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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 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 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	0.000	85.742	181.068	144.047	0.000	144.047	-	-	-	-	-	-
675345: <i>B-2 Modernization</i>	0.000	71.391	166.496	129.387	0.000	129.387	-	-	-	-	-	-
676021: <i>BASELINE SUPPORT</i>	0.000	14.351	14.572	14.660	0.000	14.660	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

The B-2 is currently undergoing modernization of avionics/communications systems, engines, 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 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.

In FY 2020 and prior, the B-2 DMS-M effort was documented in PE 0605931F B-2 DMS, Project 653844 B-2 DMS. Beginning in FY 2021, this effort is documented in PE 0101127F B-2 Squadrons, Project 675345 B-2 Modernization. The FY 2021 budget reflected a significant restructure of the B-2 DMS-M program that reduced the program scope to modernize the B-2's primary flight displays. The legacy displays are not supportable due to obsolescence and repair issues which will severely impact future aircraft availability and are currently the number-one driver for reduced fleet readiness. The DMS-M effort was re-named to B-2 Display Modernization (BDM) to reflect the current scope of the effort. The BDM program will resume the Engineering and Manufacturing Development phase, during which the engineering baseline will be finalized and production representative kits will be purchased to support software development, platform integration, integrated development/operational test, pre-Milestone C production assessment, and B-2 nuclear certification testing. Diminishing manufacturing sources and materiel shortages for affected components will be addressed to protect the planned production program by mitigating unplanned part redesign and requalification risks. The program will ensure the most efficient restructure minimizing rework from the baseline DMS-M program.

The Adaptive Communication Suite (ACS) is a non-integrated system that provides SATCOM connectivity for Command and Control enroute 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 UHF communications system in order to become part of the baseline configuration, as well as modernization upgrades to conform to mandates.

B-2 Armament upgrades integrate new and/or advanced weapons on the B-2 to attack a wider array of target sets, to include hardened, deeply buried targets, as well as destroy more targets per sortie. Integration of the Joint Air-to-Surface Standoff Missile Extended Range (JASSM-ER) weapon will further enhance the B-2s ability to attack and destroy high value target sets. Additional studies and efforts will refine B-2 targeting accuracy using GPS guided weapons.

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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 / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0101127F / <i>B-2 Squadrons</i>	
<p>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.</p> <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 Radar Aided Targeting System (RATS) is planned to be a software only solution implemented in several B-2 system level Operational Flight Programs (OFPs) to provide radar-aided enhanced targeting capability through weapon hand-off navigational updates for guided nuclear and conventional weapons in a non-GPS environment.</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>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 WEAPON SYSTEM capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.</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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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 / <i>B-2 Squadrons</i>
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B. Program Change Summary (\$ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	93.076	187.399	173.200	0.000	173.200
Current President's Budget	85.742	181.068	144.047	0.000	144.047
Total Adjustments	-7.334	-6.331	-29.153	0.000	-29.153
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-9.200	-11.331			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	5.000	5.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-2.166	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-0.968	0.000	-29.153	0.000	-29.153

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

Project: 675345: *B-2 Modernization*

Congressional Add: *B-2 Trainers Modernization*

Congressional Add Subtotals for Project: 675345

Congressional Add Totals for all Projects

	FY 2020	FY 2021
	5.000	5.000
Congressional Add Subtotals for Project: 675345	5.000	5.000
Congressional Add Totals for all Projects	5.000	5.000

Change Summary Explanation

FY 2020 adjustments of -\$4.166M (\$2M BTR to PNT; \$2.166M source on OMNIBUS); -\$3.168M Small Business Innovative Research (SBIR)

FY 2021 Program increase - training modernization \$5.000M; Prior year carryover -\$11.000M; Undistributed Reduction - Excess to Need -\$0.331M

FY 2022 reduced -\$29.153M for higher Air Force priorities.

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force										Date: May 2021		
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 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
675345: B-2 Modernization	0.000	71.391	166.496	129.387	0.000	129.387	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

The B-2 is currently undergoing modernization of avionics/communications systems, engines, 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 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.

