

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Air Force **Date:** February 2016

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0605213F / <i>F-22 Modernization Increment 3.2B</i>
-------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------

COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	198.700	163.877	140.640	70.290	0.000	70.290	0.000	0.000	0.000	0.000	0.000	573.507
654785: <i>F-22 INCREMENT 3.2B</i>	198.700	163.877	140.640	70.290	0.000	70.290	0.000	0.000	0.000	0.000	0.000	573.507
Quantity of RDT&E Articles	9	-	-	-	-	-	-	-	-	-	-	

Program MDAP/MAIS Code: 474

Note
 All Increment 3.2B efforts and associated funding prior to FY13 are included in the F-22A Squadrons budget documentation, PE 0207138F and other outside funding PEs. Prior year funding:
 PE 0207138F (FY04-FY12): \$422.4M
 PE 0207163F (FY10-FY13): \$39.8M
 PE 0207445F (FY07-FY10): \$39.6M
 PE 0200001F (FY07): \$32.9M

A. Mission Description and Budget Item Justification

Increment 3.2B will integrate the newest air-to-air intercept missiles (i.e., AIM-9X and AIM-120D), further improve the Electronic Protection (EP) capability over Increment 3.2A, and enhance the F-22's geolocation capability from the Increment 3.1 baseline with the addition of Geolocation 2. Increment 3.2B will include the Enhanced Stores Management System (ESMS), as well as Common Weapon Engagement Zone (WEZ), and an Intra-Flight Datalink (IFDL) improvement to increase IFDL bandwidth and enable cooperative functions required to realize Increment 3.2B capabilities.

Increment 3.2B will develop, certify and integrate a new platform operational flight program to ensure the system interoperability and performance of all increment-level developments.

The development program includes development, studies, and analysis to enhance the air vehicle and training system to improve/enhance F-22 weapons, communications, Electronic Warfare, and Intelligence Surveillance Reconnaissance (ISR) capabilities.

BA5 - This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Air Force **Date:** February 2016

Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force I BA 5: System Development & Demonstration (SDD)	R-1 Program Element (Number/Name) PE 0605213F I F-22 Modernization Increment 3.2B
----------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------

B. Program Change Summary (\$ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	173.647	140.640	72.467	0.000	72.467
Current President's Budget	163.877	140.640	70.290	0.000	70.290
Total Adjustments	-9.770	0.000	-2.177	0.000	-2.177
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-9.770	0.000			
• Other Adjustments	0.000	0.000	-2.177	0.000	-2.177

Change Summary Explanation

No Significant Program Changes

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

	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: F-22 Increment 3.2B	120.177	79.640	41.280	0.000	41.280
Description: The F-22 Increment 3.2B Modernization Program consists of the studies, analysis, demonstrations, and hardware/software development necessary to provide Intra-Flight Data Link improvements, Electronic Protection, AIM-9X and AIM-120D integration with Common Weapon Engagement Zone, Geolocate 2.0 and Stores Management System Common Split Bus. The Enhanced Stores Management System (ESMS) program is a hardware development program required to integrate any new weapons on the F-22 beyond Increment 3.1. Includes mission support of the F-22 Program Office: travel, computer costs, and other miscellaneous contract support.					
FY 2015 Accomplishments: F-22 Increment 3.2B software development, coding, integration, and testing significantly matured seven software iterations into a software build that integrates all key program functionality, consisting of 400K lines of code. Increment 3.2B hardware testing was completed. Install upon award of Low Rate Initial Production (LRIP).					
FY 2016 Plans:					

