Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Army											Date: February 2016	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 6: *RDT&E Management Support*					R-1 Program Element (Number/Name) PE 0605706A *I Materiel Systems Analysis*							
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	-	20.578	20.403	21.677	-	21.677	22.087	21.639	22.054	22.453	-	-
541: *Materiel Sys Analysis*	-	20.578	20.403	21.677	-	21.677	22.087	21.639	22.054	22.453	-	-

A. Mission Description and Budget Item Justification

This program element funds Department of the Army (DA) civilians at the Army Materiel Systems Analysis Activity (AMSAA) to conduct responsive and effective materiel systems analysis in support of senior Army decision making for equipping the U.S. Army. AMSAA conducts systems and engineering analyses to support Army decisions in technology; materiel acquisition; and the design, development, fielding, and sustaining of Army weapon/materiel systems. As part of this mission, AMSAA develops and certifies systems performance data used in Army studies, and develops item-level performance methodology and Models and Simulations (M&S).

AMSAA exercises Headquarters Department of the Army (HQDA) responsibility for verification, validation, and accreditation of item-level performance M&S for combat effects, including the development and maintenance of common data formats. Similarly, AMSAA also exercises HQDA responsibility for developing, maintaining, improving, verifying, validating and accrediting item-level performance data and M&S for combat effects and logistics. In support of its materiel systems analysis mission, AMSAA analyzes the performance and combat effectiveness of conceptual, developmental, and fielded systems. Unique models and methodologies have been developed to predict critical performance variables, such as weapon accuracy, target acquisition, rate of fire, and probability of inflicting catastrophic damage, survivability, mobility and system reliability. AMSAA generates performance and effectiveness measures and ensures their standard use across major Army and Joint studies. AMSAA conducts and supports various systems analysis efforts across the entire materiel system life cycle, such as: Analysis of Alternatives (AoAs); system cost/performance tradeoffs and early technology trade-offs to inform system and acquisition program risk assessments; weapons/systems mix analyses; business case analyses and cost benefit analyses; requirements analyses; technology insertion studies; reliability growth studies; Physics of Failure (PoF) analyses; and analytical support for Test and Evaluation. AMSAA also maintains, pursuant to Army Acquisition Executive direction, the Center for Army Acquisition and Materiel Lessons Learned (CAAMLL). These analyses are used by the Army Research, Development and Engineering Command; Army Materiel Command; Training and Doctrine Command; Army Test and Evaluation Command; Program Executive Officers/Project Managers; Headquarters, Department of the Army (HQDA) (both Army Staff and Assistant Secretaries in the HQDA Secretariat); and Office of Secretary of Defense (OSD)/Department of Defense (DoD) Leadership. AMSAA analyses and data are used by these organizations in making acquisition, procurement, and logistics decisions in order to provide quality equipment and procedures to the Soldier.

AMSAA's M&S capabilities support the development, linkage, and accreditation of live, virtual, and constructive simulations, and provide unique tools that support systems analysis of individual systems and the combined-arms environment. AMSAA maintains a significant number of models and simulations, most of which were developed in-house to address specific analytical requirements. This M&S infrastructure provides a hierarchical modeling process that is unique to AMSAA and allows for a comprehensive performance and effectiveness prediction capability that can be utilized to make trade-off and investment decisions prior to extensive and expensive hardware testing of proposed systems/technologies for Current and Future Force efforts. AMSAA is the Army's executive agent for the verification, validation, and accreditation of item/system level performance models. In this role, AMSAA assists model developers with the development and execution of verification and validation plans to ensure new models and simulations provide credible information/results for decision making.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Army	Date: February 2016
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605706A / *Materiel Systems Analysis*