In FY 2020 and prior, the B-2 DMS-M effort is documented in PE 0605931F B-2 DMS-M, Project 653844 B-2 DMS-M. Beginning in FY 2021, this effort is documented in PE 0101127F B-2 Squadrons, Project 675345 B-2 Modernization. The FY 2021 budget reflects a significant restructure of the B-2 DMS-M program that reduces the program scope to modernize the B-2's primary flight displays. The legacy displays are not supportable due to obsolescence and repair issues which will severely impact future aircraft availability and are currently the number-one driver for reduced fleet readiness. B-2 Display Modernization (BDM) program will resume the Engineering and Manufacturing Development phase, during which the engineering baseline will be finalized and production representative kits will be purchased to support software development, platform integration, integrated development/operational test, pre-Milestone C production assessment, and B-2 nuclear certification testing. Diminishing manufacturing sources and materiel shortages for affected components will be addressed to protect the planned production program by mitigating unplanned part redesign and re-qualification risks. The program will ensure the most efficient restructure minimizing rework from the baseline DMS-M program.

Modern communications are key enablers for the B-2. The Adaptive Communication Suite (ACS) provides baseline improvements to the B-2 ACS UHF SATCOM communication system in order to modernize the system and increase data throughput to support key mission enablers such as AMT, weather, and intelligence updates.

B-2 Armament upgrades integrate new and/or advanced weapons on the B-2 to attack a wider array of target sets, to include hardened, deeply buried targets, as well as destroy more targets per sortie. Integration of the Joint Air-to-Surface Standoff Missile Extended Range (JASSM-ER) weapon will further enhance the B-2's ability to attack and destroy high value target sets. Additional studies and efforts will refine B-2 targeting accuracy using GPS guided weapons.

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

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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
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High Frequency Material expansion), and radio frequency (RF) diagnostic tools, evaluation systems, and other tools (Tier One Material Inspection 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 high ROIs and maintains 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 from 16 minutes to 25 hours of 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). The current CSMU/FDRP does not meet the minimum requirements specified in the Aircraft Information Program (AIP) reference documents (AFI 63-133 and AFH 63-1402).

The B-2 Identification Friend or Foe (IFF) Mode 5/S modification 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.

The Radar Aided Targeting System (RATS) is planned to be a software only solution implemented in several B-2 system level Operational Flight Programs (OFPs) to provide radar-aided enhanced targeting capability through weapon hand-off navigational updates for guided nuclear and conventional weapons in a non-GPS environment. Funding supports timely software development, test and roll-out of software into a future B-2 OFP, specifically to support the B61-12 integration.

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.

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Title: Low Observable Signature and Supportability Mods and Trainers</p> <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>	18.831	10.402	9.791

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>FY 2021 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 Abrasion Resistant Coating, an upgrade to the Tier One Material Inspection System, Tailpipe Improvement analysis, and Test Article 0998. Continue Signature Diagnostic System Spiral 12.</p> <p>FY 2022 Plans: Not applicable.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Funding decrease from FY 2021 to FY 2022 due to a decrease in development activities in FY 2022.</p>			
<p>Title: B-2 Joint Air-to-Surface Standoff Missile - Extended Range (JASSM-ER) Integration</p> <p>Description: Integrates the Joint Air to Surface Standoff Missile, Extended Range weapon (JASSM-ER) onto the B-2.</p> <p>FY 2021 Plans: Continue to execute EMD efforts for JASSM-ER integration onto the B-2. EMD efforts include combined DT/OT and AMAC for P6.4 capabilities. Note: Efforts in year 2021 will be accomplished with FY20 funds.</p> <p>FY 2022 Plans: Not applicable. Integration completed in FY21 with FY20 funds, awaiting incorporation in B-2 IFC release P6.4 in FY22</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Not applicable. Integration completed in FY21 with FY20 funds, awaiting incorporation in B-2 IFC release P6.4 in FY22</p>	11.853	0.000	0.000
<p>Title: B-2 Communications Upgrade -- formerly known as Adaptable Communications Suite (ACS)</p> <p>Description: The B-2 Communications Upgrade -- formerly known as 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.</p> <p>FY 2021 Plans: Continue acquisition planning, risk reduction, and requirements maturation for a modernized ACS system. Begin system development for modernized ACS system (ACS Increment 4.0) and purchase test assets. The modernized system will be known as the B-2 Communications Upgrade.</p> <p>FY 2022 Plans:</p>	0.197	0.200	19.726

