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 6: *RDT&E Management Support*					R-1 Program Element (Number/Name) PE 0605706A *I Materiel Systems Analysis*							
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	-	20.203	21.677	21.890	-	21.890	21.754	22.181	22.580	22.599	-	-
541: *Materiel Sys Analysis*	-	20.203	21.677	21.890	-	21.890	21.754	22.181	22.580	22.599	-	-

A. Mission Description and Budget Item Justification

This Program Element (PE) funds Department of the Army (DA) civilians at the United States (US) 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 sustainment of Army weapon/materiel systems. As part of this mission, AMSAA develops and certifies system level 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 developing, maintaining, improving, verifying, validating, and accrediting item-level performance data and M&S for combat effects and logistics. This includes the development and maintenance of common data formats. 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, probability of inflicting catastrophic damage, personnel and vehicle 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 trade-offs and early technology trade-offs to inform system and acquisition program risk assessments; weapons/systems mix analyses; 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. AMSAA also maintains, pursuant to Army Acquisition Executive direction, the Center for Army Acquisition and Materiel Lessons Learned (CAAMLL). These analyses are used by leadership within HQDA (both Army Staff and Assistant Secretaries in the HQDA Secretariat); Army Materiel Command; Army Research, Development and Engineering Command; Training and Doctrine Command; Army Test and Evaluation Command; Program Executive Officers/Project Managers; and the Office of Secretary of Defense (OSD)/Department of Defense (DoD). 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, along with enhancing readiness for the Current and Future Force.

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 the readiness of the Current and Future Force.

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 life cycle

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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 footprints and life cycle costs, and extending failure-free periods for deployed equipment. AMSAA's electronic and mechanical 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 Operating and Support costs, and reduced logistics expenditures and footprints. AMSAA, in conjunction with the Army Evaluation Center (AEC), has formed the Center for Reliability Growth (CRG), which develops critical tools, methodologies, 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 over the life cycle.

AMSAA's unique analytical capabilities are supporting AEC 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 results 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 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	20.403	21.677	22.087	-	22.087
Current President's Budget	20.203	21.677	21.890	-	21.890
Total Adjustments	-0.200	0.000	-0.197	-	-0.197
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.200	-			
• Adjustments to Budget Years	0.000	0.000	-0.304	-	-0.304
• CivPay Adjustments	0.000	0.000	0.107	-	0.107

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army											Date: May 2017	
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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**
541: *Materiel Sys Analysis*	-	20.203	21.677	21.890	-	21.890	21.754	22.181	22.580	22.599	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

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AMSAA exercises Headquarters Department of the Army (HQDA) responsibility for developing, maintaining, improving, verifying, validating, and accrediting item-level performance data and M&S for combat effects and logistics. This includes the development and maintenance of common data formats. 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, probability of inflicting catastrophic damage, personnel and vehicle 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 trade-offs and early technology trade-offs to inform system and acquisition program risk assessments; weapons/systems mix analyses; 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. AMSAA also maintains, pursuant to Army Acquisition Executive direction, the Center for Army Acquisition and Materiel Lessons Learned (CAAMLL). These analyses are used by leadership within HQDA (both Army Staff and Assistant Secretaries in the HQDA Secretariat); Army Materiel Command; Army Research, Development and Engineering Command; Training and Doctrine Command; Army Test and Evaluation Command; Program Executive Officers/Project Managers; and the Office of Secretary of Defense (OSD)/Department of Defense (DoD). 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, along with enhancing readiness for the Current and Future Force.

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 the readiness of the Current and Future Force.

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 life cycle management. AMSAA develops and applies engineering approaches that assess the reliability of Army materiel and also provides recommendations on ways to

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
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improve reliability, thereby reducing logistics footprints and life cycle costs, and extending failure-free periods for deployed equipment. AMSAA's electronic and mechanical 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 Operating and Support costs, and reduced logistics expenditures and footprints. AMSAA, in conjunction with the Army Evaluation Center (AEC), has formed the Center for Reliability Growth (CRG), which develops critical tools, methodologies, 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 over the life cycle.

