Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Operational Test and Evaluation, Defense	Date: February 2018
Appropriation/Budget Activity 0460: *Operational Test and Evaluation, Defense* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605131OTE / *Live Fire Test and Evaluation (LFT&E)*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	46.882	48.316	59.500	64.332	-	64.332	58.781	61.646	59.806	57.998	Continuing	Continuing
000311: *LFT&E*	46.882	48.316	59.500	64.332	-	64.332	58.781	61.646	59.806	57.998	Continuing	Continuing

A. Mission Description and Budget Item Justification

This Program Element consists of three programs: Live Fire Test and Evaluation, Joint Aircraft Survivability Program (JASP), and Joint Technical Coordinating Group for Munitions Effectiveness (JTCG/ME).

This Program Element directly supports the Congressional statutory requirements for oversight of Live Fire Test and Evaluation (LFT&E). The primary objective of LFT&E is to assure that the vulnerability and survivability of Department of Defense (DoD) crew-carrying platforms and the lethality of our conventional munitions are known and acceptable before entering full-rate production. LFT&E encompasses realistic tests involving actual United States (U.S.) and foreign threat hardware or, if not available, acceptable surrogate threat hardware. The objective is to identify and correct design deficiencies early in the development process. A completed LFT&E program and test report is required before programs proceed beyond low-rate initial production (BLRIP). LFT&E also includes realistic modeling and simulation (M&S) to examine survivability and lethality attributes not assessed during testing.

This Program Element also supports DoD's Joint Live Fire (JLF) Program and other LFT&E related initiatives. JLF was begun in 1984 under an Office of the Secretary of Defense charter to test fielded front-line combat aircraft and armor systems for their vulnerabilities as well as fielded weapons, both U.S. and foreign, for their lethality against their respective targets. Funds are also used to support other initiatives related to quick reaction requests from theater and other areas of personnel survivability.

The Joint Aircraft Survivability Program is the DoD's focal point for joint service enhancement of military aircraft non-nuclear survivability. The JASP is chartered by the commanders of the USN Naval Air Systems Command, USA Aviation and Missile Command and USAF Life Cycle Management Center to coordinate and conduct RDT&E to improve military aircraft survivability, develop and standardize aircraft survivability modeling and simulation (M&S), facilitate information exchange on aircraft survivability and support aircraft survivability education for the DoD and U.S. aircraft community. Each chartering command provides a senior aircraft survivability expert for the JASP Principal Members Steering Group (PMSG), which guides the program and approves projects for funding. The JASP assesses and reports on combat damage incidents through the Joint Combat Assessment Team (JCAT), is the Executive Agent for the Joint Live Fire Aircraft Systems Program managed by the Live Fire Test office of DOT&E.

The Joint Logistics Commanders Joint Technical Coordinating Group for Munitions Effectiveness (JTCG/ME) was chartered more than 40 years ago to serve as DoD's focal point for munitions effectiveness information. This has taken the form of widely used Joint Munitions Effectiveness Manuals (JMEMs) which address all major non-nuclear U.S. weapons. JTCG/ME authenticates weapons effectiveness data for use in training, systems acquisition, weapon procurement, and combat modeling and simulation. JMEMs are used by the Armed Forces of the U.S., NATO, and other allies to plan operational missions, support training and tactics development, and support force-level analyses. JTCG/ME also develops and standardizes methodologies for evaluation of munitions effectiveness and maintains databases for target vulnerability, munitions lethality, and weapon system accuracy. The JMEM requirements and development processes continues to be driven by operational lessons

learned (Enduring Freedom, Iraqi Freedom, Odyssey Dawn and Inherent Resolve) and the needs of Combatant Commands, Services, Military Targeting Committee, and Operational Users Working Groups input for specific weapon-target pairings and methodologies.