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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		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
<p>Complete risk reduction, requirements maturation, and Preliminary Design Review for a modernized ACS system (ACS Increment 4.0, to be known as B-2 Communications Upgrade). Continue system development post Milestone B.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Funding increases from FY 2021 to FY 2022 due to increases in development activities in FY22. In FY 2022 ACS Increment 4.0 will execute risk reduction and preliminary design activities to achieve Milestone B requirements. ACS Increment 4.0 is required to address obsolescence and supportability issues for B-2 onboard communications.</p>				
<p>Title: B-2 Identification Friend or Foe (IFF) Mode 5/S Program</p> <p>Description: The B-2 IFF Mode 5/S replaces the current IFF transponder with a new Mode 5 and Mode S capable IFF transponder ensuring compliance with DoD/NATO Combat Identification mandates (Mode 5) and global Communications, Navigation, Surveillance/Air Traffic Management (CNS/ATM) requirements (Mode S). Mode 5 provides improved combat identification security and accuracy enabling the B-2 fleet to accomplish its anti-access and global strike mission. Mode S provides improved accuracy, altitude resolution, and reduced interference from closely spaced aircraft through interrogation of assigned transponder addresses.</p> <p>FY 2021 Plans: Execute Engineering and Manufacturing Development (EMD) phase activities to include Critical Design Review, software code development, hardware and software integration into the B-2 Weapon System Support Center (WSSC), Test Readiness Review, and initiation of developmental testing in the WSSC environment. Includes AMAC testing for P6.5.</p> <p>FY 2022 Plans: Continue executing 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, on-aircraft ground/flight development/operational testing, System Verification Review, Production Readiness Review, and Milestone C/Full Rate Production Decision. Includes AMAC testing for P6.5.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Funding increase from FY 2021 to FY 2022 to complete developmental testing, certify for aircraft install, on-aircraft ground/flight development/operational testing, and AMAC testing for P6.5.</p>		7.554	6.028	12.309
<p>Title: B-2 Crash Survivable Memory Unit (CSMU)</p> <p>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).</p>		1.870	1.098	0.000

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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		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
<p>FY 2021 Plans: Complete Non-recurring Engineering (NRE) to adapt Commercial Off the Shelf (COTS) CSMU to the B-2 Flight Data Recorder (FDR) system, complete modification of the FDRP, and update the FDRP OFF. Development completes in FY21.</p> <p>FY 2022 Plans: No development efforts in FY 2022.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Funding decreases from FY 2021 to FY 2022 due to completing development in FY21.</p>				
<p>Title: B-2 Radar Aided Targeting System (RATS)</p> <p>Description: The Radar Aided Targeting System (RATS) is planned to be a software only solution implemented in several B-2 system level Operational Flight Programs (OFPs) to provide radar-aided enhanced targeting capability through weapon hand-off navigational updates for System 2 nuclear weapons in a non-GPS environment.</p> <p>FY 2021 Plans: Execute EMD efforts for RATS integration onto the B-2. EMD efforts include combined DT/OT and AMAC for P6.4 capabilities. Note: Activities in FY-2021 will be accomplished with FY-2020 funds.</p> <p>FY 2022 Plans: Integration effort completes in FY21 with FY20 funds; awaiting FY22 fielding in P6.4</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Not applicable. No FY21 or FY22 funds for RATS</p>		7.104	0.000	0.000
<p>Title: B-2 Display Modernization (BDM)</p> <p>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. Prior years DMS-M efforts were in PE 0605931F.</p> <p>FY 2021 Plans: Continue engineering for modification of the B-2 Test Aircraft, A/C 1087, (currently configured for DMS-M) and development labs to support restructured program. Continue development and software integration of MDU Replacements (MDU-R). Conduct appropriate systems engineering and design reviews to support restructured program.</p> <p>FY 2022 Plans:</p>		0.000	143.768	87.561