AMSAA exercises HQDA responsibility for Army reliability methodology development. In this role, as the Army's Executive Agent for reliability and maintainability standardization improvement, AMSAA develops and implements reliability and maintainability reform initiatives that support acquisition decisions and lifecycle management. AMSAA develops and applies engineering approaches that assess the reliability of Army materiel and also provides recommendations on ways to improve reliability, thereby reducing logistics footprint, reducing life cycle costs, and extending failure-free periods for deployed equipment. AMSAA's electronic and mechanical Physics of Failure (PoF) program pioneered the Army's involvement in utilizing computer-aided engineering tools in the analysis of root-cause failure mechanisms at the component level during the system design process. AMSAA's reliability engineering and PoF tools/analyses have been used extensively to support the design improvement of developmental and fielded systems used in Current Operations resulting in improved reliability, reduced Operational and Support costs, and reduced logistics expenditures and footprint. AMSAA, in conjunction with the Army Evaluation Center, has formed the Center for Reliability Growth (CRG), which is developing critical tools, methodology, policies, formal guidance, and educational materials needed to help acquisition programs to achieve their required reliability during the acquisition process. The reliability improvements achieved for major weapon systems will translate into billions of dollars in operating and support cost savings across the life cycle.

AMSAA's unique analytical capabilities are supporting the Army Evaluation Center to assess and determine the essential analytical requirements to enhance Army evaluations and reduce extensive testing. AMSAA's support in this area improves evaluation products and result in better materiel solutions to the Warfighter. AMSAA assists in systems evaluations which support various Acquisition Category (ACAT) materiel system decisions, and provides quick response analyses in support of rapid initiatives for Current Operations.

As the Army's center for materiel systems analysis, AMSAA provides the technical capability to support Army and DoD decision makers throughout the entire acquisition process in responding to analytical requirements across the full spectrum of materiel. AMSAA's unique in-house, consistent, integrated analytical capability is a critical asset that provides Army leadership with timely, independent, unbiased, reliable, and high quality analysis to support complex decisions required for Current Operations and the development of the Future Force (Long-Range Investment Requirements Analysis (LIRA), Force 2025 and beyond). AMSAA's integrated set of skills and tools are focused on its core mission to be responsive to the breadth and depth of systems analysis requirements critical in supporting Army decisions.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	20.744	20.403	20.199	-	20.199
Current President's Budget	20.578	20.403	21.677	-	21.677
Total Adjustments	-0.166	0.000	1.478	-	1.478
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.166	-			
• Adjustments to Budget Years	-	-	1.478	-	1.478

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Army	Date: February 2016
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605706A *I Materiel Systems Analysis*

Change Summary Explanation

FY 2017 funding increase to support: 1) Cyberspace Operations (CO), Cybersecurity, and Cyber Electromagnetic Activities Modeling, Simulation and Analyses (MS&A); and 2) Software Analysis Capability to Support Test and Evaluation (T&E). This change holds true throughout the remaining Program Objective Memorandum (POM) years (FY2018 through FY2021) for continuous funding of these efforts.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army											Date: February 2016	
Appropriation/Budget Activity 2040 / 6					R-1 Program Element (Number/Name) PE 0605706A / *Materiel Systems Analysis*				Project (Number/Name) 541 / *Materiel Sys Analysis*			
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**
541: *Materiel Sys Analysis*	-	20.578	20.403	21.677	-	21.677	22.087	21.639	22.054	22.453	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program element funds Department of the Army (DA) civilians at the Army Materiel Systems Analysis Activity (AMSAA) to conduct responsive and effective materiel systems analysis in support of senior Army decision making for equipping the U.S. Army. AMSAA conducts systems and engineering analyses to support Army decisions in technology; materiel acquisition; and the design, development, fielding, and sustaining of Army weapon/materiel systems. As part of this mission, AMSAA develops and certifies systems performance data used in Army studies, and develops item-level performance methodology and Models and Simulations (M&S).

