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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2016 Air Force **Date:** February 2015

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force / BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207138F / <i>F-22A Squadrons</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	3,261.772	266.431	146.299	262.552	-	262.552	382.198	406.094	415.207	422.636	Continuing	Continuing
674785: <i>F-22</i>	3,261.772	266.431	143.336	209.227	-	209.227	270.904	251.397	280.459	285.477	Continuing	Continuing
674788: <i>F-22 Tactical Mandates</i>	0.000	-	2.963	53.325	-	53.325	111.294	154.697	134.748	137.159	-	594.186

**MDAP/MAIS Code:** 265

**Note**

Totals include funding for PRCP Program Number, 265 F-22A Squadrons.

In FY13, a separate Program Element (0605213F) was created for Increment 3.2B FY13 milestone B and beyond efforts for greater transparency. All Increment 3.2B efforts and associated funding prior to FY13 are included in the F-22A Squadrons (0207138F) budget documentation.

In FY15, a separate Project (Budget Program Activity Code [BPAC] 674788) was created for F-22 Tactical Mandates, formerly known as F-22 Mandates.

**A. Mission Description and Budget Item Justification**

The F-22 Raptor represents the USAF's top priority for providing the Joint Force with air dominance, operational access, and homeland and cruise missile defense for the next 20+ years. The F-22 is a first-of-a-kind multi-mission fighter aircraft that combines stealth, supercruise, advanced maneuverability and integrated avionics to make it the world's most capable combat aircraft. The Engineering and Manufacturing Development (EMD) phase of F-22 acquisition is complete. The program is now continuing the pre-planned modernization effort through incremental development phases that enhance the F-22 Global Strike capability. The development program enhances the air vehicle, engine, and training system to improve/enhance F-22 weapons, communications, and Intelligence Surveillance Reconnaissance (ISR) capabilities.

BA7 - This program is in Budget Activity 7, Operational Systems 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.

The FY2016 funding request was reduced by \$5.633 million to account for the availability of prior execution balances.

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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0207138F / <i>F-22A Squadrons</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2014</b>	<b>FY 2015</b>	<b>FY 2016 Base</b>	<b>FY 2016 OCO</b>	<b>FY 2016 Total</b>
Previous President's Budget	274.407	156.962	275.230	-	275.230
Current President's Budget	266.431	146.299	262.552	-	262.552
Total Adjustments	-7.976	-10.663	-12.678	-	-12.678
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-10.600			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-7.976	-			
• Other Adjustments	-	-0.063	-12.678	-	-12.678

**Change Summary Explanation**

FY14: \$7.976M reduction due to SBIR

FY15: \$10.663M reduction due to: \$10.600M Congressional Reduction and \$0.063M FFRDC

FY16: \$12.678M reduction due to: \$5.3M rephrased within the F-22 Program and \$1.745M inflation adjustments.

The FY2016 funding request was reduced by \$5.633 million to account for the availability of prior year balances.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2016 Air Force										<b>Date:</b> February 2015		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0207138F / F-22A Squadrons				<b>Project (Number/Name)</b> 674785 / F-22			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2014</b>	<b>FY 2015</b>	<b>FY 2016 Base</b>	<b>FY 2016 OCO</b>	<b>FY 2016 Total</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
674785: F-22	3,261.772	266.431	143.336	209.227	-	209.227	270.904	251.397	280.459	285.477	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Totals include funding for PRCP Program Number, 265 F-22A Squadrons.

In FY13, a separate Program Element (0605213F) was created for Increment 3.2B FY13 milestone B and beyond efforts for greater transparency. All Increment 3.2B efforts and associated funding prior to FY13 are included in the F-22A Squadrons (0207138F) budget documentation.

In FY15, a separate Budget Project Activity Code (BPAC 674788) was created for F-22 Tactical Mandates, formerly known as F-22 Mandates.

F-22 development and production is complete. The remaining program consists of F-22 Operational Flight Program (OFF) updates, capability enhancements, and mandates necessary to keep the F-22 weapon system the world's most capable fighter. The Cost to Complete and Total Cost are entered as "Continuing" due to ongoing individual Reliability and Maintainability Maturation Program (RAMMP) initiatives to improve operational availability.

**A. Mission Description and Budget Item Justification**

The F-22 Raptor represents the USAF's top priority for providing the Joint Force with air dominance, operational access, homeland and cruise missile defense for the next 20+ years. The F-22 is a first-of-kind multi-mission fighter aircraft that combines stealth, supercruise, advanced maneuverability and integrated avionics to make it the world's most capable combat aircraft. While F-22 Engineering and Manufacturing Development (EMD) and aircraft production completed May 2012, funding for F-22 modernization is "continuing" beyond the FYDP.

