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

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>					R-1 Program Element (Number/Name) PE 0603305A / <i>Army Missile Defense Systems Integration</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	-	25.672	29.347	9.433	-	9.433	9.491	10.912	12.179	12.276	Continuing	Continuing
TR5: <i>Missile Defense Battlelab</i>	-	25.672	29.347	9.433	-	9.433	9.491	10.912	12.179	12.276	Continuing	Continuing

A. Mission Description and Budget Item Justification

This Program Element funds missile defense systems integration efforts for both the US Army Space and Missile Defense Command/Army Forces Strategic Command (USASMDC/ARSTRAT).

USASMDC/ARSTRAT: Headquarters, Department of the Army General Order 37, dated 16 October 2006, designated USASMDC/ARSTRAT as the Army proponent for space and ground-based midcourse defense (GMD), the Army integrator for global missile defense, and the Army Service Component Command (ASCC) of the U.S. Strategic Command (USSTRATCOM). Army Regulation (AR) 10-87 Army Commands, Army Service Component Commands, and Direct Reporting Units, dated 4 September 2007 and AR 5-22 The Army Force Modernization Proponent System dated 19 August 2009 designates USASMDC/ARSTRAT as the Army specified proponent for Global Missile Defense and Space/High Altitude capabilities. As the Army proponent for space, high altitude and GMD, USASMDC/ARSTRAT is responsible for developing warfighting concepts, conduct warfighting experiments to validate those concepts, identify capabilities needed to implement the validated concepts, and develop Doctrine, Organizations, Training, Material, Leadership & Education, Personnel, Facilities and Policy (DOTMLPF-P) solutions to realize the GMD capabilities. As the Army integrator for global missile defense, USASMDC/ARSTRAT is responsible for reviewing programs managed by the Army, other Services, Defense agencies and National agencies to ensure that they are correctly synchronized and will ultimately provide the capabilities required by USSTRATCOM to execute its global missile defense responsibilities.

Project TR5 funds United States Army Space and Missile Defense Command/ Army Strategic Command (USASMDC/ARSTRAT) efforts to develop the associated operational prototyping, experimentation, operational analysis, and modeling and simulation in support of current and future Forces.

B. Program Change Summary (\$ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	25.795	10.347	9.725	-	9.725
Current President's Budget	25.672	29.347	9.433	-	9.433
Total Adjustments	-0.123	19.000	-0.292	-	-0.292
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	19.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustment to the execution year	-0.123	-	-	-	-

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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603305A / <i>Army Missile Defense Systems Integration</i>
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• Other Adjustments 2	-	-	-0.292	-	-0.292
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Congressional Add Details (\$ in Millions, and Includes General Reductions)

Project: TR5: *Missile Defense Battlelab*

Congressional Add: *Thermal Management Systems Prototypes*

	FY 2015	FY 2016
	12.877	19.000
Congressional Add Subtotals for Project: TR5	12.877	19.000
Congressional Add Totals for all Projects	12.877	19.000

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army										Date: February 2016		
Appropriation/Budget Activity 2040 / 4					R-1 Program Element (Number/Name) PE 0603305A / Army Missile Defense Systems Integration				Project (Number/Name) TR5 / Missile Defense Battlelab			
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
TR5: <i>Missile Defense Battlelab</i>	-	25.672	29.347	9.433	-	9.433	9.491	10.912	12.179	12.276	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Program Element funds missile defense systems integration efforts for both the US Army Space and Missile Defense Command/Army Forces Strategic Command (USASMDC/ARSTRAT).

USASMDC/ARSTRAT: Headquarters, Department of the Army General Order 37, dated 16 October 2006, designated USASMDC/ARSTRAT as the Army proponent for space and ground-based midcourse defense (GMD), the Army integrator for global missile defense, and the Army Service Component Command (ASCC) of the U.S. Strategic Command (USSTRATCOM). Army Regulation (AR) 10-87 Army Commands, Army Service Component Commands, and Direct Reporting Units, dated 4 September 2007 and AR 5-22 The Army Force Modernization Proponent System dated 19 August 2009 designates USASMDC/ARSTRAT as the Army specified proponent for Global Missile Defense and Space/High Altitude capabilities. As the Army proponent for space, high altitude and GMD, USASMDC/ARSTRAT is responsible for developing warfighting concepts, conduct warfighting experiments to validate those concepts, identify capabilities needed to implement the validated concepts, and develop Doctrine, Organizations, Training, Material, Leadership & Education, Personnel, Facilities and Policy (DOTMLPF-P) solutions to realize the GMD capabilities. As the Army integrator for global missile defense, USASMDC/ARSTRAT is responsible for reviewing programs managed by the Army, other Services, Defense agencies and National agencies to ensure that they are correctly synchronized and will ultimately provide the capabilities required by USSTRATCOM to execute its global missile defense responsibilities.