This program element also includes funds to obtain Federally Funded Research and Development Center (FFRDC) expertise in performing analyses in support of described Live Fire Test and Evaluation tasks, as well as travel funds to carry out the LFT&E, JASP and JTCG/ME programs.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	48.316	59.500	62.962	-	62.962
Current President's Budget	48.316	59.500	64.332	-	64.332
Total Adjustments	0.000	0.000	1.370	-	1.370
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Battle Damage Assessment (BDA)	-	-	1.370	-	1.370

Change Summary Explanation

Battle Damage Assessment (BDA) enhancement offers updates to warfighter's Joint Munitions Effectiveness Manual (JMEM) Weaponeering System (JWS) intended to ensure effective and efficient munition expenditure rates and mitigate the stockpile stress while improving Combatant Commands' force effects. The enhancement will improve the warfighter's ability to get the right weapon on the right target, achieve the desired effect, and minimize collateral damage while optimizing scarce resources.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Operational Test and Evaluation, Defense			Date: February 2018
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COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
000311: *LFT&E*	46.882	48.316	59.500	64.332	-	64.332	58.781	61.646	59.806	57.998	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Program Element consists of three programs: Live Fire Test and Evaluation, Joint Aircraft Survivability Program (JASP) and Joint Technical Coordinating Group for Munitions Effectiveness (JTCG/ME).

This Program Element directly supports the Congressional statutory requirements for oversight of Live Fire Test and Evaluation (LFT&E). The primary objective of LFT&E is to assure that the vulnerability and survivability of Department of Defense (DoD) crew-carrying platforms and the lethality of our conventional munitions are known and acceptable before entering full-rate production. LFT&E encompasses realistic tests involving actual United States (U.S.) and foreign threat hardware or, if not available, acceptable surrogate threat hardware. The objective is to identify and correct design deficiencies early in the development process. A completed LFT&E program and test report is required before programs proceed beyond low-rate initial production (BLRIP). LFT&E also includes realistic modeling and simulation (M&S) to examine survivability and lethality attributes not assessed during testing.

This Program Element also supports DoD's Joint Live Fire (JLF) Program and other LFT&E related initiatives. JLF was begun in 1984 under an Office of the Secretary of Defense (OSD) charter to test fielded front-line combat aircraft and armor systems for their vulnerabilities as well as fielded weapons, both U.S. and foreign, for their lethality against their respective targets. Funds are also used to support other initiatives related to quick reaction requests from theater and other areas of personnel survivability.

The Joint Aircraft Survivability Program is the DoD's focal point for joint service enhancement of military aircraft non-nuclear survivability. The JASP is chartered by the commanders of the USN Naval Air Systems Command, USA Aviation and Missile Command and USAF Life Cycle Management Center to coordinate and conduct RDT&E to improve military aircraft survivability, develop and standardize aircraft survivability modeling and simulation (M&S), facilitate information exchange on aircraft survivability and support aircraft survivability education for the DoD and U.S. aircraft community. Each chartering command provides a senior aircraft survivability expert for the JASP Principal Members Steering Group (PMSG), which guides the program and approves projects for funding. The JASP assesses and reports on combat damage incidents through the Joint Combat Assessment Team (JCAT), is the Executive Agent for the Joint Live Fire Aircraft Systems Program managed by the Live Fire Test office of DOT&E.

The Joint Logistics Commanders' Joint Technical Coordinating Group for Munitions Effectiveness (JTCG/ME) was chartered more than 40 years ago to serve as DoD's focal point for munitions effectiveness information. This has taken the form of widely used Joint Munitions Effectiveness Manuals (JMEMs) which address all major non-nuclear U.S. weapons. JTCG/ME authenticates weapons effectiveness data for use in training, systems acquisition, weapon procurement, and combat modeling and simulation. JMEMs are used by the Armed Forces of the U.S., NATO, and other allies to plan operational missions, support training and tactics development, and support force-level analyses. JTCG/ME also develops and standardizes methodologies for evaluation of munitions effectiveness and maintains databases for target vulnerability, munitions lethality, and weapon system accuracy. The JMEM requirements and development processes continues to be driven by operational lessons

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learned (Enduring Freedom, Iraqi Freedom, Odyssey Dawn and Inherent Resolve) and the needs of Combatant Commands (CCMDs), Services, Military Targeting Committee, and Operational Users Working Groups (OUWG) input for specific weapon-target pairings and methodologies.