This program funds all non-MDAP development efforts for the F-22. The program is now continuing the pre-planned and evolutionary modernization effort through incremental development phases that enhance the F-22 anti-access, area denial, Air Superiority and Global Strike capabilities. The development program modernizes and upgrades the air vehicle, engine, avionics, and training systems to improve/enhance F-22 weapons, communications, and intelligence, surveillance, reconnaissance (ISR) capabilities.

BA7 - 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.

The FY2016 funding request was reduced by \$5.633 million to account for the availability of prior year balances.

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

	<b>FY 2014</b>	<b>FY 2015</b>	<b>FY 2016</b>
<b>Title:</b> Increment 3.2A	40.170	2.718	-

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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207138F / F-22A Squadrons	<b>Project (Number/Name)</b> 674785 / F-22		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2014</b>	<b>FY 2015</b>	<b>FY 2016</b>
<p><b>Description:</b> The F-22 Increment 3.2A Modernization Program consists of the software development necessary to provide Increment 3.2A capabilities including improvements to Electronic Protection, Combat Identification and Link-16 Receive.</p> <p><b>FY 2014 Accomplishments:</b> Increment 3.2A software development, integration, and test continued. Developmental test was conducted.</p> <p><b>FY 2015 Plans:</b> Complete Increment 3.2A software development, integration, and test. Developmental and operational test will be conducted and completed. Increment 3.2A Operational Flight Program (OFP) upgrade on combat coded F-22 aircraft will begin.</p> <p><b>FY 2016 Plans:</b> Not Applicable</p>				
<p><b>Title:</b> Update 5</p> <p><b>Description:</b> Update 5 is a part of F-22's ongoing software updates that develop, test, and field new capabilities and capability enhancements. Software updates include changes driven by real world evolving threats, emergency/safety of flight issues, and deficiency reports. The Update 5 Operational Flight Program (OFP) includes Automatic Ground Collision Avoidance System (AGCAS), Intra Flight Data Link Mode 5th to 4th generation IFDL capability (IFDL GWY Mode), and basic Block I AIM-9X missile launch capability.</p> <p><b>FY 2014 Accomplishments:</b> The Update 5 Operational Flight Program (OFP) to include AGCAS, IFDL GWY Mode, and AIM-9X Basic tested in the Raptor Integration Lab (RAIL) and the Avionics Integration Lab (AIL). Developmental flight test was conducted by the Combined Test Force (CTF).</p> <p><b>FY 2015 Plans:</b> Complete Update 5 OFP developmental and operational flight test.</p> <p><b>FY 2016 Plans:</b> Release the Update 5 OFP for fielding on the F-22 aircraft.</p>		47.785	17.011	4.073
<p><b>Title:</b> Update 6 Interoperability</p> <p><b>Description:</b> Update 6 (U6) Interoperability is an upgrade previously documented under the Major thrust "Software Support" and has been separated out for better clarity and insight and is not a New Start. U6 will develop, test and field new capabilities and capability enhancements including changes driven by real world evolving threats, emergency/safety of flight issues, and deficiency reports. U6 Interoperability provides cryptographic updates required by the National Security Agency (NSA) to IFDL, Link-16, and Tactical Secure Voice (TSV) and development to maintain interoperability with the enhancements to Link-16 and Secure</p>		19.229	17.106	52.691

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2014</b>	<b>FY 2015</b>	<b>FY 2016</b>
<p>Voice networks. The U6 Interoperability program will absorb and build upon the development work already accomplished in the KOV-20 Cryptographic Modernization Program and integrate that development into a single Operational Flight Program (OFP) for fleet release. In addition, U6 Interoperability will develop and deliver software fixes identified as critical to the operational community.</p> <p><b>FY 2014 Accomplishments:</b> Update 6 Interoperability Materiel Development Decision (MDD) in 2QFY14. Released the program Request for Proposal (RFP) for development contract. KOV-20 Crypto Modernization completed requirements analysis at System Design Review (SDR) and continued design for a Critical Design Review (CDR) in 1QFY15. Began development, integration, and test on the KOV-20 module firmware to position the module for NSA recertification.</p> <p><b>FY 2015 Plans:</b> Prepare for contract award of remaining OFP content development. Complete Crypto Modernization CDR.</p> <p><b>FY 2016 Plans:</b> Update 6 Interoperability will begin design, code, test for IFDL/Link 16 interoperability and TSV modernization, and complete Preliminary Design Review (PDR) and Milestone B. Continue integration and test of Crypto Modernization.</p>				
<p><b>Title:</b> Software Support</p> <p><b>Description:</b> Software Support includes Pilot Training Systems (PTS) software development and Integrated Maintenance Information System (IMIS) software development to include Integrated Maintenance Data System (IMDS) and Reliability and Maintainability Information System (REMIS) interface development. Software support develops, tests and fields new capabilities and capability enhancements for training devices and IMIS software in order to maintain concurrency with aircraft configuration and capability.</p> <p><b>FY 2014 Accomplishments:</b> Pilot Training Systems (PTS) software development continued software upgrades for the field -- software enhancements, which include pilot, maintenance and training device reliability improvement, software upgrades, modernization program integration, Distributed Mission Operations (DMO) integration, IMIS integration, and safety critical items. IMIS completed Ada to C++ conversion of several applications and continued its focus on the Present Tech Order (PTO) and Air Vehicle Interface (AVI) modules. Integrated Engine Usage Based Lifeing (UBL) algorithms into IMIS to support Update 5 OFP; Provided capability to record actual aircraft flight time within IMIS.</p> <p><b>FY 2015 Plans:</b></p>		14.572	2.221	4.083