Project TR5 funds United States Army Space and Missile Defense Command/ Army Strategic Command (USASMDC/ARSTRAT) efforts to develop the associated operational prototyping, experimentation, operational analysis, and modeling and simulation in support of current and future Forces.

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

	FY 2015	FY 2016	FY 2017
Title: Prototypes	7.626	6.200	5.635
Description: Funding is provided for the following efforts			
FY 2015 Accomplishments:			
Took the lessons learned from the FY14 efforts to continue to evaluate new technologies in realistic operating environments. This was accomplished by participating in and providing support to Unified Quest wargames and experiments to analyze and integrate technology to identify the feasibility integration into Army space, missile defense, and high altitude systems. The Space and Missile Defense Command participated and supported biennial rewrites of Army Capstone, Operational and Functional Concepts. Continued to provide operational manager support to STRATCOM, NORTHCOM and SOCOM Joint Technical Capability Demonstrations to ensure Army space, missile defense, and high altitude equities are represented in advanced			

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Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603305A / <i>Army Missile Defense Systems Integration</i>	Project (Number/Name) TR5 / <i>Missile Defense Battlelab</i>

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

	FY 2015	FY 2016	FY 2017
<p>technology developments by demonstrating military utility when applied to military equipment and techniques. Examples include: supporting multi service experiments and capability development of the national-directed Phased Adaptive Approach (PAA) for Ballistic Missile Defense (BMD) as it is applied to each of the regional COCOMs; and experimenting with operationally responsive space, space control, and high altitude capabilities to ensure the broader Army enterprises can leverage the advantages of these platforms for communications, Intelligence Surveillance and Reconnaissance (ISR), position navigation, missile warning and command and control. Continued to develop mitigation strategies for Army forces to operate effectively in contested space, missile defense and cyber environments. Developed effective Integrated Missile Defense concepts for Army support to the Phased Adaptive Approach (PAA) being implemented within each regional COCOM. Supported TRADOC proponents with their responsibilities relative to doctrine, organization, training, material, leader development and education, personnel, and facilities plus related matters to continue leveraging space, missile defense, and high altitude proponent input to Joint Capabilities Integration and Development System, Science and Technology, Concept Development, Capability Development for Rapid Transition, and Capability Gap Analysis Army We sustained our core prototyping platforms, as outlined above. Battlespace Command and Control Center (BC3) was upgraded to more realistically address information flows related to Close Air Support. Support MDA to Army BMDS element transition and transfer efforts including BMDS sensor deployments. Develop/defend Army requirements development / documentation to MDA spiral/block development.</p> <p>FY 2016 Plans: Take the lessons learned from the FY15 efforts to continue to evaluate new technologies in realistic operating environments. This is accomplished by participating in and providing support to Unified Quest wargames and experiments to analyze and integrate technology to identify the feasibility integration into Army space, missile defense, and high altitude systems. The Space and Missile Defense Command will participate and support biennial rewrites of Army Capstone, Operational and Functional Concepts. Continue to provide operational manager support to STRATCOM, NORTHCOM and SOCOM Joint Technical Capability Demonstrations to ensure Army space, missile defense, and high altitude equities are represented in advanced technology developments by demonstrating military utility when applied to military equipment and techniques. Examples include: supporting multi service experiments and capability development of the national-directed Phased Adaptive Approach (PAA) for Ballistic Missile Defense (BMD) as it is applied to each of the regional COCOMs; and experimenting with operationally responsive space, space control, and high altitude capabilities to ensure the broader Army enterprises can leverage the advantages of these platforms for communications, Intelligence Surveillance and Reconnaissance (ISR), position navigation, missile warning and command and control. Continue to develop mitigation strategies for Army forces to operate effectively in contested space, missile defense and cyber environments. Developing effective Integrated Missile Defense concepts for Army support to the Phased Adaptive Approach (PAA) being implemented within each regional COCOM. Will support TRADOC proponents with their responsibilities relative to doctrine, organization, training, material, leader development and education, personnel, and facilities plus related matters to continue leveraging space, missile defense, and high altitude proponent input to Joint Capabilities Integration and Development System, Science and Technology, Concept Development, Capability Development for Rapid</p>			

