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Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Air Force **Date:** April 2022

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0101127F / B-2 Squadrons
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COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
Total Program Element	0.000	147.390	131.647	111.990	0.000	111.990	112.890	20.742	0.004	0.004	Continuing	Continuing
675345: <i>B-2 Modernization</i>	0.000	132.818	116.987	96.554	0.000	96.554	112.890	20.742	0.004	0.004	Continuing	Continuing
676021: <i>BASELINE SUPPORT</i>	0.000	14.572	14.660	15.436	0.000	15.436	0.000	0.000	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

The B-2 is currently undergoing modernization of avionics, communications systems, cockpit displays, 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, as well as advanced weapons integration and advanced communications, 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.

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. FY 2021 and prior years DMS-M efforts were in PE 0605931F.

B-2 Communications Upgrade (formerly known only as Adaptable Communications Suite) includes multiple modernization efforts including Adaptable Communications Suite (ACS) Increment 4.0, Airborne Integrated Terminal Group (AITG) Replacement and B-2 Collaborative Combat Communication (B2C3).

ACS is a non-integrated system that provides SATCOM connectivity for Command and Control en route 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 Ultra High Frequency (UHF) communications system in order to become part of the baseline configuration, as well as modernization upgrades to conform to mandates.

AITG provides Line-of-Sight UHF and Very High Frequency (VHF) voice communications including anti-jam, encrypted, and unencrypted. AITG Replacement will include the replacement of the AN/ARC-234 radio which will reach end-of-life effective 01 Oct 2026. AITG replacement will also implement the SATURN Waveform for anti-jam voice communications; this is a transition from the HAVE QUICK Waveform which will be retired effective 01 Oct 2024.

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.

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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 0101127F / <i>B-2 Squadrons</i>	
<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 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>This budget supports B-2 nuclear certification activities to include certification testing, analysis, and support related costs to ensure the weapon system's nuclear mission remains intact. 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 B-2 capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY 2021 0M was expended for civilian pay expenses in this program element, and in FY 2023 0M 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. Program Change Summary (\$ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	181.068	144.047	0.000	0.000	0.000
Current President's Budget	147.390	131.647	111.990	0.000	111.990
Total Adjustments	-33.678	-12.400	111.990	0.000	111.990
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-12.400			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-27.787	0.000			
• SBIR/STTR Transfer	-5.891	0.000			
• Other Adjustments	0.000	0.000	111.990	0.000	111.990

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

Project: 675345: *B-2 Modernization*

Congressional Add: *B-2 Trainers Modernization Congressional Add*

Congressional Add Subtotals for Project: 675345

Congressional Add Totals for all Projects

	FY 2021	FY 2022
	4.837	0.000
	4.837	0.000
	4.837	0.000

Change Summary Explanation

FY 2021 reprogramming of -27.742M on ATR package FY2116 PA along with small reprogramming adjustments.

FY 2022 Congressional reduction for -12.4M for B-2 Display Modernization carryover

The FY 2022 President's Budget submittal did not reflect FY 2023 through FY 2026 funding. Therefore, an explanation of the change between the two budget positions for FY 2023 cannot be made in a relevant manner

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Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0101127F / B-2 Squadrons				Project (Number/Name) 675345 / B-2 Modernization			
COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
675345: B-2 Modernization	0.000	132.818	116.987	96.554	0.000	96.554	112.890	20.742	0.004	0.004	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The B-2 is currently undergoing modernization of avionics, communications systems, cockpit displays, 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, as well as advanced weapons integration and advanced communications, 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.

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. FY 2021 and prior years DMS-M efforts were in PE 0605931F.

B-2 Communications Upgrade (formerly known only as Adaptable Communications Suite) includes multiple modernization efforts including Adaptable Communications Suite (ACS) Increment 4.0 and Airborne Integrated Terminal Group (AITG) Replacement.

ACS is a non-integrated system that provides SATCOM connectivity for Command and Control en route 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 Ultra High Frequency (UHF) communications system in order to become part of the baseline configuration, as well as modernization upgrades to conform to mandates.