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2014</b>	<b>FY 2015</b>	<b>FY 2016</b>
IMIS will continue the Ada to C++ conversion of Present Tech Order (PTO), Air Vehicle Interface (AVI), and Wind Swept Surfaces (WSS).				
<b>FY 2016 Plans:</b> Integrate Advanced Diagnostic Interface Tool (ADIT) and Multiplex Bus Fault Isolation (MBFI) capability within IMIS.				
<b>Title:</b> Advanced Technology Development		20.925	15.634	45.261
<b>Description:</b> Technology maturation, risk reduction, studies, and demonstrations of Classified F-22 related development efforts.				
<b>FY 2014 Accomplishments:</b> Continued support for technology development and maturation of projects. Established contracts to perform studies of several new technology candidates to determine feasibility for integration onto F-22. Completed study for candidate C24.				
<b>FY 2015 Plans:</b> Continue support of technology development and maturation of projects. Wing seal development and flight testing. Candidate C24 development ongoing.				
<b>FY 2016 Plans:</b> Continue support for technology development and maturation of projects.				
<b>Title:</b> Virtual Address eXtension Migration		4.960	-	-
<b>Description:</b> The VAX Migration program develops, integrates, tests, and deploys computer infrastructure and software tools to replace existing VAX-based resources used to develop, field, and sustain F-22 capabilities. The current VAX architecture is obsolete, resulting in increased program risk, and delays in development due to reliance upon increasingly unreliable and unsupported infrastructure.				
<b>FY 2014 Accomplishments:</b> Completed site-by-site replacement of VAX systems through deployment of PC-based systems, compilers and software support tools including: Dimensions, Cradle, Quicksilver; Deployment of Instrumentation Tools, Simulations Tools and User Unique Tools. Completed full migration of F-22 development efforts from legacy VAX-dependent architecture; Re-hosted essential software tools to a PC environment without loss of capability, reliability, or degradation of the existing functionality. Shut-down VAX per requirement.				
<b>FY 2015 Plans:</b> Not Applicable				
<b>FY 2016 Plans:</b>				

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2014</b>	<b>FY 2015</b>	<b>FY 2016</b>
Not Applicable				
<p><b>Title:</b> System Engineering/Program Management Support</p> <p><b>Description:</b> Provides for F-22 program-wide planning and execution to include studies, analysis, and requirements definition.</p> <p><b>FY 2014 Accomplishments:</b> Provided for F-22 program-wide planning and execution comprised of, but not limited to, the following: Future Capabilities Planning and F-22 Mandates Requirements Definition, Cost Estimating Data, and Systems Engineering Process Management.</p> <p><b>FY 2015 Plans:</b> Provides for F-22 program-wide planning and execution comprised of, but not limited to, the following: Strategic Analysis and Support, Cost Estimating Data, and Systems Engineering Process Management.</p> <p><b>FY 2016 Plans:</b> Provides for F-22 program-wide planning and execution comprised of, but not limited to, the following: Strategic Analysis and Support, Cost Estimating Data, and Systems Engineering Process Management.</p>		5.471	6.192	9.139
<p><b>Title:</b> Reliability and Maintainability Maturation Program (RAMMP)</p> <p><b>Description:</b> The Reliability, Availability, and Maintainability Maturation Program (RAMMP) provides for the development and integration of upgrades to improve reliability, availability and maintainability (RAM). The associated RAMMP RDT&amp;E effort develops candidate RAMMP initiatives which are down-selected for implementation based on their development maturity and impact on F-22 life cycle costs. RAMMP provides for the development of urgent response requirements for the aircraft, for example Automatic Back-Up Oxygen System (ABOS).</p> <p><b>FY 2014 Accomplishments:</b> Provided for development of multiple efforts to improve Mean Time Between Maintenance (MTBM), Maintainability, and reduce F-22 Weapon System Life Cycle Costs. FY 2014 active RAMMP development projects included, but are not limited to: Mighty Tough Boot Development, Aircraft Mounted Nozzle Shield (AMNS) Liner Redesign, Integrated Forebody (IFB) Rain Erosion Nose Cap, Canopy Topcoat Redesign, Gland Redesign.</p> <p><b>FY 2015 Plans:</b> Provides for development of multiple efforts to improve Mean Time Between Maintenance (MTBM), Maintainability, and reduce F-22 Weapon System Life Cycle Costs. FY2015 active RAMMP development projects include, but are not limited to: Mighty Tough Boot, AMNS Liner Redesign.</p> <p><b>FY 2016 Plans:</b></p>		16.695	0.880	1.098