AMSAA exercises Headquarters Department of the Army (HQDA) responsibility for verification, validation, and accreditation of item-level performance M&S for combat effects, including the development and maintenance of common data formats. Similarly, AMSAA also exercises HQDA responsibility for developing, maintaining, improving, verifying, validating and accrediting item-level performance data and M&S for combat effects and logistics. In support of its materiel systems analysis mission, AMSAA analyzes the performance and combat effectiveness of conceptual, developmental, and fielded systems. Unique models and methodologies have been developed to predict critical performance variables, such as weapon accuracy, target acquisition, rate of fire, and probability of inflicting catastrophic damage, survivability, mobility and system reliability. AMSAA generates performance and effectiveness measures and ensures their standard use across major Army and Joint studies. AMSAA conducts and supports various systems analysis efforts across the entire materiel system life cycle, such as: Analysis of Alternatives (AoAs); system cost/performance tradeoffs and early technology trade-offs to inform system and acquisition program risk assessments; weapons/systems mix analyses; business case analyses and cost benefit analyses; requirements analyses; technology insertion studies; reliability growth studies; Physics of Failure (PoF) analyses; and analytical support for Test and Evaluation. AMSAA also maintains, pursuant to Army Acquisition Executive direction, the Center for Army Acquisition and Materiel Lessons Learned (CAAMLL). These analyses are used by the Army Research, Development and Engineering Command; Army Materiel Command; Training and Doctrine Command; Army Test and Evaluation Command; Program Executive Officers/Project Managers; Headquarters, Department of the Army (HQDA) (both Army Staff and Assistant Secretaries in the HQDA Secretariat); and Office of Secretary of Defense (OSD)/Department of Defense (DoD) Leadership. AMSAA analyses and data are used by these organizations in making acquisition, procurement, and logistics decisions in order to provide quality equipment and procedures to the Soldier.

AMSAA's M&S capabilities support the development, linkage, and accreditation of live, virtual, and constructive simulations, and provide unique tools that support systems analysis of individual systems and the combined-arms environment. AMSAA maintains a significant number of models and simulations, most of which were developed in-house to address specific analytical requirements. This M&S infrastructure provides a hierarchical modeling process that is unique to AMSAA and allows for a comprehensive performance and effectiveness prediction capability that can be utilized to make trade-off and investment decisions prior to extensive and expensive hardware testing of proposed systems/technologies for Current and Future Force efforts. AMSAA is the Army's executive agent for the verification, validation, and accreditation of item/system level performance models. In this role, AMSAA assists model developers with the development and execution of verification and validation plans to ensure new models and simulations provide credible information/results for decision making.

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 6	**R-1 Program Element (Number/Name)** PE 0605706A / *Materiel Systems Analysis*	**Project (Number/Name)** 541 / *Materiel Sys Analysis*

management. AMSAA develops and applies engineering approaches that assess the reliability of Army materiel and also provides recommendations on ways to improve reliability, thereby reducing logistics footprint, reducing life cycle costs, and extending failure-free periods for deployed equipment. AMSAA's electronic and mechanical Physics of Failure (PoF) program pioneered the Army's involvement in utilizing computer-aided engineering tools in the analysis of root-cause failure mechanisms at the component level during the system design process. AMSAA's reliability engineering and PoF tools/analyses have been used extensively to support the design improvement of developmental and fielded systems used in Current Operations resulting in improved reliability, reduced Operational and Support costs, and reduced logistics expenditures and footprint. AMSAA, in conjunction with the Army Evaluation Center, has formed the Center for Reliability Growth (CRG), which is developing critical tools, methodology, policies, formal guidance, and educational materials needed to help acquisition programs to achieve their required reliability during the acquisition process. The reliability improvements achieved for major weapon systems will translate into billions of dollars in operating and support cost savings across the life cycle.

AMSAA's unique analytical capabilities are supporting the Army Evaluation Center to assess and determine the essential analytical requirements to enhance Army evaluations and reduce extensive testing. AMSAA's support in this area improves evaluation products and result in better materiel solutions to the Warfighter. AMSAA assists in systems evaluations which support various Acquisition Category (ACAT) materiel system decisions, and provides quick response analyses in support of rapid initiatives for Current Operations.

