Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army											Date: May 2017	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0603327A *I Air and Missile Defense Systems Engineering*							
COST ($ in Millions)	**Prior Years**	**FY 2016**	**FY 2017**	**FY 2018 Base**	**FY 2018 OCO**	**FY 2018 Total**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**Cost To Complete**	**Total Cost**
Total Program Element	-	0.000	14.200	33.949	15.000	48.949	35.795	24.939	28.268	33.370	Continuing	Continuing
FG9: *Air and Missile Defense (AMD) Electronic Warfare*	-	0.000	14.200	33.949	15.000	48.949	35.795	24.939	28.268	33.370	Continuing	Continuing

Note

Note: FY2018 funding in the amount of $5.939M was realigned from this Program Element (PE) to PE 0604741A, Project 126.

A. Mission Description and Budget Item Justification

Funding in this program supports efforts to assess Army Air and Missile Defense (AMD) performance and system vulnerabilities to threats from Cyber and Electromagnetic Activities (CEMA). Army AMD sensors, Integrated Air and Missile Defense (IAMD) Battle Command System (IBCS) Command and Control (C2), Radio Frequency (RF) data and voice networks will be assessed against current and postulated threat systems and techniques. Potential solutions developed by the Army, other Services, and Defense agencies (for example Missile Defense Agency) to close identified gaps will be demonstrated and assessed in live and simulated CEMA environments. Assessment events will be conducted approximately every two years. Analysis of results and implementation of potential solutions will occur between events using system-specific funding. The proposed solutions will then be assessed at the next event after implementation.

Included in this line are funds to plan and execute periodic CEMA activities with Army AMD systems, to include other Service and other Agency AMD systems as appropriate. Upon completion of CEMA demonstration analyses, create concepts for mitigating Army AMD sensor, C2, and RF data link vulnerabilities. Efforts in this program will also develop tools for use by Army AMD systems to improve overall system performance in contested environments, to include effects-based CEMA Modeling and Simulation (M&S) to assess Army AMD CEMA concepts in Hardware-In-The-Loop (HWIL) environment. Collaboration is required with United States Strategic Command (USSTRATCOM) Joint Electromagnetic Preparedness for Advanced Combat (JEPAC) to evaluate, modify, and field existing Army AMD EP Tactics, Techniques, and Procedures (TTPs) in a Joint environment. Additionally, there will be continual interface with intelligence communities to maintain cognizance of emerging CEMA threats and incorporate these threats in future CEMA demonstrations. An output from these activities will be development of a time-phased roadmap that identifies the investments needed to improve the CEMA capabilities of Army AMD sensors, C2, and RF data and voice networks.

Funds in this line will also be used to transition the Army Low-Cost Portable Surveillance (ALPS) sensor from Science and Technology (S&T) into an emerging Program of Record (PoR). Initially, prototype systems will be provided to meet a Combatant Command identified need and to conduct an operational assessment. This program will also develop and integrate ALPS into the Army Integrated Air & Missile Defense (AIAMD) Battle Command System (IBCS) to improve the CEMA posture of the Army's AMD architecture. The objectives of this effort are to prove component and subsystem maturity in a system-of-systems environment and to reduce subsequent PoR integration risk.

Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army					Date: May 2017
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*			R-1 Program Element (Number/Name) PE 0603327A *I Air and Missile Defense Systems Engineering*		
B. Program Change Summary ($ in Millions)	**FY 2016**	**FY 2017**	**FY 2018 Base**	**FY 2018 OCO**	**FY 2018 Total**
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	14.200	33.949	15.000	48.949
Total Adjustments	0.000	14.200	33.949	15.000	48.949
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	0.000	14.200	33.949	15.000	48.949

Change Summary Explanation

FY2017 funding in the amount of $14.200 million is included in the March 2017 Request for Additional Appropriations.

FY2018 base funding in the amount of $5.939 million was realigned from Program Element (PE) 0604741A, Project 126. Additionally, base funding increased by $13.010 million for ALPS development/integration and $15.000 million for CEMA activities.