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2014</b>	<b>FY 2015</b>	<b>FY 2016</b>
In FY 2016: Development of efforts to improve Mean Time Between Maintenance (MTBM), Maintainability, and reduce F-22 Weapon System Life Cycle Costs.				
<p><b>Title:</b> F-22 Small Projects</p> <p><b>Description:</b> Provides for F-22 modernization activities including, but not limited to: technology studies and demonstrations, Low Observable (LO) Signature Management, EN/Threat Modeling Support, Developmental Test (DT) Weapon Assets, Pilot Training (PT), Dynamic Synthetic Aperture Radar (SAR), Flight Test Engine Refurbishment, Support Equipment Development, XP Migration and Government Furnished Equipment (GFE).</p> <p><b>FY 2014 Accomplishments:</b> Continued F-22 modernization development and support activities including, but not limited to: DT Weapons Assets, Threat Modeling Support, Test Support, Test Aircraft Modifications, Scorpion Helmet Mounted Display Demo, Common Range Integrated Instrumentation System (CRIIS) Network development, PT, Dynamic SAR, AIM-9X Risk Reduction, XP Migration and GFE.</p> <p><b>FY 2015 Plans:</b> Continue F-22 modernization development and support activities including, but not limited to: DT Weapons Assets, Threat Modeling Support, Test Support, Test Aircraft Modifications, Scorpion Helmet Mounted Display Demo, CRIIS Network development, PT Dynamic SAR, Flutter Excitation System (FES), XP Migration and GFE.</p> <p><b>FY 2016 Plans:</b> Continue F-22 modernization development and support activities including, but not limited to: DT Weapons Assets, Threat Modeling Support, Test Support, Test Aircraft Modifications, continue to assess helmet mounted display technology and requirements definition, CRIIS Network development, PT Dynamic SAR, Flutter Excitation System (FES), Wing Covers, and GFE.</p>		3.187	4.090	11.127
<p><b>Title:</b> Combined Test Force</p> <p><b>Description:</b> The F-22 Combined Test Force (CTF), located at Edwards Air Force Base, conducts full-up weapons system testing to assess the synergistic effect of the F-22 combined characteristics of stealth, speed, maneuverability, and integrated avionics in mission accomplishment. The CTF uses operationally significant ground and flight test scenarios to identify system performance deficiencies early before they are more difficult and costly to resolve.</p> <p><b>FY 2014 Accomplishments:</b> The significant programs that underwent flight test at AFTC include: Inc 3.2A OFF, AIM-9X Seek Eagle Separation completing the highest angle of attack (AoA). AIM-9X Launch to date, AIM-9X Basic, Update 5, Line-in-the-Sky Automated Ground Collision Avoidance System (LIS-AGCAS), TA-02, 3.2B OFF Test Bed support, MIT Lincoln Labs Airborne Countermeasures Test System 2 (ACTS 2) and planning for the Wing Pylon Covers testing.</p> <p><b>FY 2015 Plans:</b></p>		52.839	38.715	39.981