AITG provides Line-of-Sight UHF and Very High Frequency (VHF) voice communications including anti-jam, encrypted, and unencrypted. AITG Replacement will include the replacement of the AN/ARC-234 radio which will reach end-of-life effective 01 Oct 2026. AITG replacement will also implement the SATURN Waveform for anti-jam voice communications; this is a transition from the HAVE QUICK Waveform which will be retired effective 01 Oct 2024.

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 High Frequency Material expansion), and radio frequency (RF) diagnostic tools, evaluation systems, and other key support equipment (Tier One Material Inspection

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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 a high Return On Investment (ROI) and provides 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 for storing Flight Information Data (FID) for recovery and use in the event of a mishap.

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.

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.

B-2 funding may be used to resolve emerging safety of flight and diminishing manufacturing sources issues, and fulfill FAA or other mandates necessary to ensure continued aircrew safety and mission effectiveness. Funding may also support innovation activities including, but not limited to, 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 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. In FY2021 OM was expended for civilian pay expenses in this program element, and in FY2022 OM 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 approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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

	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: Low Observable Signature and Supportability Mods and Trainers	9.892	9.279	5.268	-	5.268

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
<p>Description: 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> <p>FY 2022 Plans: 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 upgrade to the Tier One Material Inspection System, Tailpipe Improvement analysis, and Test Article 0998. Continue Signature Diagnostic System Spiral 12, essential for integrating the Next Generation Zonal Radar, which is critical for field maintainers.</p> <p>FY 2023 Base Plans: Continue development of on-going LOSSM and Training System core upgrades. Continue final development efforts for advanced LO materials, structures, procedures, and other enhanced diagnostics and measurement systems. Address any safety issues for Test Article 0998. Finalize Signature Diagnostic System Spiral 12 integration of the new software baseline to optimize the Next Generation Zonal Radar.</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: Funding decrease from FY 2022 to FY 2023 due to a decrease in development activities in FY 2023.</p>					
<p>Title: B-2 Communications Upgrade -- formerly known as Adaptable Communications Suite (ACS)</p> <p>Description: The 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. ACS Increment 4.0 will involve replacing the current PRC-117G radios with the AN/ARC-210 Gen 6 radio to transition B-2 SATCOM to the Mobile User Objective System (MUOS) satellite constellation.</p> <p>The B-2 Airborne Integrated Terminal Group (AITG) provides Line-of-Sight UHF and VHF voice communications including anti-jam, encrypted and unencrypted, for the aircraft. Acquisition planning and risk reduction efforts are underway for replacement of the AITG.</p> <p>FY 2022 Plans:</p>	0.200	19.726	34.187	-	34.187

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
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ACS Increment 4.0: Complete risk reduction, System Requirements Review, System Functional Review, and Preliminary Design Review for a modernized ACS system.
 AITG Replacement: Continue acquisition planning and trade study efforts.

FY 2023 Base Plans:
 ACS Increment 4.0: Achieve Milestone B, complete Critical Design Review, initiate Developmental Testing and Evaluation. Award ACR-210 radio production buy.
 AITG Replacement: Complete planning and trade studies and initiate acquisition for EMD.

FY 2022 to FY 2023 Increase/Decrease Statement:
 Funding increase from FY 2022 to FY 2023 due to ramp up of development efforts for the AITG Replacement and production planning for ACS Increment 4.0 in FY 2023.

Title: B-2 Identification Friend or Foe (IFF) Mode 5/S Program	6.028	9.309	0.000	-	0.000
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Description: The B-2 IFF Mode 5/S Program is part of B-2 Integrated Functional Capability (IFC) drop P6.5, which also includes software sustainment updates and form, fit, function hardware replacement. The IFC Process is the framework within which B-2 avionics-related improvements are designed, developed, integrated, tested, and delivered. 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.

FY 2022 Plans:
 Execute 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, and initiation of on-aircraft ground/flight development/operational testing.