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Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603305A / Army Missile Defense Systems Integration	Project (Number/Name) TR5 / Missile Defense Battlelab		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2015	FY 2016	FY 2017
<p>Transition, and Capability Gap Analysis Army We will sustain our core prototyping platforms, as outlined above. Battlespace Command and Control Center (BC3) will be upgraded to more realistically address information flows related to Close Air Support. Support MDA to Army BMDS element transition and transfer efforts including BMDS sensor deployments. Develop/defend Army requirements development / documentation to MDA spiral/block development.</p> <p>FY 2017 Plans: Take the lessons learned from the FY16 efforts to continue to evaluate new technologies in realistic operating environments. This is accomplished by participating in and providing support to Unified Quest wargames and experiments to analyze and integrate technology to identify the feasibility integration into Army space, missile defense, and high altitude systems. The Space and Missile Defense Command will participate and support biennial rewrites of Army Capstone, Operational and Functional Concepts. Continue to provide operational manager support to STRATCOM, NORTHCOM and SOCOM Joint Technical Capability Demonstrations to ensure Army space, missile defense, and high altitude equities are represented in advanced technology developments by demonstrating military utility when applied to military equipment and techniques. Examples include: supporting multi service experiments and capability development of the national-directed Phased Adaptive Approach (PAA) for Ballistic Missile Defense (BMD) as it is applied to each of the regional COCOMs; and experimenting with operationally responsive space, space control, and high altitude capabilities to ensure the broader Army enterprises can leverage the advantages of these platforms for communications, Intelligence Surveillance and Reconnaissance (ISR), position navigation, missile warning and command and control. Continue to develop mitigation strategies for Army forces to operate effectively in contested space, missile defense and cyber environments. Developing effective Integrated Missile Defense concepts for Army support to the Phased Adaptive Approach (PAA) being implemented within each regional COCOM. Will support TRADOC proponents with their responsibilities relative to doctrine, organization, training, material, leader development and education, personnel, and facilities plus related matters to continue leveraging space, missile defense, and high altitude proponent input to Joint Capabilities Integration and Development System, Science and Technology, Concept Development, Capability Development for Rapid Transition, and Capability Gap Analysis Army We will sustain our core prototyping platforms, as outlined above. Battlespace Command and Control Center (BC3) will be upgraded to more realistically address information flows related to Close Air Support. Support MDA to Army BMDS element transition and transfer efforts including BMDS sensor deployments. Develop/defend Army requirements development / documentation to MDA spiral/block development.</p>				
<p>Title: Analysis, and Models and Simulations (M&S)</p> <p>Description: Funding is provided for the following efforts</p> <p>FY 2015 Accomplishments: : Take the lessons learned from the FY14 efforts to continue to evaluate new technologies in realistic operating environments. This will be accomplished by supporting ongoing efforts that provide the most realistic operating environment available to perform technology gap and cost reduction analysis of space, missile defense, and high altitude systems. Realistic operating</p>		5.169	4.147	3.798

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

	FY 2015	FY 2016	FY 2017
<p>environments will be available to determine the ability of the specific technologies to fill capability gaps in terms of utility to the warfighter. Support of technology demonstrations, Analysis and Demonstration Tools/Test Beds for evolving space superiority and operationally responsive space concepts will address emerging needs and continue to be expanded to ensure that advanced technology development can adequately enhance space, missile defense and high altitude systems. The FWC will continue to provide program management for maintenance, sustainment, and development for EADSIM delivering the required high fidelity synthetic operating environment to provide the capability to perform system and cost benefit analysis, operational planning, and exercise/ experimentation support.</p> <p>FY 2016 Plans: Take the lessons learned from the FY15 efforts to continue to evaluate new technologies in realistic operating environments. This will be accomplished by supporting ongoing efforts that provide the most realistic operating environment available to perform technology gap and cost reduction analysis of space, missile defense, and high altitude systems. Realistic operating environments will be available to determine the ability of the specific technologies to fill capability gaps in terms of utility to the warfighter. Support of technology demonstrations, Analysis and Demonstration Tools/Test Beds for evolving space superiority and operationally responsive space concepts will address emerging needs and continue to be expanded to ensure that advanced technology development can adequately enhance space, missile defense and high altitude systems. The Future War Center (FWC) will continue to provide program management for maintenance, sustainment, and development for Extended Air Defense Simulation (EADSIM) delivering the required high fidelity synthetic operating environment to provide the capability to perform system and cost benefit analysis, operational planning, and exercise/ experimentation support. The FWC will continue to provide program management for maintenance, sustainment, and development for Reconfigurable Tactical Operations Simulator (RTOS) delivering operator in the loop capability for air and missile defense simulation in distributed exercises and experiments.</p> <p>FY 2017 Plans: Force Design Assessment of Army Forces TAA 20-24 (APR 2016-MAR 2017) will introduce missile defense capabilities into the force. In order to bring those capabilities into the force development of new force design updates (FDUs) for FDU cycles 16-1, 16-2, 17-1 will be required. Additionally during the TAA cycle new Rules of Allocation (ROA) will be developed to ensure missile defense units are properly accounted for in the future. Take the lessons learned from the FY16 efforts to continue to evaluate new technologies in realistic operating environments. This will be accomplished by supporting ongoing efforts that provide the most realistic operating environment available to perform technology gap and cost reduction analysis of space, missile defense, and high altitude systems. Realistic operating environments will be available to determine the ability of the specific technologies to fill capability gaps in terms of utility to the warfighter. Support of technology demonstrations, Analysis and Demonstration Tools/Test Beds for evolving space superiority, high altitude and operationally responsive space concepts will address emerging needs and continue to be expanded to ensure that advanced technology development can adequately enhance missile defense capabilities. The Future War Center (FWC) will continue to provide program management for maintenance, sustainment, and development for Extended Air Defense Simulation (EADSIM) delivering the required high fidelity synthetic operating environment to provide the</p>			