FY2018 Overseas Contingency (OCO) fund in the amount of $15.000 million support a Combatant Command identified need for ALPS and to continue the operational assessment started with FY17 funding in the Request for Additional Appropriations.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603327A / *Air and Missile Defense Systems Engineering*	Project (Number/Name) FG9 / *Air and Missile Defense (AMD) Electronic Warfare*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
FG9: *Air and Missile Defense (AMD) Electronic Warfare*	-	0.000	14.200	33.949	15.000	48.949	35.795	24.939	28.268	33.370	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Note: FY2018 funding in the amount of $5.939M was realigned from this Program Element (PE) to PE 0604741A, Project 126.

A. Mission Description and Budget Item Justification

Funding in this program supports efforts to assess Army Air and Missile Defense (AMD) performance and system vulnerabilities to threats from Cyber and Electromagnetic Activities (CEMA). Army AMD sensors, Integrated Air and Missile Defense (IAMD) Battle Command System (IBCS) Command and Control (C2), Radio Frequency (RF) data and voice networks will be assessed against current and postulated threat systems and techniques. Potential solutions developed by the Army, other Services, and Defense agencies (for example Missile Defense Agency) to close identified gaps will be demonstrated and assessed in live and simulated CEMA environments. Assessment events will be conducted approximately every two years. Analysis of results and implementation of potential solutions will occur between events using system-specific funding. The proposed solutions will then be assessed at the next event after implementation.

Included in this line are funds to plan and execute periodic CEMA activities with Army AMD systems, to include other Service and other Agency AMD systems as appropriate. Upon completion of CEMA demonstration analyses, create concepts for mitigating Army AMD sensor, C2, and RF data link vulnerabilities. Efforts in this program will also develop tools for use by Army AMD systems to improve overall system performance in contested environments, to include effects-based CEMA Modeling and Simulation (M&S) to assess Army AMD CEMA concepts in Hardware-In-The-Loop (HWIL) environment. Collaboration is required with United States Strategic Command (USSTRATCOM) Joint Electromagnetic Preparedness for Advanced Combat (JEPAC) to evaluate, modify, and field existing Army AMD EP Tactics, Techniques, and Procedures (TTPs) in a Joint environment. Additionally, there will be continual interface with intelligence communities to maintain cognizance of emerging CEMA threats and incorporate these threats in future CEMA demonstrations. An output from these activities will be development of a time-phased roadmap that identifies the investments needed to improve the CEMA capabilities of Army AMD sensors, C2, and RF data and voice networks.

Funds in this line will also be used to transition the Army Low-Cost Portable Surveillance (ALPS) sensor from Science and Technology (S&T) into an emerging Program of Record (PoR). Initially, prototype systems will be provided to meet a Combatant Command identified need and to conduct an operational assessment. This program will also develop and integrate ALPS into the Army Integrated Air & Missile Defense (AIAMD) Battle Command System (IBCS) to improve the CEMA posture of the Army's AMD architecture. The objectives of this effort are to prove component and subsystem maturity in a system-of-systems environment and to reduce subsequent PoR integration risk.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Advanced Electronic Protection Enhancements and ALPS Development/Integration	-	14.200	33.949	15.000	48.949

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603327A / *Air and Missile Defense Systems Engineering*	**Project (Number/Name)** FG9 / *Air and Missile Defense (AMD) Electronic Warfare*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Description: Provides CEMA planning, conducts CEMA demonstrations and post-mission analysis, and develop/integrate ALPS. ***FY 2017 Plans:*** Provide ALPS prototype systems to meet a Combatant Command identified need and begin an operational assessment. Begin development and integration of ALPS into Integrated Air & Missile Defense (IAMD) Battle Command System (IBCS). ***FY 2018 Base Plans:*** Funding is provided for additional analysis of the P-11 event output, along with initial planning and preparation for the P-12 event. Funding will also be used to continue the Cyber and Electromagnetic Activities (CEMA) roadmap and strategy that ensures coordination and execution of prioritized goals. Virtualize IAMD and PATRIOT components, validate the models, and assess them in a contested environment. Begin virtualization of additional IAMD sensors and launchers. Continue ALPS development and integration of ALPS into the Army AMD architecture. ***FY 2018 OCO Plans:*** Provide additional ALPS prototype systems to meet a Combatant Command identified need and continue the operational assessment.					
Accomplishments/Planned Programs Subtotals	-	14.200	33.949	15.000	48.949