AMSAA's unique analytical capabilities are supporting AEC 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 results 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 (Strategic Portfolio Analysis Review (SPAR), 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 2016	FY 2017	FY 2018
Title: Materiel Systems Analysis	20.203	21.677	21.890
Description: These funds are used by AMSAA to conduct various materiel systems analysis efforts in support of senior Army decision makers during fiscal years 2016 through 2022. AMSAA will continue to conduct analyses, materiel systems performance data generation and certification, methodology development, 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 OSD. These analyses form the basis for AMSAA to successfully conduct 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, PoF analyses and analytical support for Test and Evaluation.			
FY 2016 Accomplishments: Critical analyses from AMSAA continued to support key Army acquisition milestone decision reviews. AMSAA supported conceptual and developmental ACAT 1, ACAT 2, ACAT 3, and ACAT 4 programs, including but not limited to Joint Light Tactical			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Vehicle, Biometrics Enabling Capabilities, M113 Replacement at Echelons Above Brigade, Lower Tier Air & Missile Defense Capabilities, H-47 Block II, Dominating Mobility Through Terrain Shaping and Engagement, and Distributed Common Ground System – Army. In addition, AMSAA conducted multiple trade-space efforts in support of the Deputy Under Secretary of the Army for Test and Evaluation (DUSA-TE), provided analytical support to modify Test and Evaluation planning efforts, and reduced testing through the use of modeling and simulation. AMSAA also analyzed the use of software metrics for the DUSA-TE. 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. AMSAA's technical work program relating to AoAs (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 fiscal year (FY) 2014 and FY2015). AMSAA continued efforts in support of the Army Center for Reliability Growth (CRG) and the Center for Army Acquisition and Materiel Lessons Learned (CAAMLL). Due to cybersecurity concerns, AMSAA initiated methodology development for cyber risk analyses. AMSAA also focused on tasks, analyses, and model enhancements for current operations by developing system performance data and providing materiel system performance analyses. AMSAA continued 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.			
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			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
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). ***FY 2018 Plans:*** AMSAA will continue to provide critical analyses and data to support key Army acquisition milestone decisions and reviews. AMSAA will continue to support Army conceptual and developmental ACAT 1, ACAT 2, ACAT 3, and ACAT 4 programs, including but not limited to: Squad-Multipurpose Equipment Transport; Vehicle Protection Suites; Lethal Miniature Aerial Missile System (LMAMs); Big Data initiatives; Mission Command; Cyber Electromagnetic Activities (CEMA); and Force 2025. AMSAA will further develop and enhance Cyber, Air & Missile Defense, and life cycle cost analytic capabilities to ensure more robust analysis of potential capabilities to properly equip the Current and Future Force. Additionally, AMSAA will ensure modeling and simulation readiness by properly updating and sustaining key analytic tools and models. AMSAA will continue to support a variety of trade-space efforts and analyses in support of the Army Secretariat and Staff. This will include directly participating in and providing analytical products for Army Requirements Oversight Councils (AROCs) and Army Systems Acquisition Review Councils (ASARCs) to assist senior leaders in key acquisition strategy and life cycle decisions for a variety of materiel systems/programs. AMSAA will also provide analytical support to modify T&E planning efforts, reduce testing through the use of modeling and simulation, and provide software analysis and reliability capabilities to support 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 AoAs (providing analytic input and certified data, as well as leading specified AoAs), Business Case Analyses, and Cost Benefit Analyses and Risk Assessments will continue at a high level (similar to FY2016 and FY2017). AMSAA will continue efforts in support of the Army CRG and the CAAMLL. Moreover, AMSAA will continue to develop and enhance its comprehensive set of system performance data and essential verified and validated item/system level methodologies, tools, and models and simulations to conduct materiel system performance analysis. This will insure accurate and up-to-date analytical products are provided across the full spectrum of Army capability/commodity areas. Overall, AMSAA's analysis capabilities and products will enable Senior Leaders to properly shape and influence acquisition policy, procedures, and materiel solutions and increase readiness for our Current and Future Force.			
Accomplishments/Planned Programs Subtotals	20.203	21.677	21.890

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

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E. Performance Metrics

N/A