FY 2023 Base Plans:

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Continue on-aircraft ground/flight development/operational testing, aircraft monitoring and control testing (AMAC), and Milestone C decision. FY 2022 to FY 2023 Increase/Decrease Statement: Not applicable. FY 2022 is last year of 3600 funding.					
Title: B-2 Crash Survivable Memory Unit (CSMU) Description: 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). FY 2022 Plans: No development efforts in FY 2022. FY 2023 Base Plans: No development efforts in FY 2023. FY 2022 to FY 2023 Increase/Decrease Statement: N/A	1.098	0.000	0.000	-	0.000
Title: B-2 Display Modernization (BDM) Description: 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. FY 2021 and prior years DMS-M efforts were in PE 0605931F. FY 2022 Plans: Deliver engineering development units of MDU replacement hardware (MDU-R) to the development labs. Order MDU-R hardware for Engineering and Manufacturing Development kits. Begin modification of the B-2 Test Aircraft and development labs to support the BDM program. Continue software development and integration activities. Conduct appropriate systems engineering and design reviews, and release the Request for Proposal (RFP) for the Production phase of the program. FY 2023 Base Plans:	110.090	78.161	56.558	-	56.558

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Continue development and software integration of MDU Replacements (MDU-R). Advance development on lab support activities and continue engineering for modification of the B-2 Test Aircraft, A/C 1087, (currently configured for DMS-M). Conduct appropriate systems engineering and design reviews to support restructured program. FY 2022 to FY 2023 Increase/Decrease Statement: Funding decrease from FY 2022 to FY 2023 due to a decrease in development activities in FY 2023, including prime contractor open commitments that will not be required in FY 2023.					
Title: B-2 Trainers Modernization Description: 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. Support to include, but not limited to, PMA, A&AS, and travel to enable mission requirements. FY 2022 Plans: FY22 Funding for Trainers Division/Directorate PMA, IPT travel, and A&AS EPASS costs. FY 2023 Base Plans: FY23 Funding for Trainers Division/Directorate PMA, IPT travel, and A&AS EPASS costs. FY 2022 to FY 2023 Increase/Decrease Statement: N/A: Funding from FY22 to FY23 relatively stable	0.673	0.512	0.541	-	0.541
Accomplishments/Planned Programs Subtotals	127.981	116.987	96.554	-	96.554
	FY 2021	FY 2022			
Congressional Add: B-2 Trainers Modernization Congressional Add	4.837	0.000			

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	FY 2021	FY 2022
FY 2021 Accomplishments: Virtual Reality Phase 2 - Deploy Virtual Reality headsets and controllers to integrate with high fidelity immersive 3D B-2 training content in SAP environment.		
FY 2022 Plans: FY22 Funding for Trainers Division/Directorate PMA, IPT travel, and A&AS EPASS costs.		
Congressional Adds Subtotals	4.837	0.000

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

<u>Line Item</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u> <u>Base</u>	<u>FY 2023</u> <u>OCO</u>	<u>FY 2023</u> <u>Total</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 05 Line Item B00200: B-2 ACS Mod Funding PE 0101127F	0.300	0.300	0.306	-	0.306	0.311	25.511	31.527	32.167	Continuing	Continuing
• APAF 05 Line Item B00200 (1)...: B-2 LOSSM Mod Funding, PE 0101127F	19.194	16.407	18.829	-	18.829	20.536	11.479	11.715	-	Continuing	Continuing
• APAF 05 Line Item B00200 (2)...: B-2 CSMU Mod Funding, PE 0101127F	3.268	1.568	1.594	-	1.594	1.620	1.649	1.685	-	Continuing	Continuing
• APAF 05 Line Item B00200 (3)...: B-2 IFF Mode 5/S Mod Funding, PE 0101127F	-	2.795	15.552	-	15.552	10.264	-	-	-	Continuing	Continuing
• APAF 05 Line Item B00200 (4)...: BDM	-	-	38.114	-	38.114	17.574	3.669	3.309	0.014	Continuing	Continuing