As the Army's center for materiel systems analysis, AMSAA provides the technical capability to support Army and DoD decision makers throughout the entire acquisition process in responding to analytical requirements across the full spectrum of materiel. AMSAA's unique in-house, consistent, integrated analytical capability is a critical asset that provides Army leadership with timely, independent, unbiased, reliable, and high quality analysis to support complex decisions required for Current Operations and the development of the Future Force (Long-Range Investment Requirements Analysis (LIRA), Force 2025 and beyond). AMSAA's integrated set of skills and tools are focused on its core mission to be responsive to the breadth and depth of systems analysis requirements critical in supporting Army decisions.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Materiel Systems Analysis	20.578	20.403	21.677
Description: These funds are used by the US Army Materiel Systems Analysis Activity (AMSAA) to conduct various materiel systems analysis efforts in support of senior Army decision makers during FY15-21. AMSAA will continue to conduct analyses, materiel systems performance data generation and certification, methodology development, Modeling and Simulation (M&S) development, and verification, validation, and accreditation. The accomplishments include performance and combat effectiveness analyses of materiel systems and technology base programs for the Department of Army Secretariat/Staff, the Army Materiel Command, the Research, Development and Engineering Command, Program Executive Officers/Program Managers, the Training and Doctrine Command, the Army Service Component Commands, the Army Test and Evaluation Command, and the Office of the Secretary of Defense (OSD). These analyses form the basis for Analysis of Alternatives (AoAs), system cost/performance tradeoffs, early technology trade-offs, weapons/systems mix analyses, system risk assessments, business case analyses, cost benefit analyses, requirements analyses, technology insertion studies, reliability growth studies, Physics of Failure (PoF) analyses and analytical support for Test and Evaluation.			
FY 2015 Accomplishments:			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 6	**R-1 Program Element (Number/Name)** PE 0605706A / *Materiel Systems Analysis*	**Project (Number/Name)** 541 / *Materiel Sys Analysis*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Critical analyses from the US Army Materiel Systems Analysis Activity (AMSAA) continued to support Army key milestone decision reviews. AMSAA supported conceptual and developmental Acquisition Category ((ACAT) 1, ACAT 2, ACAT 3, and ACAT 4) programs, including but not limited to Improved Turbine Engine, Man Transportable Robotic System, Next Generation Diagnostic System, Personnel Decontamination, Pre-emptive Threat Detection, and the Maneuver Support Vessel-Light. In addition, AMSAA supported multiple trade-space efforts in support of the Deputy Under Secretary of the Army for Test and Evaluation (DUSA-TE), and provided analytical support to modify Test and Evaluation planning efforts to reduce testing through the use of modeling and simulation. AMSAA conducted follow-on studies for major Army programs undergoing engineering change proposals and continued to provide essential certified weapons system performance data for all major Army studies. AMSAAs technical work program relating to Analyses of Alternative (AoA) (both providing analytic input and certified data as well as leading specified AoAs), Business Case Analyses, Cost Benefit Analyses and Risk Assessments continued at a high level (similar to FY12 through FY14) as a result of DOD/DA efforts to meet the requirements laid out in the 2009 Weapons System Acquisition Reform Act. AMSAA realized an increase in analytical support to Army ACAT 3, and ACAT 4 systems due to budget restrictions and financial limitations. AMSAA continued efforts in support of the Army Center for Reliability Growth (CRG), the Center for Army Acquisition and Materiel Lessons Learned (CAAMLL) as well as efforts on current operations related tasks, analyses, and model enhancements, specifically those supporting system performance data development, and materiel system performance analysis. AMSAA continued to enhance its comprehensive set of essential verified and validated item/system level methodologies, tools, and models and simulations, insuring accurate and up-to-date analytical products across the full spectrum of Army capability/ commodity areas.			