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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2014</b>	<b>FY 2015</b>	<b>FY 2016</b>
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<p>The significant programs undergoing flight test at AFTC include: Inc. 3.2A, Inc. 3.2B, AIM 9X Seek Eagle support, Update 5, and Pylon Wing Covers. Also, early planning will be accomplished for KC-46 Refueling Certification, Tactical Mandates, Update 6 and Common Range Integration Instrumentation System (CRIIS).</p> <p><b>FY 2016 Plans:</b> The significant programs undergoing flight test at AFFTC include: Inc 3.2B, KC-46 Refueling Certification, F-22 Tactical Mandates, Update 6, and Common Range Integration Instrumentation System (CRIIS).</p>			
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<p><b>Title:</b> Laboratory Test &amp; Operations (LTO)</p> <p><b>Description:</b> Lab Test &amp; Operations is a continuous activity that plans and conducts development, integration, test, &amp; verification (IT&amp;V) of F-22 OFPs with F-22 hardware. LTO provides maintenance, staffing, and operation of 18 development labs including 5 unique major System Integration Laboratories (SILs): the Agile Integration Lab (AIL); the Raptor Integration Lab (RAIL); the Air Combat Simulation (ACS) Lab; Vehicle Integration Facility (VIF); and the Vehicle System Simulator (VSS). Through the ACS, LTO provides the combat air forces with advanced mission-level test and training capability through a fully representative virtual simulation.</p> <p><b>FY 2014 Accomplishments:</b> Maintained lab availability in support of F-22 programs. Updated critical systems as required to support new aircraft configurations and capabilities. Accomplished OFP verification and risk reduction. Supported pilot training for Air Combat Command exercises and war gaming; Air Force Operation Test &amp; Evaluation Center test planning; and test event rehearsals. Supported periodic Air Warfare Center operational mission data updates. The significant programs that underwent lab test were Increment 3.2A, Increment 3.2B, Update 5, and AFWC Mission Data Loads.</p> <p><b>FY 2015 Plans:</b> Maintain lab availability in support of F-22 programs. Update critical systems as required to support new aircraft configurations and capabilities. Accomplish OFP verification and risk reduction. Support pilot training for Air Combat Command exercises and war gaming; Air Force Operation Test &amp; Evaluation Center test planning; and test event rehearsals. Support periodic Air Warfare Center operational mission data updates. The significant programs planned for lab test are Increment 3.2B and AFWC Mission Data Loads.</p> <p><b>FY 2016 Plans:</b> Maintain lab availability in support of F-22 programs. Update critical systems as required to support new aircraft configurations and capabilities. Accomplish OFP verification and risk reduction. Support pilot training for Air Combat Command exercises and war gaming; Air Force Operation Test &amp; Evaluation Center test planning; and test event rehearsals. Support periodic Air</p>	40.598	38.769	41.774
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2014</b>	<b>FY 2015</b>	<b>FY 2016</b>
Warfare Center operational mission data updates. The significant programs planned for lab test are Increment 3.2B, F-22 Tactical Mandates, Update 6, and AFWC Mission Data Loads.			
<b>Accomplishments/Planned Programs Subtotals</b>	266.431	143.336	209.227

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

<b>Line Item</b>	<b>FY 2014</b>	<b>FY 2015</b>	<b>FY 2016 Base</b>	<b>FY 2016 OCO</b>	<b>FY 2016 Total</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• APAF: BA05: Line Item # F02200: <i>F-22A Squadrons, PE 0207138F*</i>	358.268	301.426	129.251	-	129.251	285.014	218.692	222.923	275.407	Continuing	Continuing
• RDT&E: BA07: PE 0605213F: <i>Increment 3.2B, RDT&amp;E**</i>	88.268	173.647	140.640	-	140.640	72.467	1.399	1.426	1.452	23.348	613.079
• APAF: BA05: Line Item # F2232B: <i>F-22 Increment 3.2B, PE 0207138F***</i>	-	28.500	72.259	-	72.259	83.561	152.613	13.187	20.529	-	370.649
• MILCON: PE 0207138F: <i>MILCON</i>	13.900	11.000	-	-	-	-	-	-	-	-	24.900
• RDT&E: BA07: PE 0207163F: <i>AIM-120D, AMRAAM, RDT&amp;E****</i>	20.830	23.940	5.820	-	5.820	-	-	-	-	-	50.590

**Remarks**

NOTES:

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

\*\*F-22 Increment 3.2B, RDT&E/PE 0605213F, includes funding for FY13 and beyond identified in the Increment 3.2B documentation. PEs 0605213F and 0207318F share lab and infrastructure support costs across the F-22 enterprise.

\*\*\*F-22 Increment 3.2B, APAF/PE 0207138F includes funding for associated Increment 3.2B BPs 11 (Aircraft Modifications) and 16 (Initial Spares) only.

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

**D. Acquisition Strategy**

The Raptor Enhancement Development & Integration (REDI) contract is an Indefinite Delivery/Indefinite Quantity Ordering 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

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Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)
3600 / 7	PE 0207138F / <i>F-22A Squadrons</i>	674785 / <i>F-22</i>

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 Indefinite Delivery/Indefinite Quantity 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.

**E. 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.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Air Force** **Date:** February 2015