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Not applicable for this item.

D. Acquisition Strategy

Assessment events will be conducted approximately every two years in live and simulated Cyber and Electromagnetic Activity environments. In addition to government planning and conduct of assessments, funding will also be provided through various contracts for subject matter expertise.

ALPS will utilize an existing Defense Ordinance Technology Consortium (DOTC) Section 845 Other Transaction Authority (OTA) agreement to develop and integrate prototypes in AIAMD architecture. An operational assessment will be used to refine ALPS requirements and assess the longer-term strategy.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603327A / *Air and Missile Defense Systems Engineering*	**Project (Number/Name)** FG9 / *Air and Missile Defense (AMD) Electronic Warfare*

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603327A / *Air and Missile Defense Systems Engineering*	Project (Number/Name) FG9 / *Air and Missile Defense (AMD) Electronic Warfare*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Program Management	Various	Various : Various	2.252	-		0.900	Aug 2017	3.100	Nov 2017	-		3.100	Continuing	Continuing	Continuing
		Subtotal	2.252	-		0.900		3.100		-		3.100	-	-	-

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
System Integration Assessment	Various	Various : Various	1.218	-		-		0.200	Dec 2017	-		0.200	Continuing	Continuing	Continuing
ALPS Development/ Integration	Various	Various : Various	0.000	-		13.300	Aug 2017	11.110	Jan 2018	15.000	Jan 2018	26.110	Continuing	Continuing	Continuing
		Subtotal	1.218	-		13.300		11.310		15.000		26.310	-	-	-

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Component Assessments & Research and Trade Studies	Various	Various : Various	5.137	-		-		15.339	Feb 2018	-		15.339	Continuing	Continuing	Continuing
		Subtotal	5.137	-		-		15.339		-		15.339	-	-	-

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Demonstration Planning and Execution	Various	Various : Various	0.000	-		-		4.200	Nov 2017	-		4.200	Continuing	Continuing	Continuing
		Subtotal	0.000	-		-		4.200		-		4.200	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603327A / *Air and Missile Defense Systems Engineering*	Project (Number/Name) FG9 / *Air and Missile Defense (AMD) Electronic Warfare*	

	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	8.607	-		14.200		33.949		15.000		48.949	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603327A / *Air and Missile Defense Systems Engineering*	**Project (Number/Name)** FG9 / *Air and Missile Defense (AMD) Electronic Warfare*