FY 2016 Plans: Critical analyses from the US Army Materiel Systems Analysis Activity (AMSAA) continue to support Army key milestone decision reviews. AMSAA supports conceptual and developmental Acquisition Category ((ACAT) 1, ACAT 2, ACAT 3, and ACAT 4) programs, including but not limited to Joint Light Tactical Vehicle, Biometrics Enabling Capabilities, Multi-Function Electronic Warfare, Long Range Precision Fires, H-47 Block II, and Distributed Common Ground System – Army. In addition, AMSAA will support multiple trade-space efforts in support of the Deputy Under Secretary of the Army for Test and Evaluation (DUSA-TE), and provide analytical support to modify Test and Evaluation planning efforts, and reduce testing through the use of modeling and simulation. AMSAA will also analyze the use of software metrics for the DUSA-TE. AMSAA will conduct follow-on studies for major Army programs undergoing engineering change proposals and continue to provide essential certified weapons system performance data for all major Army studies. AMSAAs technical work program relating to Analyses of Alternative (AoA) (both providing analytic input and certified data as well as leading specified AoAs), Business Case Analyses, Cost Benefit Analyses and Risk Assessments will continue at a high level (similar to FY14 through FY15). AMSAA is anticipating an increase in analytical support to Army ACAT 3, and ACAT 4 systems due to budget restrictions and financial limitations. AMSAA will continue efforts in support of the Army Center for Reliability Growth (CRG), the Center for Army Acquisition and Materiel Lessons Learned (CAAMLL) as well as efforts on current operations related tasks, analyses, and model enhancements, specifically those supporting system performance data development, and materiel system performance analysis. AMSAA continues to enhance			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 6	**R-1 Program Element (Number/Name)** PE 0605706A / *Materiel Systems Analysis*	**Project (Number/Name)** 541 / *Materiel Sys Analysis*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
its comprehensive set of essential verified and validated item/system level methodologies, tools, and models and simulations to insure accurate and up-to-date analytical products across the full spectrum of Army capability/commodity areas. ***FY 2017 Plans:*** Critical analyses from the US Army Materiel Systems Analysis Activity (AMSAA) continue to support Army key milestone decision reviews. AMSAA supports Army conceptual and developmental Acquisition Category ((ACAT) 1, ACAT 2, ACAT 3, and ACAT 4) programs, including but not limited to: Dominate Mobility Through Terrain Shaping and Engagement; Autonomous Convoy Operations; Defense Cyberspace Operations; Army Cyber Situational Awareness; Assured Positioning, Navigation and Timing; Mission Command; Future Vertical Lift; Light Reconnaissance Vehicle; Synthetic Training Environment; and Force 2025. In addition, AMSAA will support multiple trade-space efforts in support of the Army Secretariat and Staff, and provide analytical support to modify Test and Evaluation planning efforts, and reduce testing through the use of modeling and simulation. AMSAA will also provide software analysis capability to support test and evaluation (T&E). AMSAA will conduct follow-on studies for major Army programs undergoing engineering change proposals and continue to provide essential certified weapons system performance data for all major Army studies. AMSAAs technical work program relating to Analyses of Alternative (AoA) (both providing analytic input and certified data as well as leading specified AoAs), Business Case Analyses, Cost Benefit Analyses and Risk Assessments will continue at a high level (similar to FY15 and FY16). AMSAA is anticipating an increase in analytical support to Army ACAT 3, and ACAT 4 systems due to budget restrictions and financial limitations. AMSAA will continue efforts in support of the Army Center for Reliability Growth (CRG), the Center for Army Acquisition and Materiel Lessons Learned (CAAMLL) as well as efforts on current operations related tasks, analyses, and model enhancements, specifically those supporting system performance data development, and materiel system performance analysis. AMSAA will continue to enhance its comprehensive set of essential verified and validated item/system level methodologies, tools, and models and simulations to insure accurate and up-to-date analytical products across the full spectrum of Army capability/commodity areas. Additional funding to support: 1) Cyberspace Operations (CO), Cybersecurity, and Cyber Electromagnetic Activities Modeling, Simulation and Analyses (MS&A); and 2) Software Analysis Capability to Support Test and Evaluation (T&E).			
Accomplishments/Planned Programs Subtotals	20.578	20.403	21.677

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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