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207138F / F-22A Squadrons	<b>Project (Number/Name)</b> 674785 / F-22
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<b>Product Development (\$ in Millions)</b>				<b>FY 2014</b>		<b>FY 2015</b>		<b>FY 2016 Base</b>		<b>FY 2016 OCO</b>		<b>FY 2016 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Increment 3.2A	SS/CPIF	Lockheed Martin : Fort Worth, TX	356.107	40.170	Nov 2013	2.718	Jan 2015	-		-		-	-	398.995	-
Update 5	SS/Various	Lockheed Martin : Fort Worth, TX	44.776	47.785	Dec 2013	17.011	Jan 2015	-		-		-	-	109.572	-
Update 6 Interoperability	SS/Various	Lockheed Martin : Fort Worth, TX	15.197	19.229	Jun 2014	17.106	Jan 2015	48.691	Dec 2015	-		48.691	86.625	186.848	-
Software Support	SS/Various	Lockheed Martin : Fort Worth, TX	275.932	14.572	Mar 2014	2.221	Jan 2015	4.083	Nov 2015	-		4.083	Continuing	Continuing	-
Advanced Technology Development	Various	Various : Various,	52.357	20.925	Mar 2014	15.634	Mar 2015	45.261	Dec 2015	-		45.261	Continuing	Continuing	-
VAX Migration	SS/CPIF	Lockheed Martin : Fort Worth, TX	173.764	4.960	Mar 2014	-		-		-		-	-	178.724	-
System Engineering / Program Management	SS/CPFF	Lockheed Martin : Fort Worth, TX	201.651	5.471	Aug 2014	6.192	Jan 2015	9.139	Jan 2016	-		9.139	Continuing	Continuing	-
RAMMP	SS/CPFF	Lockheed Martin : Fort Worth, TX	151.006	16.695	Apr 2014	0.880	Feb 2015	1.098	Jan 2016	-		1.098	Continuing	Continuing	-
F-22 Small Projects	Various	Various : Various,	547.723	3.187	Nov 2013	4.090	Dec 2014	11.127	Nov 2015	-		11.127	Continuing	Continuing	-
<b>Subtotal</b>			1,818.513	172.994		65.852		119.399		-		119.399	-	-	-

<b>Support (\$ in Millions)</b>				<b>FY 2014</b>		<b>FY 2015</b>		<b>FY 2016 Base</b>		<b>FY 2016 OCO</b>		<b>FY 2016 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
<b>Subtotal</b>			-	-		-		-		-		-	-	-	-

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2014</b>		<b>FY 2015</b>		<b>FY 2016 Base</b>		<b>FY 2016 OCO</b>		<b>FY 2016 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Combined Test Force	Various	Various : Various,	729.997	52.839	Nov 2013	38.715	Dec 2014	39.981	Nov 2015	-		39.981	Continuing	Continuing	-
Laboratory Test & Operations (LTO)	SS/Various	Lockheed Martin : Ft Worth, TX	583.891	40.598	Nov 2013	38.769	Dec 2014	49.847	Nov 2015	-		49.847	Continuing	Continuing	-

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Air Force** **Date:** February 2015

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207138F / F-22A Squadrons	<b>Project (Number/Name)</b> 674785 / F-22
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<b>Test and Evaluation (\$ in Millions)</b>				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 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			
<b>Subtotal</b>			1,313.888	93.437		77.484		89.828		-		89.828	-	-	-

**Remarks**  
 The Combined Test Force and Laboratory Test & Operations costs appear to decrease significantly FY2013-2015 due to Increment 3.2B test costs which have been segregated beginning FY13 and subsequently captured in the PE 0605213F documentation. Upon completion of Increment 3.2B testing, costs will again be captured in this PE 0207138F, F-22A Squadrons documentation.

<b>Management Services (\$ in Millions)</b>				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 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			
Mission Support	Various	Various : Various,	129.371	-		-		-		-		-	-	129.371	-
<b>Subtotal</b>			129.371	-		-		-		-		-	-	129.371	-

			Prior Years	FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>			3,261.772	266.431		143.336		209.227		-		209.227	-	-	-

**Remarks**

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**Exhibit R-4, RDT&E Schedule Profile: PB 2016 Air Force** **Date:** February 2015

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207138F / F-22A Squadrons	<b>Project (Number/Name)</b> 674785 / F-22
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	FY 2014				FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020			
	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
Increment 3.2A Development, Integration, & Test	██████████																											
Increment 3.2A Final Operational Test & Evaluation (FOT&E)					██████████																							
Increment 3.2A Fleet Release									██████████																			
Update 5 Fleet Release Block 20									██████████																			
Update 5 Fleet Release Block 30/35													██████████															
Update 6 Interoperability Requirements Analysis/Design	██████████				██████████				██████████				██████████															
Update 6 Interoperability Development, Integration, & Test					██████████				██████████				██████████															
Update 6 Interoperability Preliminary Design Review (PDR)									██████████																			
Update 6 Interoperability Milestone B									██████████																			
Update 6 Interoperability Critical Design Review (CDR)													██████████															
Update 6 Interoperability Flight Test													██████████				██████████											
Update 6 Interoperability Milestone C																					██████████							
Update 6 Interoperability Full Deployment Decision (Fleet Release)																					██████████							
Advanced Technology Development Demonstrations	██████████				██████████				██████████				██████████				██████████				██████████							
Advanced Technology Development Studies & Analysis	██████████				██████████				██████████				██████████				██████████				██████████							

