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Exhibit R-2, RDT&E Budget Item Justification: PB 2014 Army	DATE: April 2013
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APPROPRIATION/BUDGET ACTIVITY					R-1 ITEM NOMENCLATURE							
2040: <i>Research, Development, Test & Evaluation, Army</i> BA 7: <i>Operational Systems Development</i>					PE 0607865A: <i>Patriot Product Improvement</i>							
COST (\$ in Millions)	All Prior Years	FY 2012	FY 2013 [#]	FY 2014 Base	FY 2014 OCO ^{##}	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
Total Program Element	-	0.000	109.978	70.053	-	70.053	47.264	61.100	51.919	54.858	Continuing	Continuing
DV8: <i>PATRIOT PRODUCT IMPROVEMENT</i>	-	0.000	109.978	70.053	-	70.053	47.264	61.100	51.919	54.858	Continuing	Continuing

[#] FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012

^{##} The FY 2014 OCO Request will be submitted at a later date

Note

Increase in base dollars in FY14 addresses SIPRNet/NIPRNet Access Point/Troposcatter (SNAP/TROPO) efforts for PATRIOT Product Improvement Program (PIP).

A. Mission Description and Budget Item Justification

PATRIOT is an advanced Surface-to-Air guided missile system with a high probability of kill capable of operation in the presence of Electronic Countermeasures (ECM) and able to conduct multiple simultaneous engagements against high performance air breathing targets and ballistic missiles likely to be encountered by US Forces. The PATRIOT Product Improvement Program provides for the upgrade of the PATRIOT System through individual materiel changes. The PATRIOT Product Improvement Program upgrades the PATRIOT system to address operational lessons learned, enhancements to joint force interoperability, and other system performance improvements to provide overmatch capability with the emerging threat. Efforts will be made to expedite PATRIOT materiel solutions (e.g. Radar Digital Processor, Communications Upgrades, Radars on the Net) to both enhance capability and facilitate integration into the IAMD architecture.

B. Program Change Summary (\$ in Millions)	<u>FY 2012</u>	<u>FY 2013</u>	<u>FY 2014 Base</u>	<u>FY 2014 OCO</u>	<u>FY 2014 Total</u>
Previous President's Budget	0.000	109.978	60.392	-	60.392
Current President's Budget	0.000	109.978	70.053	-	70.053
Total Adjustments	0.000	0.000	9.661	-	9.661
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	9.661	-	9.661

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Exhibit R-2A, RDT&E Project Justification: PB 2014 Army										DATE: April 2013		
APPROPRIATION/BUDGET ACTIVITY 2040: Research, Development, Test & Evaluation, Army BA 7: Operational Systems Development					R-1 ITEM NOMENCLATURE PE 0607865A: Patriot Product Improvement				PROJECT DV8: PATRIOT PRODUCT IMPROVEMENT			
COST (\$ in Millions)	All Prior Years	FY 2012	FY 2013 [#]	FY 2014 Base	FY 2014 OCO ^{##}	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
DV8: PATRIOT PRODUCT IMPROVEMENT	-	0.000	109.978	70.053	-	70.053	47.264	61.100	51.919	54.858	Continuing	Continuing
Quantity of RDT&E Articles												

[#] FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012

^{##} The FY 2014 OCO Request will be submitted at a later date

Note

This is not a new start - continues effort funded in PE 0203801A (Project 036).

A. Mission Description and Budget Item Justification

Software Improvement for Threat Evolution: Performs necessary analysis and development efforts to maintain PATRIOT system effectiveness against evolving threat technologies and specific threat capabilities. This effort identifies evolving threats and threat characteristics that might present a challenge to PATRIOT's current capabilities and develops initial concepts to maintain system effectiveness relative to these threats.

Radar Digital Processor Development: Incorporates improvements to mitigate radar hardware obsolescence, improve Reliability, Maintainability, and Availability (RAM) and improve performance of the PATRIOT Radar Set against evolving threat sets. This program includes the implementation of Identification Friend or Foe (IFF) Mode 5 Level 1 / Level 2, and a Non-Cooperative Target Recognition (NCTR) Combat ID technique to mitigate potential fratricide risk, and the development of CONOPS to incorporate the new Combat ID capabilities into system operation. The RDP also provides the necessary radar processing capability to support follow-on EDP Tasks 6 and 7 to counter emerging threats and provide data necessary to support migration to IAMD. The RDP is a pre-requisite for migration to an IAMD Netted Sensor.

SIPRNet/NIPRNet Access Point/Troposcatter (SNAP/TROPO): Provides hardware interfaces to support extended range communications within the battalion (TROPO) and Force Operations interfaces to satellite for access to SIPR/NIPR worldwide communication networks.