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2015	FY 2016	FY 2017
capability to perform system and cost benefit analysis, operational planning, and exercise/ experimentation support. The FWC will continue to provide program management for maintenance, sustainment, and development for Reconfigurable Tactical Operations Simulator (RTOS) delivering operator in the loop capability for air and missile defense simulation in distributed exercises and experiments.				
Accomplishments/Planned Programs Subtotals		12.795	10.347	9.433
		FY 2015	FY 2016	
Congressional Add: Thermal Management Systems Prototypes		12.877	19.000	
FY 2015 Accomplishments: Continued development of operational prototypes of several thermal management systems for the Army users. Development includes a rack cooling system for electronics for PATRIOT and the High Energy Laser Mobile Demonstrator (HEL MD); an environmental cooling unit to support field shelters; and a prototype of a directed energy thermal management system, initially designed to support HEL MD applications. Continued development of prototype system to test thermal management systems in a relevant environment prior to delivery to users.				
FY 2016 Plans: To perform the following Thermal Management activities in FY16: For continuous thermal loads: Improve packaging of Environmental Control Units (ECU) and testing addressing both reliability and certification. Additional ECU types & generator package designs and builds will address larger systems. Improved packaging of electronics for enhanced endurance and reliability in adverse conditions. For burst thermal loads: Prototype of second generation fuel fired 100KW burst cooling for HELMD.				
Congressional Adds Subtotals		12.877	19.000	
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy				
Not applicable for this item.				
E. Performance Metrics				
N/A				

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603305A / Army Missile Defense Systems Integration	Project (Number/Name) TR5 / Missile Defense Battlelab
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Event Name	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	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
Experiments & technology enhancements of prototypes/tools and analy	Eval integration of tech identified in Wargame Campaign Plan and Analysis 12-14																											
Release of Extended Air Defense Simulation Updates																												
Release of RTOS																												
Offensive/Defensive Integration																												
Operational Analysis in Support of Joint Functional Component Commar																												
High Energy Laser for AMD																												
ENBAD Analysis																												
Force Design Assessment of Army Forces																												
AN/TPY-2 FBM Transition from MDA to Army																												
Enhanced Thermal Management Testbed																												
Missile Defense Simulation Suppt to TRADOC ARCIC Experimentation																												
Joint Capabilities Mix Study (JCM4)																												
Military Value of Air&Missile Defense against a Robust Air/Missile Def. T																												

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603305A / Army Missile Defense Systems Integration	Project (Number/Name) TR5 / Missile Defense Battlelab
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Event Name	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021							
	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				
Allied and Partner Modeling to Inform Integration Efforts to Meet Objectiv																																
Pacific Focused-Adversary Centric Bundled																																
Inert Debris Analysis																																

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Army		Date: February 2016
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Experiments & technology enhancements of prototypes/tools and analysis.	1	2015	4	2022
Release of Extended Air Defense Simulation Updates	1	2015	4	2022
Release of RTOS	1	2015	4	2022
Offensive/Defensive Integration	1	2015	4	2015
Operational Analysis in Support of Joint Functional Component Command for IMD	1	2015	4	2022
High Energy Laser for AMD	1	2015	4	2016
ENBAD Analysis	1	2015	2	2016
Force Design Assessment of Army Forces	3	2016	3	2017
AN/TPY-2 FBM Transition from MDA to Army	1	2015	4	2017
Enhanced Thermal Management Testbed	1	2015	1	2016
Missile Defense Simulation Suppt to TRADOC ARCIC Experimentation	1	2015	4	2022
Joint Capabilities Mix Study (JCM4)	1	2015	4	2017
Military Value of Air&Missile Defense against a Robust Air/Missile Def. Threat	3	2016	2	2017
Allied and Partner Modeling to Inform Integration Efforts to Meet Objectives	3	2016	2	2017
Pacific Focused-Adversary Centric Bundled	3	2016	2	2017
Inert Debris Analysis	3	2016	2	2017

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