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2016 Air Force **Date:** February 2015

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207138F / F-22A Squadrons	<b>Project (Number/Name)</b> 674785 / F-22
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Increment 3.2A Development, Integration, & Test	1	2014	1	2015
Increment 3.2A Final Operational Test & Evaluation (FOT&E)	2	2015	3	2015
Increment 3.2A Fleet Release	4	2015	4	2015
Update 5 Fleet Release Block 20	4	2015	4	2015
Update 5 Fleet Release Block 30/35	1	2016	1	2016
Update 6 Interoperability Requirements Analysis/Design	1	2014	2	2017
Update 6 Interoperability Development, Integration, & Test	2	2015	3	2018
Update 6 Interoperability Preliminary Design Review (PDR)	4	2016	4	2016
Update 6 Interoperability Milestone B	4	2016	4	2016
Update 6 Interoperability Critical Design Review (CDR)	2	2017	2	2017
Update 6 Interoperability Flight Test	3	2017	2	2019
Update 6 Interoperability Milestone C	3	2019	3	2019
Update 6 Interoperability Full Deployment Decision (Fleet Release)	4	2019	4	2019
Advanced Technology Development Demonstrations	1	2014	4	2020
Advanced Technology Development Studies & Analysis	1	2014	4	2020

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2016 Air Force										<b>Date:</b> February 2015		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0207138F / F-22A Squadrons				<b>Project (Number/Name)</b> 674788 / F-22 Tactical Mandates			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2014</b>	<b>FY 2015</b>	<b>FY 2016 Base</b>	<b>FY 2016 OCO</b>	<b>FY 2016 Total</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
674788: F-22 Tactical Mandates	-	-	2.963	53.325	-	53.325	111.294	154.697	134.748	137.159	-	594.186
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Totals include funding for PRCP Program Number, 265 F-22 Tactical Mandates

In FY15, a separate Budget Program Activity Code (BPAC 674788) within PE 0207138F was created for F-22 Tactical Mandates, formerly known as F-22 Mandates. F-22 Tactical Mandates proposal activities were initiated in BPAC 674785 in FY14. This is not a new start of FY15.

**A. Mission Description and Budget Item Justification**

The F-22 Tactical Mandates program is the follow-on modernization effort to Increment 3.2B. This program includes Link 16 Transmit and Mode 5 Identification Friend or Foe (IFF) Transpond/Interrogate. Integration will be accomplished using Open Systems Architecture, to enable future life cycle savings opportunities for the platform. The program will require hardware and software modifications to the Block 30/35 combat-coded F-22 fleet.

Mode 5 IFF is a Joint Requirements Oversight Council (JROC) mandated blue force identification capability that will directly improve the combat effectiveness of the Raptor as well as reducing fratricide risk DoD-wide.

Link 16 Transmit enables 5th-to-5th and 5th-to-4th tactical information exchange - a top Air Force priority. The Raptor's superior 5th Gen sensor suite will now aid the situational awareness of all participants, in any battle space, while further reducing fratricide risk.

BA07 - This program is in Budget Activity 07, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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

	<b>FY 2014</b>	<b>FY 2015</b>	<b>FY 2016</b>
<b>Title:</b> F-22 Tactical Mandates	-	2.963	51.566
<b>Description:</b> The F-22 Tactical Mandates program (previously documented as F-22 Mandates; PE 0207138F, BPAC 674785) consists of the software and hardware development necessary to provide tactical Mode 5 and Link 16 Transmit on the F-22. The mandate for Mode 5 is required by the Joint Requirements Oversight Council (JROC). Includes Mission Support of the F-22 Program Office: travel, computer costs, and other miscellaneous contract support.			
<b>FY 2014 Accomplishments:</b> Not Applicable			
<b>FY 2015 Plans:</b>			



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2016 Air Force		<b>Date:</b> February 2015
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207138F / F-22A Squadrons	<b>Project (Number/Name)</b> 674788 / F-22 Tactical Mandates

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2014</b>	<b>FY 2015</b>	<b>FY 2016</b>
F-22 Tactical Mandates will begin capabilities analysis and selection, requirements development, design maturity, and early software modeling and test. Initiate design efforts.  <b>FY 2016 Plans:</b> F-22 Tactical Mandates will continue capabilities analysis and selection, requirements development, design, and early software modeling and test.			
<b>Title:</b> F-22 Tactical Mandates Test Execution  <b>Description:</b> The F-22 Combined Test Force (CTF), located at Edwards Air Force Base, conducts testing to assess performance and military utility of Tactical Mandates. The CTF uses operationally relevant ground and flight test scenarios to conduct thorough developmental testing in order to identify possible Tactical Mandates deficiencies. Tactical Mandates Lab Tests and Operations will plan and conduct software build, integration and testing of the F-22 system at the system and sub-system laboratories.  <b>FY 2014 Accomplishments:</b> Not Applicable  <b>FY 2015 Plans:</b> Not Applicable  <b>FY 2016 Plans:</b> The CTF will conduct initial test planning activities for Tactical Mandates developmental flight testing. The Labs will conduct test planning activities in the laboratories in order to prepare for full prototype and system level testing.	-	-	1.759
<b>Accomplishments/Planned Programs Subtotals</b>	-	2.963	53.325