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
Begin modification of the B-2 Test Aircraft and development labs to support the BDM program. Continue software development and integration activities. Deliver engineering development units of MDU-R hardware to the development labs. Order MDU-R hardware for Engineering and Manufacturing Development kits. Conduct appropriate systems engineering and design reviews, and release the Request for Proposal (RFP) for the Production phase of the program. FY 2021 to FY 2022 Increase/Decrease Statement: Funding decrease from FY 2021 to FY 2022 due to scope reduction as a result of DMS-M strategy pivot.			
Title: B-2 Expanded Strike Description: The Expanded Strike program adds the Advanced 5,000 pound Joint Direct Attack Munition (A5K JDAM) and Hard Target Void Sensing Fuze (HTVSF) to the B-2 arsenal providing additional armament capability for hardened, deeply buried targets. FY 2021 Plans: N/A FY 2022 Plans: N/A FY 2021 to FY 2022 Increase/Decrease Statement: Expanded Strike program terminated in FY 2021 Budget. No events are planned.	18.982	0.000	0.000
Accomplishments/Planned Programs Subtotals	66.391	161.496	129.387

	FY 2020	FY 2021
Congressional Add: B-2 Trainers Modernization FY 2020 Accomplishments: Develop plan to execute FY 2020 Congressional add for B-2 Trainers Modernization efforts. FY 2021 Plans: Any planned efforts in FY21 will be accomplished with FY20 Congressional add funds.	5.000	5.000
Congressional Adds Subtotals	5.000	5.000

C. Other Program Funding Summary (\$ in Millions)										
Line Item	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 05 Line Item B00200: B-2 LOSSM Mod Funding, PE 0101127F	0.276	19.194	16.389	-	16.389	-	-	-	-	-

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

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 05 Line Item B00200 (1)...: B-2 CSMU Mod Funding, PE 0101127F	-	-	1.568	-	1.568	-	-	-	-	-	-
• APAF 05 Line Item B00200 (2)...: B-2 IFF Mode 5/S Mod Funding, PE 0101127F	-	-	15.398	-	15.398	-	-	-	-	-	-
• APAF 05 B2DMS0: B-2 DMS	-	-	-	-	-	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

Key elements of the overall acquisition strategy include: use of sole source contract with a prime/integrating contractor (Northrop Grumman), employ the program office as the system integrator when practical, leverage mature technology and systems development investments by other Department of Defense organizations, encourage prime contractor competition of subsystems and key components to reduce risk and cost, use of cost plus incentive fee (CPIF) development contracts, and combine 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 2022 Air Force											Date: May 2021				
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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	-		-		-		-		-	-	-	-
Low Observable Signature and Supportability Mods	Various	Various : Various	0.000	18.392	Oct 2019	9.892	Oct 2020	9.279	Oct 2021	-		9.279	-	-	-
B-2 Joint Air-to-Surface Standoff Missile - Extended Range (JASSM-ER) Integration	Various	Various : Various	0.000	0.000	Oct 2019	-		-		-		-	-	-	-
B-2 Adaptable Communications Suite (ACS)	Various	Various : Various	0.000	0.197	Dec 2019	0.200	Dec 2020	19.726		-		19.726	-	-	-
B-2 IFF Mode 5/S	Various	Various : Various	0.000	7.554	Nov 2019	6.028	Nov 2020	12.309		-		12.309	-	-	-
B-2 Crash Survivable Memory Unit (CSMU)	Various	Various : Various	0.000	1.870	Jun 2020	1.098	Dec 2020	-		-		-	-	-	-
Not specified.	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	-	-	-
B-2 RATS	Various	Various : Various	0.000	14.582	Oct 2019	-		-		-		-	-	-	-
B-2 Display Modernization (BDM)	Various	Various : Various	0.000	-		128.623	Feb 2021	78.009		-		78.009	-	-	-
Aircrew Training	Various	Various : Various	0.000	5.502	Dec 2019	5.510		0.512		-		0.512	-	-	-
Mission Planning	Various	Various : Various	0.000	10.463	Jan 2020	-		-		-		-	-	-	-
Subtotal			0.000	58.560		151.351		119.835		-		119.835	-	-	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 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	0.000	-		-		-		-		-	-	-	-
Government Test	MIPR	Various : CA	0.000	1.321	Dec 2019	2.828		4.900	Oct 2021	-		4.900	-	-	-
Subtotal			0.000	1.321		2.828		4.900		-		4.900	-	-	N/A