This program element also includes funds to obtain Federally Funded Research and Development Center (FFRDC) expertise in performing analyses in support of described Live Fire Test and Evaluation tasks, as well as travel funds to carry out the LFT&E, JASP and JTCG/ME programs.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Live Fire Test and Evaluation	48.316	59.500	64.332
FY 2018 Plans: Live Fire Test and Evaluation (LFT&E) of Major Department of Defense (DOD) Acquisition Programs The FY 2018 budget will enable the LFT&E Deputate to: (1) assess the adequacy of programs' test and evaluation plans and reports and generate new test and evaluation policies, as needed; (2) review and analyze the test data to support an independent evaluation of the survivability/lethality of the systems in support of the development of OSD Live Fire Test and Evaluation reports to Congress; and (3) review major acquisition plans, reports, and requirement documents to inform system design and capability development. JLF Programs and LFT&E Initiatives The FY 2018 JLF budget will support at least 23 projects (tentatively 13 new starts and 10 projects continuing from previous FYs). Focus areas for JLF include projects that either: (1) characterize new survivability issues; (2) characterize new lethality issues; (3) improve accuracy and fidelity of weapon data; (4) improve test methods; (5) improve modeling and simulation methods; or (6) develop vulnerability data libraries for emerging non-kinetic threats. JLF Air projects will continue to evaluate technologies and techniques to decrease vulnerabilities of aircraft against operationally relevant threats. Previously initiated projects that will be continued include developing a model for the OG-7V fragmentation grenade, quantifying the penetration of armor piercing incendiary munitions as a function of yaw, evaluating the effectiveness of CV-22 Wing Fire Protection Systems, determining the root cause of CH-53 and CH-47 self-sealing bladder performance issues, measuring flammability traits of AH-64E Fire Detection Expansion Systems, and developing a 12.7 x 108 mm Heat (High) Explosive Incendiary threat model prediction. Several new efforts will be initiated to (1) assess the vulnerability of H-60 rotor craft accumulators; (2) determine methodology to properly model multi-fragment vulnerability; and (3) determine how to better assess the performance/vulnerability of rotor craft shafts. JLF Ground projects will continue to measure the effects of munition fragments on concreate masonry units, as well as continue to develop the instrumented inert threat system for Active Protection System evaluation. Two new efforts will be initiated to develop better test methodologies: (1) determine the most appropriate surrogate for the TM-62 mine for U.S. system vulnerability studies; and (2) develop improved methods of measuring blast effects within confined spaces. One effort will evaluate the lethality of U.S.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
munitions against emerging foreign body armors. Finally, three efforts will kick-off to improve M&S capability: (1) one effort will concentrate on improving (reducing) the uncertainty in predictions yielded by AJEM/MUVES; (2) one effort will validate/collect data to more precisely represent fragment penetration; and (3) one effort will improve the modeling of behind armor debris that occurs when a munition penetrates thick armor. JLF Sea projects will continue FY17 work initiated to properly characterize bubble jetting as well as multi-cycle underwater explosion effects. New projects will initiate in FY18 to (1) develop a penetration model for an emerging foreign shaped charge warhead threat; (2) evaluate the effectiveness of fire insulation after it has been exposed to various degrees of physical damage; and (3) develop M&S tools for naval system fragility as a function of both fire and blast. JASP In FY 2018 the JASP will continue work on at least 29 multi-year RDT&E projects and initiate 4 new projects approved by the JASP Principal Members Steering Group and OSD/DOT&E. The JASP will develop measures to defeat Near-Peer Adversary Threat (N-PAT) radio-frequency and infrared guided threats coupled with quantifiable improvements in digital and hardware in the loop modeling and simulation capability and credibility. Improve aircraft force protection by increasing threat and flight environmental situational awareness, hostile fire identification, and degraded visual environment flight capabilities; advancing system hardening against ballistic and high energy laser threats; and improving aircraft crashworthiness. Improve aircraft survivability to fire by increasing the speed and efficiency of fire detection and suppression systems and the accuracy and confidence in prediction of threat initiated fires onboard aircraft. The JCAT will continue to support the Air Force, Army, Marine Corps and Navy by assessing combat damage incidents, training operators on threat effects and combat damage assessment, and reporting