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016</u> <u>Base</u>	<u>FY 2016</u> <u>OCO</u>	<u>FY 2016</u> <u>Total</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• RDT&E: BA07: PE 0207138F: F-22A Squadrons*	266.431	143.336	209.227	-	209.227	270.904	251.398	280.459	285.477	Continuing	Continuing
• APAF: BA05: Line Item #F02200: F-22A Squadrons, PE 0207138F**	358.268	301.426	129.251	-	129.251	285.014	218.692	222.923	275.407	Continuing	Continuing
• RDT&E, BA05, PE 0605213F: F-22A Increment 3.2B***	88.268	173.647	140.640	-	140.640	72.462	1.399	1.426	1.452	23.348	613.079
• APAF: BA05: Line Item #F2232B: F-22A Increment 3.2B, PE 0207138F****	-	28.500	72.259	-	72.259	83.561	152.613	13.187	20.529	-	370.649

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2016 Air Force	<b>Date:</b> February 2015
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207138F / <i>F-22A Squadrons</i>	<b>Project (Number/Name)</b> 674788 / <i>F-22 Tactical Mandates</i>
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016</u> <u>Base</u>	<u>FY 2016</u> <u>OCO</u>	<u>FY 2016</u> <u>Total</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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**Remarks**

- \*F-22 Squadrons, RDT&E/PE 0207138F, includes funding for F-22A Squadrons modernization and development BPAC 674785.
- \*\*F-22A Squadrons, APAF/PE 0207138F, includes funding for F-22A Squadrons BPs 11 (Aircraft Modifications), 13 (Post-Production Support), 16 (Initial Spares), and 19 (Depot Activation) only.
- \*\*\*F-22 Increment 3.2B, RDT&E/PE 0605213F, includes funding for the development of F-22A, Increment 3.2B and share lab and infrastructure costs across the F-22 enterprise.
- \*\*\*\*F-22 Squadrons, APAF/PE 0207138F/F2232B, includes funding for F-22 Increment 3.2B BPs 11 (Aircraft Modifications) and 16 (Initial Spares) only.

**D. Acquisition Strategy**

The (REDI) II contract is a follow-on Indefinite Delivery/Indefinite Quantity 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.

**E. 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.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Air Force** **Date:** February 2015

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207138F / F-22A Squadrons	<b>Project (Number/Name)</b> 674788 / F-22 Tactical Mandates
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<b>Product Development (\$ in Millions)</b>				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 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			
F-22 Tactical Mandates	SS/CPIF	Lockheed Martin : Ft Worth, TX	0.000	-		2.963	Sep 2015	51.566	Nov 2015	-		51.566	459.626	514.155	-
<b>Subtotal</b>			0.000	-		2.963		51.566		-		51.566	459.626	514.155	-

<b>Support (\$ in Millions)</b>				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 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			
<b>Subtotal</b>			-	-		-		-		-		-	-	-	-

<b>Test and Evaluation (\$ in Millions)</b>				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 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 Execution	Various	Various : Various,	0.000	-		-		1.759	Nov 2015	-		1.759	78.272	80.031	-
<b>Subtotal</b>			0.000	-		-		1.759		-		1.759	78.272	80.031	-

<b>Management Services (\$ in Millions)</b>				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 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			
<b>Subtotal</b>			-	-		-		-		-		-	-	-	-

	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	0.000	-	2.963	53.325	-	53.325	537.898	594.186	-

**Remarks**



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**Exhibit R-4A, RDT&E Schedule Details:** PB 2016 Air Force **Date:** February 2015

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0207138F / <i>F-22A Squadrons</i>	<b>Project (Number/Name)</b> 674788 / <i>F-22 Tactical Mandates</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
F-22 Tactical Mandates Requirements Analysis	4	2015	3	2016
F-22 Tactical Mandates System Requirements Review/System Design Review (SRR/SDR)	3	2016	3	2016
F-22 Tactical Mandates Design	3	2016	2	2017
F-22 Tactical Mandates Preliminary Design Review (PDR)	1	2017	1	2017
F-22 Tactical Mandates Milestone B	2	2017	2	2017
F-22 Tactical Mandates Development, Integration & Test	2	2017	4	2020
F-22 Tactical Mandates Milestone C	1	2020	1	2020