Remarks

D. Acquisition Strategy

The B-2 is currently undergoing modernization of avionics systems, communication systems, cockpit displays, low observable components and training systems as well as the integration of advanced weapons. Most, but not all B-2 modernization programs utilize a sole source contract with the prime/integrating contractor (Northrop Grumman). Key elements of the acquisition strategy include: use of cost plus incentive fee and fixed price incentive fee development contracts, as well as the combination of developmental upgrades with software sustainment blocks to minimize the number of software releases, aircraft downtime, and number of fielded configurations.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Air Force **Date:** April 2022

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0101127F / B-2 Squadrons	Project (Number/Name) 675345 / B-2 Modernization
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Product Development (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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			
Low Observable Signature and Supportability Mods	Various	Various : Various	0.000	9.892	Oct 2020	9.279	Oct 2021	5.268	Dec 2022	-		5.268	Continuing	Continuing	-
B-2 Communications Upgrade	Various	Various : Various	0.000	0.200	Dec 2020	15.726	Aug 2022	34.187	Feb 2023	-		34.187	66.338	116.451	-
B-2 IFF Mode 5/S	Various	Various : Various	0.000	6.028	Nov 2020	9.309	May 2022	-		-		-	0.000	15.337	-
B-2 Crash SurvivableMemory Unit (CSMU)	Various	Various : Various	0.000	1.098	Dec 2020	-		-		-		-	0.000	1.098	-
B-2 Display Modernization (BDM)	Various	Various : Various	0.000	94.945	Feb 2021	67.510	Apr 2022	45.294	May 2023	-		45.294	30.206	237.955	-
Aircrew Training	Various	Various : Various	0.000	5.510	Sep 2021	0.512	Feb 2022	0.541	Feb 2023	-		0.541	Continuing	Continuing	-
Subtotal			0.000	117.673		102.336		85.290		-		85.290	Continuing	Continuing	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.

Test and Evaluation (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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	TBD	Not specified. : TBD	0.000	-		-		-		-		-	0.000	0.000	-
Government Test	MIPR	Various : CA	0.000	2.828		0.155	Dec 2021	0.164	Dec 2022	-		0.164	5.310	8.457	-
Subtotal			0.000	2.828		0.155		0.164		-		0.164	5.310	8.457	N/A

Remarks
B-2 Display Modernization (BDM) transitioned to PE 0101127F in FY 2021

Management Services (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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	0.000	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Air Force **Date:** April 2022

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0101127F / B-2 Squadrons	Project (Number/Name) 675345 / B-2 Modernization
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Management Services (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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	Various : TBD	0.000	12.317	Oct 2020	14.496	Feb 2022	11.100	Dec 2022	-		11.100	22.442	60.355	-
Subtotal			0.000	12.317		14.496		11.100		-		11.100	22.442	60.355	N/A
Project Cost Totals			0.000	132.818		116.987		96.554		-		96.554	Continuing	Continuing	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 2023 Air Force **Date:** April 2022

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0101127F / B-2 Squadrons	Project (Number/Name) 675345 / B-2 Modernization
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FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027			
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-2 Modifications Schedule																												
Low Observable Signature and Supportability Mods and Trainers																												
IFF Mode 5/S EMD Phase																												
Crash Survivable Memory Unit EMD Contract																												
B-2 Display Modernization (BDM) Displays EMD Phase																												
Adaptable Communications Suite (ACS)																												
Airborne Integrated Terminal Group (AITG)																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2023 Air Force **Date:** April 2022

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0101127F / <i>B-2 Squadrons</i>	Project (Number/Name) 675345 / <i>B-2 Modernization</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>B-2 Modifications Schedule</i>				
Low Observable Signature and Supportability Mods and Trainers	1	2021	4	2023
IFF Mode 5/S EMD Phase	1	2021	3	2022
Crash Survivable Memory Unit EMD Contract	1	2021	2	2022
B-2 Display Modernization (BDM) Displays EMD Phase	2	2021	4	2025
Adaptable Communications Suite (ACS)	4	2022	2	2027
Airborne Integrated Terminal Group (AITG)	3	2023	2	2027

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Air Force										Date: April 2022		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0101127F / B-2 Squadrons				Project (Number/Name) 676021 / BASELINE SUPPORT			
COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
676021: BASELINE SUPPORT	0.000	14.572	14.660	15.436	0.000	15.436	0.000	0.000	0.000	0.000	Continuing	Continuing
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.