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

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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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			

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

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			
Management Services	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	-	-	-
PMA	Various	Various : TBD	0.000	11.510	Oct 2019	12.317	Oct 2020	4.652		-		4.652	-	-	-
Subtotal			0.000	11.510		12.317		4.652		-		4.652	-	-	N/A

	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	0.000	71.391	166.496	129.387	-	129.387	-	-	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 2022 Air Force **Date:** May 2021

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 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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																												
JASSM-ER Integration EMD Phase																												
IFF Mode 5/S EMD Phase																												
Crash Survivable Memory Unit Milestone B																												
Crash Survivable Memory Unit EMD Contract																												
B-2 Display Modernization (BDM) Acquisition Planning & Transition																												
B-2 Display Modernization (BDM) Displays EMD Phase																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force **Date:** May 2021

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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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	2020	4	2023
JASSM-ER Integration EMD Phase	1	2020	3	2022
IFF Mode 5/S EMD Phase	1	2020	3	2022
Crash Survivable Memory Unit Milestone B	2	2020	2	2020
Crash Survivable Memory Unit EMD Contract	2	2020	3	2022
B-2 Display Modernization (BDM) Acquisition Planning & Transition	2	2020	1	2021
B-2 Display Modernization (BDM) Displays EMD Phase	2	2021	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force										Date: May 2021		
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 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
676021: BASELINE SUPPORT	0.000	14.351	14.572	14.660	0.000	14.660	-	-	-	-	-	-
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.

Funds may be used to resolve emerging safety of flight and diminishing manufacturing sources issues, accommodate technology insertion and fulfill FAA or other mandates necessary to ensure continued aircrew safety and mission effectiveness.

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

	FY 2020	FY 2021	FY 2022
<p>Title: Baseline Support Acq Plan/Studies/Integr Test Support</p> <p>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.</p> <p>FY 2021 Plans: Continue Baseline Support activities including acquisition planning for future capabilities, long range planning, studies, and program integration activities.</p> <p>FY 2022 Plans: Continue Baseline Support activities including acquisition planning for future capabilities, long range planning, studies, and program integration activities.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program decrease due to slight reduction in effort.</p>	0.297	0.297	0.290
<p>Title: Baseline Support Flight Test</p> <p>Description: 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 need for additional operational aircraft and accelerating deployment of advanced operational capabilities to the warfighter.</p> <p>FY 2021 Plans:</p>	14.054	14.275	14.370

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force	Date: May 2021
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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 2020	FY 2021	FY 2022
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.			
<i>FY 2022 Plans:</i> 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.			
<i>FY 2021 to FY 2022 Increase/Decrease Statement:</i> FY 2022 funding increase accounts for minor increase in B-2 test requirements for FY 2022.			
Accomplishments/Planned Programs Subtotals	14.351	14.572	14.660

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 2022 Air Force **Date:** May 2021

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 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			
Support	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	-	-	-
Other Government Costs	Various	Various : Various	0.000	10.225	Oct 2019	10.019	Oct 2020	10.128	Oct 2021	-		10.128	-	-	-
Subtotal			0.000	10.225		10.019		10.128		-		10.128	-	-	N/A

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	0.000	-		-		-		-		-	-	-	-
Government Test	MIPR	AFTC : CA	0.000	2.750	Oct 2019	2.716	Oct 2020	2.531		-		2.531	-	-	-
Subtotal			0.000	2.750		2.716		2.531		-		2.531	-	-	N/A

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			
Management Services	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	-	-	-
PMA	Various	Various : TBD	0.000	1.376	Oct 2019	1.837	Oct 2020	2.001		-		2.001	-	-	-
Subtotal			0.000	1.376		1.837		2.001		-		2.001	-	-	N/A

	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		0.000	14.351	14.572	14.660	-	-	14.660	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 2022 Air Force **Date:** May 2021

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>
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FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
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>	
FY20 Flight Test Core Support Annual Contract Award	[REDACTED]

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force **Date:** May 2021

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>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>B-2 Baseline Support</i>				
FY20 Flight Test Core Support Annual Contract Award	1	2020	1	2023