THAAD PATRIOT Interoperability: Implements improvements to THAAD/PATRIOT Interoperability and addresses Joint Defense Network (JDN) deficiencies that impact Tactical Ballistic Missile (TBM) battle management and force/engagement operations. Efforts will be concentrated on joint, collaborative force operations (defense design and planning) and enhanced Tactical Digital Information Link - Joint (TADIL J) interoperability.

Advanced Electronic Counter Measures (AECM): This task investigates the implications of advanced technology (DRFM) available on airborne platforms that enables new ECM techniques which could adversely affect Air and Missile Defense System effectiveness.

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Exhibit R-2A, RDT&E Project Justification: PB 2014 Army		DATE: April 2013		
APPROPRIATION/BUDGET ACTIVITY 2040: Research, Development, Test & Evaluation, Army BA 7: Operational Systems Development	R-1 ITEM NOMENCLATURE PE 0607865A: Patriot Product Improvement	PROJECT DV8: PATRIOT PRODUCT IMPROVEMENT		
Internet Protocol Commo Phase 1 Force Modernization: Replacement of the current KG-194A encryptors in PATRIOT requires redesign of the basic PATRIOT shelter communications architecture to incorporate new hardware which interfaces the existing IDOCS to new KIV-7M encryptors and provides an IP base backbone for range extension and over the air IP communications tunneling for Force Operations message traffic without impacting the Engagement Operations traffic.				
Evolutionary Development Program (EDP): Provides an integrated approach to maintain and update system capabilities against the evolving threat. Develops and implements a comprehensive strategy to leverage modernization and upgrade efforts.				
Task 2: Implements improved ground system and interceptor capabilities (PAC-2/GEM, PAC-3, and MSE) to counter stressing TBM threats.				
Task 6: Improves discrimination of higher altitude TBM RVs from associated objects to support the full engagement capabilities of the interceptor. Longer-range detection and track, and improved high-altitude discrimination are required to achieve the required lethality performance against the RV and to mitigate missile wastage against separation debris. This task leverages the signal processing capabilities of the RDP, and supports the high altitude engagements required by the PAC-3 and PAC-3 Missile Segment Enhancement missiles.				
Upper Tier Debris Mitigation (UTDM): Implements algorithms to mitigate system impacts of debris from Upper Tier intercepts associated with operating in the BMDS environment. Debris from Upper Tier intercepts can cause significant radar loading effects and the potential for erroneous engagements and missile wastage on debris.				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2012	FY 2013	FY 2014
Title: PATRIOT Product Improvement		0.000	109.978	70.053
Articles:			0	
Description: Software Improvement for Threat Evolution				
FY 2013 Plans:				
Continues Software Improvement for Threat Evolution. Radar Digital Processor continues development efforts to support U.S. FY 2016 fielding, providing the field with additional capability and growth potential to counter stressing threats. Increase addresses Evolutionary Development Program (EDP) efforts and Electronic Counter Measures (ECM).				
FY 2014 Plans:				
Continues Software Improvement for Threat Evolution. Radar Digital Processor continues development efforts to support U.S. FY 2016 fielding, providing the field with additional capability and growth potential to counter stressing threats. Continues Evolutionary Development Program (EDP) efforts and Electronic Counter Measures (ECM). Increase addresses SNAP/TROPO.				
Accomplishments/Planned Programs Subtotals		0.000	109.978	70.053