their findings to combatant commanders and the DoD science and technology and acquisition communities. The JASP will continue supporting aircraft survivability education and information exchange through internet sites (restricted access and classified), by publishing the Aircraft Survivability Journal, developing educational materials and conducting training for the DoD and their contractors. The JASP will initiate, continue and complete other projects as approved by the JASP Principal Members Steering Group and OSD/DOT&E Joint Technical Coordinating Group for Munitions Effectiveness In FY18, JTCG/ME will continue to develop and standardize methodologies for evaluating munitions effectiveness. This includes target vulnerability characterization, munitions lethality, weapon system accuracy, and specific weapon-target pairings driven primarily from current operational lessons learned, Joint Staff Data Calls, and CCMDs' needs.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
JTCG/ME will deploy and continue to enhance future versions of its major JTCG/ME Joint Munitions Effectiveness Manual (JMEM) products, the JMEM Weaponeering System (JWS), Joint Antiair Combat Effectiveness (J-ACE), Digital Precision Strike Suite (DPSS) Collateral Damage Estimation (DCiDE) tool, and the Digital Imagery Exploitation Engine (DIEE). JTCG/ME will continue to progress and develop non-kinetic JMEM capability, as well as support specialized solutions to address operational needs to include direct analytical support to operations, Probability of kill (Pk) Lookup Tools, Collateral Damage Estimation (CDE) analysis and tables, and munitions weaponeering guides. The objective is to provide efficient and effective support to meet CCMD current and future needs for agility in a dynamic operational environment. Since JTCG/ME products are User focused and requirements driven, JTCG/ME will continue to maintain and strengthen relationships with the Warfighter, operational users, and coalition partners to establish requirements for current and future products. Efforts will include forums, training, foreign military sales, and day-to-day operational support. In FY 2018, JTCG plans to: - Field JWS v2.3 that will include enhanced data sets and capabilities with a focus on connectivity to other targeting and mission planning capabilities for improved estimates and seamless planning. Specifically, JWS v2.3 will include connectivity to MIDB, JTT, and DIEE; updates to Fast Integrated Structural Tool (FIST) and Ship Weaponeering Estimation Tool (SWET), updated weapons characteristics and delivery accuracy, more target vulnerability data sets. - Finalize development of JWS v2.4, which will provide enhanced data and connectivity capabilities, while maximizing the final JWS v2.x product line and allowing development of JWS v3.x. JWS v2.4 will be a database driven product with enhanced business logic and user interfaces, allowing for accelerated weapons and target data updates, tailored product versions for releasability, and more effective, focused testing. Capabilities will include updated weapons and targets and FIST v2.1 with inclusion and updates to WinBlast, Bridge Analysis System, Linear Target Module, and surface response and penetration functions in burst point editor. These capabilities will enable more options to the Weaponeer and improve the underlying phenomenology representation in JWS. - Continue development on the next JWS series (JWS v3.x). JTCG/ME will leverage the JWS v3.x Capability Needs Statement (CNS) completed in FY17 to progress towards initial capability. Specific efforts will include requirements analysis/decomposition, functionality/methodology review and gap analysis, development plan finalization, and endgame framework road mapping. - Support current use and future development requirements, by hosting and supporting JWS training sessions, Operational Users Working Groups (OUWG), and User help via the JMEM Product Information Access System (JPIAS) and JWS newsletter. The training sessions allow users to optimize use of JWS capabilities, while providing JTCG/ME with critical input on Warfighter use for future development. OUWGs are critical venues for receiving direct User feedback and development of future requirements from the operational community in regards to needed software enhancements and capabilities to support Air to Surface (AS) and Surface to Surface (SS).			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