B-2 funding may be used to resolve emerging safety of flight and diminishing manufacturing sources issues, and fulfill FAA or other mandates necessary to ensure continued aircrew safety and mission effectiveness. Funding may also support innovation activities including, but not limited to, studies, analyses, requirements definition, and quick-reaction capability prototypes/demonstrations to accelerate planning for technology transition, technology insertion, and future acquisition programs.

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

	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: Baseline Support Acq Plan/Studies/Integr Test Support	0.297	0.290	0.290	-	0.290
Description: 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.					
FY 2022 Plans: Continue Baseline Support activities including acquisition planning for future capabilities, long range planning, studies, and program integration activities.					
FY 2023 Base Plans: Continue Baseline Support activities including acquisition planning for future capabilities, long range planning, studies, and program integration activities.					
FY 2022 to FY 2023 Increase/Decrease Statement: N/A - No increase/decrease					
Title: Baseline Support Flight Test	14.275	14.370	15.146	-	15.146
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					

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Air Force	Date: April 2022
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Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0101127F / B-2 Squadrons	Project (Number/Name) 676021 / BASELINE SUPPORT
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
<p>need for additional operational aircraft and accelerating deployment of advanced operational capabilities to the warfighter.</p> <p>FY 2022 Plans: 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.</p> <p>FY 2023 Base Plans: 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.</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: Funding increase due to an increase in flight test support requirements for P6.5 (IFF), P6.6, and B-2 communications upgrade.</p>					
Accomplishments/Planned Programs Subtotals	14.572	14.660	15.436	-	15.436

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 2023 Air Force **Date:** April 2022

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0101127F / B-2 Squadrons	Project (Number/Name) 676021 / BASELINE SUPPORT
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Support (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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	0.000	-
Other Government Costs	Various	Various : Various	0.000	10.019	Oct 2020	10.128	Oct 2021	10.870	Dec 2022	-		10.870	Continuing	Continuing	-
Subtotal			0.000	10.019		10.128		10.870		-		10.870	Continuing	Continuing	N/A

Test and Evaluation (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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	0.000	-
Government Test	MIPR	AFTC : CA	0.000	2.716	Oct 2020	2.531	Oct 2021	3.000	Dec 2022	-		3.000	Continuing	Continuing	-
Subtotal			0.000	2.716		2.531		3.000		-		3.000	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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	0.000	-
PMA	Various	Various : TBD	0.000	1.837	Oct 2020	2.001	Oct 2021	1.566	Dec 2022	0.000	Dec 2022	1.566	Continuing	Continuing	-
Subtotal			0.000	1.837		2.001		1.566		0.000		1.566	Continuing	Continuing	N/A

	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals		0.000	14.572	14.660	15.436	0.000	15.436	Continuing	Continuing	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 2023 Air Force **Date:** April 2022

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0101127F / B-2 Squadrons	Project (Number/Name) 676021 / BASELINE SUPPORT
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	FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027			
	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>B-2 Baseline Support</i>	
FY 2021 Flight Test Core Support Annual Contract Award	
FY 2022 Flight Test Core Support Annual Contract Award	
FY 2023 Flight Test Core Support Annual Contract Award	

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Exhibit R-4A, RDT&E Schedule Details: PB 2023 Air Force		Date: April 2022
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0101127F / <i>B-2 Squadrons</i>	Project (Number/Name) 676021 / <i>BASELINE SUPPORT</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>B-2 Baseline Support</i>				
FY 2021 Flight Test Core Support Annual Contract Award	1	2021	1	2022
FY 2022 Flight Test Core Support Annual Contract Award	1	2022	1	2023
FY 2023 Flight Test Core Support Annual Contract Award	1	2023	1	2024