigation*

Congressional Add Subtotals for Project: 675191

Congressional Add Totals for all Projects

	FY 2023	FY 2024
	5.000	0.000
	5.000	0.000
	5.000	0.000

Change Summary Explanation

FY23 SBIR adjustments -\$1.056M
 FY23 SDB II increase of +\$6.331M from below threshold reprogramming

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C. Accomplishments/Planned Programs (\$ in Millions)		FY 2023	FY 2024	FY 2025
<p>Title: SDB II Development and Engineering Changes</p> <p>Description: 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 software capability upgrades. Conduct trade studies and concept development for technology refresh redesigns as based on obsolescence forecasts.</p> <p>FY 2024 Plans: Complete cryptographic modernization weapon data link integration and subsystem level design verification testing. Continue collaboration with National Security Agency (NSA) on cryptographic modernized Weapon data Link (WDL) key testing, fielding, and management. Continue enhancements for JMPS and Operational Flight Program (OFP) software. Complete all-up-round (AUR) testing.</p> <p>Continue design verification tests of electronic circuit card assemblies (CCAs) affected by obsolescence and M-Code moving toward AUR level testing. Perform OFP and firmware updates to support new CCA designs. Complete Proof of Manufacturing (POM)-level integrated CCA stack design verification testing and qualification. Complete integration and test of the TacNet 1.5 WDL with the 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. Increase 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>FY 2025 Plans: Begin cryptographic modernization 2.0 weapon data link design into the TacNet 1.5 WDL. Complete design verification tests of electronic circuit card assemblies (CCAs) affected by obsolescence and M-Code moving toward AUR level testing. Perform OFP and firmware updates to support new CCA designs. Complete POM-level integrated CCA stack design verification testing and qualification. Complete integration and test of the TacNet 1.5 WDL with the new CCAs and associated OFP changes.</p>		10.386	23.998	22.245

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C. Accomplishments/Planned Programs (\$ in Millions)		FY 2023	FY 2024	FY 2025
<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. Increase 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>FY 2024 to FY 2025 Increase/Decrease Statement: Funding decreased due to completion of the testing and integration of the TacNet 1.5 WDL into the AUR.</p>				
<p>Title: SDB II M-Code</p> <p>Description: 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>FY 2024 Plans: 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 continue associated component integration. Continue M-Code receiver-level qualification, including security certification. Conduct production readiness activities at the receiver level. Continue building section level and All Up Round (AUR) developmental test assets and conduct section level design verification testing as well as All Up Round testing and qualification. 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. Build additional AUR-level builds in support of flight qualification.</p> <p>FY 2025 Plans: Complete activities to provide SDB II with M-Code capabilities for improved anti-jam and secure access to military GPS signals. Complete test and qualification activities for M-Code receiver and complete associated component integration. Complete M-Code receiver-level qualification, including security certification. Conduct production readiness activities at the receiver level. Complete building section level and All Up Round (AUR) developmental test assets and conduct section level design verification testing as well as All Up Round testing and qualification. Update mission planning and threshold aircraft OFP</p>		22.602	13.520	7.665

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2023	FY 2024	FY 2025
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. Build additional AUR-level builds in support of flight qualification. FY 2024 to FY 2025 Increase/Decrease Statement: Funding decrease due to completion of Common Assured Architecture for Position Navigation and Tracing (PNT) (CAAP) M-Code Application Specific Integrated Circuit (ASIC) and receiver component level testing required for integration into the AUR, and purchase of M-Code test articles in FY23 and FY24.			
Accomplishments/Planned Programs Subtotals	32.988	37.518	29.910

	FY 2023	FY 2024
Congressional Add: Precise Navigation FY 2023 Accomplishments: Design, integration, and test of candidate seeker-based algorithms suitable for operation in a Global Positioning System (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. FY 2024 Plans: N/A	5.000	0.000
Congressional Adds Subtotals	5.000	0.000

D. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025 Base</u>	<u>FY 2025 OCO</u>	<u>FY 2025 Total</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>FY 2028</u>	<u>FY 2029</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• MPAF 02 Line Item SDB002: <i>Small Diameter Bomb II</i>	379.006	291.553	327.676	-	327.676	310.658	281.143	315.417	321.670	Continuing	Continuing
• RDTE 05 PE 0604329N: <i>Small Diameter Bomb II</i>	38.429	52.211	19.861	-	19.861	12.062	10.633	9.966	10.173	0.000	153.335
• WPN Line Item 223800: <i>Small Diameter Bomb II</i>	100.684	65.863	76.101	-	76.101	86.738	86.487	93.233	95.191	0.000	604.297

Remarks
DoN RDT&E funds include F-35B and F-35C Integration and Support Cost.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Air Force Date: March 2024

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

R-1 Program Element (Number/Name)
PE 0207327F / *Small Diameter Bomb (SDB)*

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 4-9 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, 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.

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 0605827F, 0605828F, 0605829F, 0605831F, 0605832F, 0605833F, 0605898F, 0606398F. In PY (FY2023) \$0.604M was expended for civilian pay expenses in this program element, and CY (FY2024) \$0.855M is forecasted for civilian pay expenses in this program element.