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Exhibit R-2A, RDT&E Project Justification: PB 2014 Army		DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 7: <i>Operational Systems Development</i>	R-1 ITEM NOMENCLATURE PE 0607865A: <i>Patriot Product Improvement</i>	PROJECT DV8: <i>PATRIOT PRODUCT IMPROVEMENT</i>
C. Other Program Funding Summary (\$ in Millions) N/A		
Remarks		
D. Acquisition Strategy The design objective of the PATRIOT system was to provide a baseline system capable of modification to cope with continuing threat evolution. This program minimizes technological risks and provides a means of enhancing system capability through planned upgrades of deployed systems. The PATRIOT Product Improvement program upgrades the PATRIOT system to address operational lessons learned, enhancements to joint force interoperability and communications, and other system performance improvements to provide overmatch capability against the emerging threat. Upgrades are implemented through individual hardware and software materiel changes and fielded incrementally. This program encompasses several changes which will require the use of a variety of acquisition methods to develop, test, procure and field.		
E. Performance Metrics Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2014 Army												DATE: April 2013			
APPROPRIATION/BUDGET ACTIVITY 2040: Research, Development, Test & Evaluation, Army BA 7: Operational Systems Development						R-1 ITEM NOMENCLATURE PE 0607865A: Patriot Product Improvement				PROJECT DV8: PATRIOT PRODUCT IMPROVEMENT					
Management Services (\$ in Millions)				FY 2012		FY 2013		FY 2014 Base		FY 2014 OCO		FY 2014 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	All Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Program Management	Various	RSA:Various	0.000	-		0.538	Oct 2012	0.259	Oct 2013	-		0.259	Continuing	Continuing	0.000
U.S. Contracts	C/FFP	Intuitive Research and Technology Corp. (IRTC):Huntsville, AL	0.000	-		0.361	Jan 2013	0.250	Jan 2014	-		0.250	Continuing	Continuing	0.000
Subtotal			0.000	0.000		0.899		0.509		0.000		0.509			0.000
Product Development (\$ in Millions)				FY 2012		FY 2013		FY 2014 Base		FY 2014 OCO		FY 2014 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	All Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Software Improvement for Threat Evolution	Various	Multiple:Multiple	0.000	-		9.986	Jan 2013	10.375	Jan 2014	-		10.375	Continuing	Continuing	0.000
Radar Digital Processor (RDP) Development	SS/ Various	Raytheon:Massachusetts	0.000	-		32.200	Jan 2013	14.829	Jan 2014	-		14.829	0.000	47.029	0.000
SNAP/TROPO	SS/ Various	Raytheon:Massachusetts	0.000	-		-		9.923	Jan 2014	-		9.923	0.000	9.923	0.000
THAAD PATRIOT Interoperability	SS/ Various	Raytheon:Massachusetts	0.000	-		6.800	Jan 2013	2.133	Jan 2014	-		2.133	0.000	8.933	0.000
Advanced Electronic Counter Measures (ECM)	SS/ Various	Raytheon:Massachusetts	0.000	-		16.000	Jan 2013	13.339	Jan 2014	-		13.339	Continuing	Continuing	Continuing
Internet Protocol Commo Phase 1 Force Modernization	SS/ Various	Raytheon:Massachusetts	0.000	-		3.181	Jan 2013	-		-		-	0.000	3.181	0.000
Evolutionary Development Program (EDP)	SS/ Various	Raytheon:Massachusetts	0.000	-		35.700	Jan 2013	5.263	Jan 2014	-		5.263	Continuing	Continuing	0.000
Task 2	SS/ Various	Raytheon:Massachusetts	0.000	-		-		6.917	Jan 2014	-		6.917	Continuing	Continuing	Continuing
Task 6	SS/ Various	Raytheon:Massachusetts	0.000	-		-		6.397	Jan 2014	-		6.397	Continuing	Continuing	Continuing

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APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 7: <i>Operational Systems Development</i>							R-1 ITEM NOMENCLATURE PE 0607865A: <i>Patriot Product Improvement</i>				PROJECT DV8: <i>PATRIOT PRODUCT IMPROVEMENT</i>				

Product Development (\$ in Millions)				FY 2012		FY 2013		FY 2014 Base		FY 2014 OCO		FY 2014 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	All Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Upper Tier Debris Mitigation (UTDM)	SS/ Various	Raytheon:Massachusetts	0.000	-		4.800	Jan 2013	-		-		-	0.000	4.800	0.000
Subtotal			0.000	0.000		108.667		69.176		0.000		69.176			

Remarks
The contract method type Sole Source/Various is Fixed Price Level of Effort which includes Cost Plus Fixed Fee for material, ODC, and travel.

Test and Evaluation (\$ in Millions)				FY 2012		FY 2013		FY 2014 Base		FY 2014 OCO		FY 2014 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	All Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
RDEC and Other Govt Agencies	Various	RSA:Various	0.000	-		0.412	Jan 2013	0.368	Jan 2014	-		0.368	Continuing	Continuing	0.000
Subtotal			0.000	0.000		0.412		0.368		0.000		0.368			0.000

			All Prior Years	FY 2012		FY 2013		FY 2014 Base		FY 2014 OCO		FY 2014 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.000		109.978		70.053		0.000		70.053			

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2014 Army											DATE: April 2013				
APPROPRIATION/BUDGET ACTIVITY						R-1 ITEM NOMENCLATURE						PROJECT			
2040: Research, Development, Test & Evaluation, Army						PE 0607865A: Patriot Product Improvement						DV8: PATRIOT PRODUCT IMPROVEMENT			
BA 7: Operational Systems Development															

	FY 2012				FY 2013				FY 2014				FY 2015				FY 2016				FY 2017				FY 2018			
	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
PDB 7 Fielding (Modernized Adjunct Processor) IOC																												
PDB 8 (RDP) IOC																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2014 Army		DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 2040: <i>Research, Development, Test & Evaluation, Army</i> BA 7: <i>Operational Systems Development</i>	R-1 ITEM NOMENCLATURE PE 0607865A: <i>Patriot Product Improvement</i>	PROJECT DV8: <i>PATRIOT PRODUCT IMPROVEMENT</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
PDB 7 Fielding (Modernized Adjunct Processor) IOC	3	2013	3	2013
PDB 8 (RDP) IOC	3	2016	3	2016