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Air Force				Date: February 2016	
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 5: System Development & Demonstration (SDD)</i>		R-1 Program Element (Number/Name) PE 0605213F / <i>F-22 Modernization Increment 3.2B</i>			
C. Accomplishments/Planned Programs (\$ in Millions)					
	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
<p>F-22 Increment 3.2B software development, coding, integration, and testing will continue in preparation for 3QFY16 Milestone C. In addition, will conduct management and infrastructure activities in support of F-22 Program Office.</p> <p>FY 2017 Base Plans: F-22 Increment 3.2B will complete work in the Development, Code, Integration, and Test Phase. In addition, will conduct management and infrastructure activities in support of the F-22 Program Office.</p> <p>FY 2017 OCO Plans: N/A</p>					
<p>Title: Combined Test Force (CTF)</p> <p>Description: The F-22 Combined Test Force (CTF), located at Edwards Air Force Base, conducts testing to assess performance and military utility of Increment 3.2B. The CTF uses operationally relevant ground and flight test scenarios to identify Increment 3.2B performance deficiencies. This funds Inc 3.2B unique test costs.</p> <p>FY 2015 Accomplishments: The CTF performed detailed test planning and Increment 3.2B Flight Test execution on production representative hardware.</p> <p>FY 2016 Plans: The CTF will complete developmental flight test in preparation for Low Rate Initial Production (LRIP) decision (Milestone C).</p> <p>FY 2017 Base Plans: The CTF will complete final developmental flight test for Increment 3.2B Flight Test execution.</p> <p>FY 2017 OCO Plans: N/A</p>					
	8.200	27.500	21.100	0.000	21.100
<p>Title: Lab Test & Operations</p> <p>Description: Increment 3.2B Lab Test & Operations plans and conducts system integration and testing of software builds within the suite of F-22 system integration laboratories: the Agile Integration Lab (AIL); the Raptor Integration Lab (Rall); the Air Combat Simulation (ACS) Lab; the Vehicle Management System (VMS) Vehicle Integration Facility (VIF); and the Vehicle System Simulator (VSS).</p>					
	35.500	33.500	7.910	0.000	7.910

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Air Force		Date: February 2016
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0605213F / <i>F-22 Modernization Increment 3.2B</i>	

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
<p><i>FY 2015 Accomplishments:</i> Increment 3.2B Lab Test & Operations conducted testing for software build-up and integration on production representative hardware in the F-22 system integration laboratories noted in the description above: the AIL, Rail, ACS, VMS, VIF, and VSS. To enhance software maturation, the developmental software labs delivered several planned software versions to support developmental flight test execution.</p> <p><i>FY 2016 Plans:</i> Increment 3.2B Lab Test & Operations will plan and conduct testing for software build-up and integration on production representative hardware in the F-22 system integration laboratories that include: the AIL, the Rail, the ACS lab, the VMS, the VIF, and the VSS. To enhance software maturation, the developmental software labs will deliver several planned software versions to support developmental flight test execution. Increment 3.2B Lab Test & Operations will deliver the fully integrated Operational Flight Program (OFP) required to complete developmental flight test and resolve performance deficiencies in preparation for Air Force Operational Flight Test Evaluation.</p> <p><i>FY 2017 Base Plans:</i> Increment 3.2B Lab Test & Operations will conclude testing on production representative hardware in the F-22 system integration laboratories. Increment 3.2B Lab Test & Operations will deliver the fully integrated Operational Flight Program (OFP) required to complete developmental flight test and resolve performance deficiencies in preparation for Air Force Operational Flight Test Evaluation.</p> <p><i>FY 2017 OCO Plans:</i> N/A</p>					
Accomplishments/Planned Programs Subtotals	163.877	140.640	70.290	0.000	70.290

D. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• RDT&E: BA07: PE 0207138F: <i>F-22A Squadrons, RDT&E*</i>	146.291	231.599	387.540	0.000	387.540	423.005	418.700	393.633	430.233	Continuing	Continuing
• APAF: BA05: Line Item # F2232B: <i>Increment 3.2B**</i>	28.500	64.325	78.410	0.000	78.410	413.679	13.081	20.373	10.749	0.000	340.617
• APAF: BA05: Line Item # F02200: <i>F-22A***</i>	286.426	119.171	271.593	0.000	271.593	218.441	227.011	368.986	524.575	Continuing	Continuing

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Air Force **Date:** February 2016

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0605213F / <i>F-22 Modernization Increment 3.2B</i>
-------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------

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

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• APAF: BA056: 000999: <i>Initial Spares</i>	0.000	2.822	4.431	0.000	4.431	7.720	0.000	0.000	0.000	0.000	14.973
• RDT&E: BA07: PE 0207163F: <i>AIM-120D, AMRAAM T&E, RDT&E****</i>	23.800	5.820	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	50.450

Remarks

NOTES:

*F-22A Squadrons, RDT&E/PE 0207138F includes F-22A Squadrons modernization and development. Both PEs 0207138F and 0605213F share lab and Combined OTF Test Force infrastructure support costs across the F-22 enterprise.

**Increment 3.2B, APAF/PE 0207138F, F2232B includes BP11 (Aircraft Modifications) for Increment 3.2B only.

***F-22A Squadrons, APAF/PE 0207138F, F02200 includes BPs 11 (Aircraft Modifications), 13 (Post-Production Support), 16 (Initial Spares), and 19 (Depot Activation) for F-22 Squadrons only.