This program element may include necessary emergent or unanticipated civilian pay expenses required to manage, execute, and deliver Small Diameter Bomb Increment II (SDB II) 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 0207327F.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2025 Air Force **Date:** March 2024

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0207327F / <i>Small Diameter Bomb (SDB)</i>	Project (Number/Name) 675191 / <i>SDB Increment II</i>
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Product Development (\$ in Millions)				FY 2023		FY 2024		FY 2025 Base		FY 2025 OCO		FY 2025 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 Changes & Technical Support	SS/ Various	Raytheon : Tucson, AZ	-	5.935	Dec 2022	20.047	Dec 2023	19.126	Dec 2024	-		19.126	0.000	45.108	136.520
M-Code Integration	SS/ Various	Raytheon : Tucson, AZ	-	22.602	Dec 2022	13.571	Dec 2023	7.665	Dec 2024	-		7.665	0.000	43.838	109.437
Precision Navigation	Various	Not specified. : TBD	-	5.000	Aug 2023	-		-		-		-	0.000	5.000	-
F-15E Integration & Test Support	SS/ Various	Boeing : St. Louis, MO	-	1.350	Dec 2022	0.750	Dec 2023	1.400	Dec 2024	-		1.400	0.000	3.500	-
Subtotal			-	34.887		34.368		28.191		-		28.191	0.000	97.446	N/A

Remarks
 - M-Code Integration FY2024 to FY2025 Funding decrease reflects effort is ramping down and headed towards completion of Common Assured Architecture for Position Navigation and Tracing (PNT) (CAAP) M-Code Application Specific Integrated Circuit (ASIC) and receiver component level testing required for integration into the AUR, and purchase of M-Code test articles in FY23.

 *M-Code integration is required to meet the 2011 NDAA mandate. M-Code receiver and required electronics integration into AUR, testing and qualification for production cut-in are on-going through FY25.

 - F-15E Integration and Test Support FY2024 to FY2025 funding increase is due to the continued biannual weapon OFP updates and continuation of integration and testing of iECP into the AUR.

Test and Evaluation (\$ in Millions)				FY 2023		FY 2024		FY 2025 Base		FY 2025 OCO		FY 2025 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 Test Support	Various	Various : Various	-	1.400	Mar 2023	1.400	Mar 2024	-		-		-	0.000	2.800	11.896
Subtotal			-	1.400		1.400		-		-		-	0.000	2.800	N/A

Remarks
 UTTR: Utah Test and Training Range
 WSMR: White Sands Missile Range

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2025 Air Force **Date:** March 2024

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0207327F / <i>Small Diameter Bomb (SDB)</i>	Project (Number/Name) 675191 / <i>SDB Increment II</i>
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Management Services (\$ in Millions)				FY 2023		FY 2024		FY 2025 Base		FY 2025 OCO		FY 2025 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 Professional Administrative Support Services (EPASS)	Various	Various : Eglin AFB, FL	-	0.750	Jun 2023	0.548	Jun 2024	0.548	Jun 2025	-		0.548	0.000	1.846	25.508
Program Management Administration (PMA)	Various	Various : Eglin AFB, FL	-	0.347	Oct 2022	0.347	Oct 2023	0.316	Oct 2024	-		0.316	0.000	1.010	11.536
DCA Civ Pay	Allot	Allotment : Eglin AFB, FL	-	0.604	Oct 2022	0.855	Oct 2023	0.855	Oct 2024	-		0.855	Continuing	Continuing	-
Subtotal			-	1.701		1.750		1.719		-		1.719	Continuing	Continuing	N/A

Remarks
PMA: Other government costs (travel, equipment supplies, and IT support)

	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	37.988	37.518	29.910	-	29.910	Continuing	Continuing	N/A

Remarks
Engineering Changes: FY2024 to FY2025 decrease includes 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.

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Exhibit R-4, RDT&E Schedule Profile: PB 2025 Air Force **Date:** March 2024

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FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028				FY 2029			
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

<i>SDB Increment II</i>																												
F-15E Integration & Test Support																												
M-Code Integration & Testing																												
Data Link Crypto Mod Integration & Testing																												
Integration & Testing on Threshold F-35B/C																												
Precision Navigation																												
Lot Integration and Test																												
System Improvement Program																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2025 Air Force **Date:** March 2024

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0207327F / <i>Small Diameter Bomb (SDB)</i>	Project (Number/Name) 675191 / <i>SDB Increment II</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>SDB Increment II</i>				
F-15E Integration & Test Support	2	2023	4	2028
M-Code Integration & Testing	1	2023	3	2025
Data Link Crypto Mod Integration & Testing	1	2023	3	2024
Integration & Testing on Threshold F-35B/C	1	2023	3	2028
Precision Navigation	1	2023	4	2026
Lot Integration and Test	1	2023	4	2028
System Improvement Program	1	2023	4	2029

Note

The F-15E integration and test support will be on-going as new capabilities are developed and tested on the platform. This includes testing in the F-15 Richter Lab. This also includes any required F-15E testing as a result of hardware changes such as iECP in FY25-26.

The F-35 B/C testing is on going with the Navy/Marines Corps platforms.

Lot Integration and Test (LIT) will continue to be the contract vehicle that supports all testing across the program. This includes lab testing, captive flight testing, and through live fire testing. Additionally, engineering use guided test vehicles can be purchased through the LIT contract to support specialized testing requirements.

System Improvement Program (SIP) will be on-going through FY29+ as the program develops, tests and fields new capabilities for the weapon system. The program currently plans to release an Operational Flight Program (OFP) every other year that includes these capability upgrades.