- Continue to facilitate coalition interoperability and information exchange forums, by delivering JWS version releases and standalone Pk Lookup tools to key coalition partners in support of current operations under Foreign Military Sales agreements. This capability improves the effectiveness of U.S. fires and targeting personnel working in combined environments. - Continue to maintain and enhance the Collateral Effects Library (CEL) tool in support of advanced CDE mitigation techniques. JTCG/ME will leverage CEL, along with other high fidelity techniques to deliver collateral damage mitigation analysis and tables to operational Users for high value targets and current operational planning. These efforts directly assist Combatant Commands to meet commander's intent and minimize collateral damage. - Initiate multiyear plan, developed in FY17, to enhance and validate collateral damage. The enhancement will support improvements in weaponeering methodology to minimize risk to mission and risk to forces, while not increasing risk of collateral damage by providing foundational data for the development of higher fidelity predictive tools. Specific efforts will generate buried ordnance characterization data based upon usage statistics from CCMD Expenditure reports, and AOR specific building debris data to enhance and validate current weaponeering/collateral damage estimation methodologies required by Strike Approval Authorities to make their strike decision calls. The FY18 efforts build off three FY17 JLF testing events and multiple collaboration forums. - Field DIEE v2.1 that will include user requested enhancements, JWS interface, updated CGS for PPM capability, JTT read/write capability, CEL interface development, as well as additional supported image and layer management formatting. - Continue to develop future DIEE versions (v2.2), which will include 3-D viewer capability and updates to connectivity interfaces. - Continue to support the CJCSI 3160.01, by updating and accrediting CER Reference Tables for Air-to-Surface (AS) and surface-to-surface (SS) weapons, which are the basic data that support the CDE methodology. The CER tables and CDE methodology are used in every planned kinetic strike in all Areas of Responsibility (AORs) to meet Commanders' intent and to minimize civilian casualties. As such, it is critical to the Warfighters ability to meet urgent operational needs. DCiDE tool implements the latest CER and CDE methodology. DCiDE is an accredited and automated CDE tool that expedites and simplifies the CDE process and is interconnected with DIEE. - Continue to provide direct forward presence support to CCMDs, which enabled target materiel development, weaponeering and CDE solution development. - Sustain DCiDE and DIEE training sessions for the Warfighter. - Sustain/support fielded J-ACE v5.3. Efforts will include multiple training and user forums for the fielded product. These forums are pivotal for J-ACE developers to understand requirements and align development with other external debrief and analytical capabilities that use J-ACE as the underlying analytical engine to underpin results. Many users leverage J-ACE's API to link debrief and analysis tools at training and test ranges across the Joint community. The forums allows J-ACE external application developers to receive an updates and interact with J-ACE developer to refine requirements and plans. - Continue development and finalization of J-ACE v5.4, with expected fielding in FY19. J-ACE v5.4 fielding will include an enhanced BROWSE module for descriptive material to support new weapons in the JAAM and Endgame Manager. In addition, it will facilitate greater connectivity for debrief capabilities, include initial capability to evaluate two sided SEAD/DEAD, target			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
detection estimation by leveraging NASIC RF models, and increased counter air defense prediction with greater Enhanced Surface-to-Air Missile Simulation (ESAMS) capability. An enhanced architecture will maximize re-use, interoperability, support future hardware/software compatibility, and optimize integration and validation testing. - Develop next J-ACE version series by finalizing requirements and implementing initial capabilities for rotary wing aircraft, as well increasing capability for SEAD/DEAD, electronic warfare, and counter-measures. - Continue to develop J-NKE as the single source for operational Warfighters, analysts, targeteers, and planners to analyze offensive cyber capabilities and directed energy effectiveness. Specifically: -- Execute a multiyear plan to build a Cyber JMEM capability to include standardization of data to address weapon characterization, target vulnerability, Operational Environment, and Uncertainty Metrics for the Cyber Operation Lethality and Effectiveness (COLE) tool. Efforts will include solidifying relationships with key stakeholders, framework development, initial network modeling, standardize weapons and target characterization, codify/develop operational environment model, and determine uncertainty metrics and data standards. -- Continue multiyear plan to build develop directed energy effectiveness estimate capability. JTCG/ME will leverage the FY18/19 Joint Test Project, JLaSE, to provide lessons learned, data, and build initial capabilities. Results of the JLaSE program will provide Joint Fire Support Planners and Targeteers the tactics, techniques, and procedures for Joint Targeting Cycle, Capabilities Analysis – Weaponeering and Collateral Damage Estimation, to adequately plan for and execute Directed Energy Laser Weapons in the joint battlespace. In this way, the JTCG/ME and JLaSE partnership will help facilitate data standards, methodology standards, and working relations imperative in the fruition of a DE effectiveness, weaponeering, and CDE solution for the Warfighter. FY18 outcomes will include standards and requirements to facilitate building of initial methodologies in FY19.			