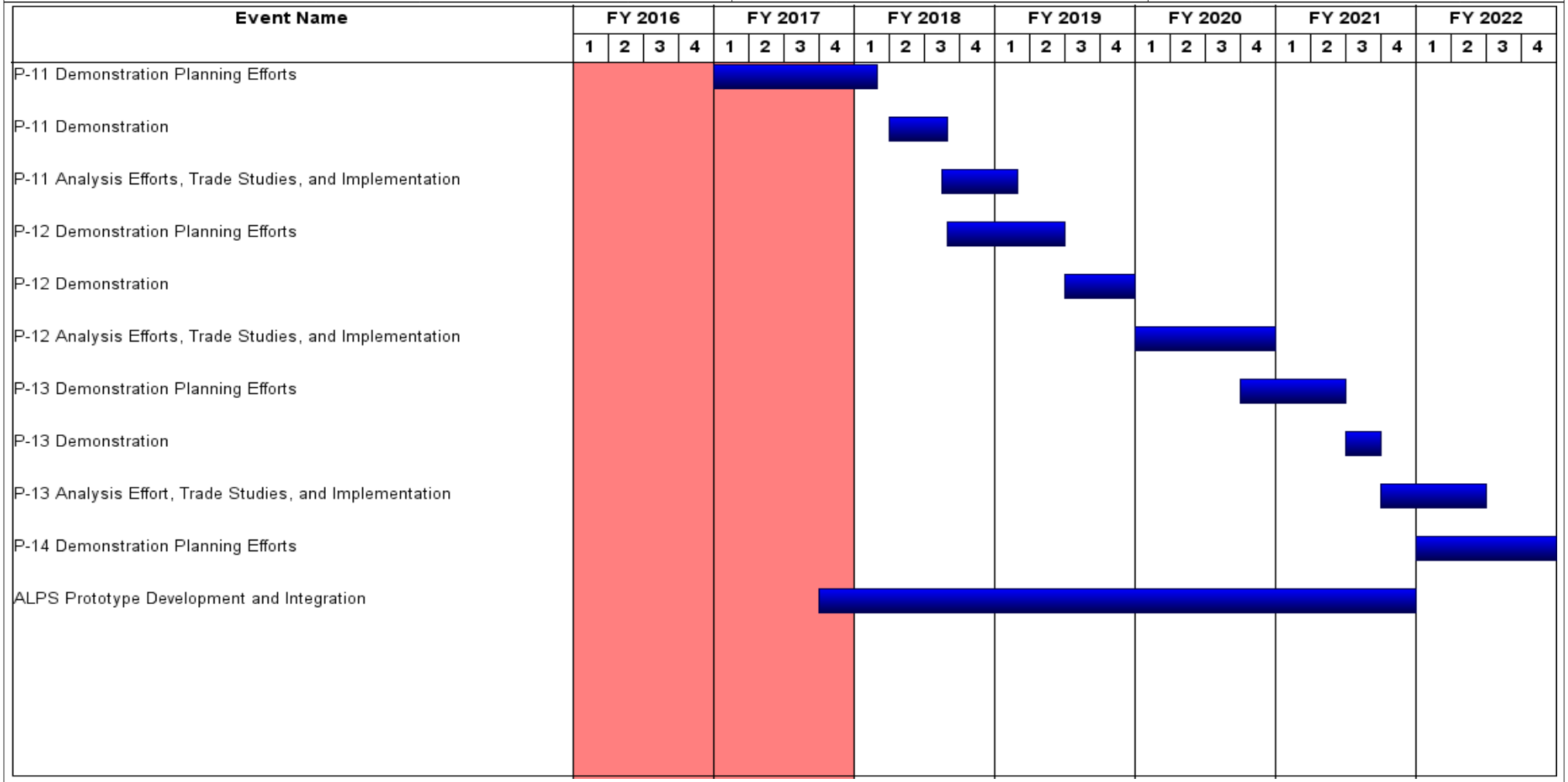

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603327A / *Air and Missile Defense Systems Engineering*	**Project (Number/Name)** FG9 / *Air and Missile Defense (AMD) Electronic Warfare*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
P-11 Demonstration Planning Efforts	1	2017	1	2018
P-11 Demonstration	2	2018	3	2018
P-11 Analysis Efforts, Trade Studies, and Implementation	3	2018	1	2019
P-12 Demonstration Planning Efforts	3	2018	2	2019
P-12 Demonstration	3	2019	4	2019
P-12 Analysis Efforts, Trade Studies, and Implementation	1	2020	4	2020
P-13 Demonstration Planning Efforts	4	2020	2	2021
P-13 Demonstration	3	2021	3	2021
P-13 Analysis Effort, Trade Studies, and Implementation	4	2021	2	2022
P-14 Demonstration Planning Efforts	1	2022	4	2022
ALPS Prototype Development and Integration	4	2017	4	2021