****AIM-120D, AMRAAM RDT&E/PE 0207163F, funding provides for the AIM-120D development as a part of the F-22 Increment 3.2B effort.

E. Acquisition Strategy

The Raptor Enhancement Development & Integration (REDI) contract is an Indefinite Delivery/Indefinite Quantity Ordering (ID/IQ) contract that maximizes flexibility to start, stop, accelerate and decelerate projects as required. The REDI contract was established to be more responsive to evolving war fighter requirements. The REDI contract allows the issuance of orders for the highest priority war fighter capabilities in operationally meaningful capability increments, requirements analysis, contractor cost estimates and studies, development and demonstration of capability enhancements, and unanticipated future war fighter requirements. Each increment is broken into phases to initiate requirements analysis, the design phase and the development, integration and verification phase of a specific incremental development effort. The REDI II contract is a follow-on ID/IQ contract to the initial REDI contract. REDI II provides maximum flexibility to manage various modernization projects. The REDI II contract allows for the issuance of orders for efforts associated with the planning, analysis, design, development, qualification, test and documentation of F-22 weapon system performance enhancements, life-cycle improvements, Operational Flight Program (OFP) upgrades, and associated efforts essential to accomplishing the F-22 mission.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Air Force **Date:** February 2016

Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0605213F / F-22 Modernization Increment 3.2B	Project (Number/Name) 654785 / F-22 INCREMENT 3.2B
--------------------------------------------------	------------------------------------------------------------------------------------------------	--------------------------------------------------------------

Product Development (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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			
Increment 3.2B	Various	Lockheed Martin : Ft. Worth, TX	182.905	120.177	Nov 2014	79.640	Nov 2015	41.280	Nov 2016	0.000		41.280	0.000	424.002	488.035
Subtotal			182.905	120.177		79.640		41.280		0.000		41.280	0.000	424.002	488.035

Remarks
Target Value of Contract includes only active REDI/REDI II delivery orders DO 0070, DO 0071, and DO 0004. Target Value of Contract and Total cost do not match due to prior year costs executed in F-22 Squadrons PE 0207138F and other outside funded PE's as documented in the R-2A.

Support (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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			
Subtotal			-	-		-		-		-		-	-	-	-

Test and Evaluation (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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			
Combined Test Force	Various	Various : Various	4.390	8.200	Dec 2014	27.500	Dec 2015	21.100	Dec 2016	0.000		21.100	0.000	61.190	-
Laboratory Test Operations	SS/ Various	Lockheed Martin : Fort Worth, TX	11.405	35.500	Jan 2015	33.500	Nov 2015	7.910	Dec 2016	0.000		7.910	0.000	88.315	-
Subtotal			15.795	43.700		61.000		29.010		0.000		29.010	0.000	149.505	-

Remarks
FY12 and prior year costs for Increment 3.2B are shown under PE 0207138F. FY13 and later are shown under PE 0605213F.

Management Services (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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			
Subtotal			-	-		-		-		-		-	-	-	-

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Air Force								Date: February 2016			
Appropriation/Budget Activity 3600 / 5				R-1 Program Element (Number/Name) PE 0605213F / <i>F-22 Modernization Increment 3.2B</i>				Project (Number/Name) 654785 / <i>F-22 INCREMENT 3.2B</i>			
	Prior Years	FY 2015		FY 2016		FY 2017 Base	FY 2017 OCO	FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	198.700	163.877		140.640		70.290	0.000	70.290	0.000	573.507	-

Remarks

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Air Force		Date: February 2016
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0605213F / <i>F-22 Modernization Increment 3.2B</i>	Project (Number/Name) 654785 / <i>F-22 INCREMENT 3.2B</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Increment 3.2B HW Development/Risk Reduction/Lab Equipment**	1	2015	2	2015
Increment 3.2B Code, Integration, and Test	1	2015	1	2018
Increment 3.2B Critical Design Review (CDR)	1	2016	1	2016
Increment 3.2B Milestone C	3	2016	3	2016
Increment 3.2B Initial Operational Test & Evaluation (IOT&E)	3	2017	3	2018
Increment 3.2B Fleet Release	3	2018	3	2018
Increment 3.2B Retrofit	3	2018	4	2020

UNCLASSIFIED

THIS PAGE INTENTIONALLY LEFT BLANK

UNCLASSIFIED