FY 2019 Plans: Live Fire Test and Evaluation (LFT&E) of Major Department of Defense (DOD) Acquisition Programs The FY 2018 budget will enable the LFT&E Deputate to: (1) assess the adequacy of programs' test and evaluation plans and reports and generate new test and evaluation policies, as needed; (2) review and analyze the test data to support an independent evaluation of the survivability/lethality of the systems in support of the development of OSD Live Fire Test and Evaluation reports to Congress; and (3) review major acquisition plans, reports, and requirement documents to inform system design and capability development. JLF Programs and LFT&E Initiatives The FY 2019 budget will support the planning and execution of tests of fielded systems not previously tested under the Live Fire Programs to support DOT&E and operator needs. New threats, missions, TTPs, and combat environments will create the need for these tests and an assessment of performance. JLF projects will be defined, planned, and executed to provide survivability and lethality data on currently fielded U.S. systems; improve modeling and simulation tools; develop vulnerability data libraries for emerging threats; and initiate responses to quick reaction requests from theater.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
JASP In FY 2019 the JASP will continue work on at least 20 multi-year RDT&E projects and initiate about 8 new projects approved by the JASP Principal Members Steering Group and OSD/DOT&E. The JASP will develop measures to defeat Near-Peer Adversary Threat (N-PAT) radio-frequency and infrared guided threats coupled with quantifiable improvements in digital and hardware in the loop modeling and simulation capability and credibility. Improve aircraft force protection by increasing threat and flight environmental situational awareness, hostile fire identification, and degraded visual environment flight capabilities; advancing system hardening against ballistic and high energy laser threats; and improving aircraft crashworthiness. Improve aircraft survivability to fire by increasing the speed and efficiency of fire detection and suppression systems and the accuracy and confidence in prediction of threat initiated fires onboard aircraft. The JCAT will continue to support the Air Force, Army, Marine Corps and Navy by assessing combat damage incidents, training operators on threat effects and combat damage assessment, and reporting their findings to combatant commanders and the DoD science and technology and acquisition communities. The JASP will continue supporting aircraft survivability education and information exchange through internet sites (restricted access and classified), by publishing the Aircraft Survivability Journal, developing educational materials and conducting training for the DoD and their contractors. The JASP will initiate, continue and complete other projects as approved by the JASP Principal Members Steering Group and OSD/DOT&E. Joint Technical Coordinating Group for Munitions Effectiveness In FY19, JTCG/ME will continue to develop and standardize methodologies for evaluating munitions effectiveness, including target vulnerability characterization, munitions lethality, weapon system accuracy, and specific weapon-target pairings driven primarily from current operational lessons learned, Joint Staff Data Calls, and CCMD needs. JTCG/ME will deploy and continue to enhance future versions of its major JMEM products, JWS, J-ACE, DCiDE, and DIEE. This will continue initial capabilities for its future product line architectures that will allow optimal leveraging and flexibility for agile enhancements, imperative in a complex strategic and operational environment. It will progress to greater maturity of Cyber and DE standards and J-NKE capability realization. In addition, it will continue to make the Warfighter the focal point, by providing specialized solutions and direct analytical support to provide efficient and effective support to meet CCMD current and future needs for agility in a dynamic operational environment. In FY2019, JTCG plans to:			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
- Field JWS v2.4, which will provide enhanced data and connectivity capabilities, while maximizing the final JWS v2.x product line as JWS v3.x capabilities mature. It will be a database driven product, enhancing business logic and user interfaces. This will allow for accelerated weapons and target data updates, tailored product versions for releasability, and more effective, focused testing. Specific capabilities will include updated weapon and target data sets and enhanced FIST v2.1, to include WinBlast, Bridge Analysis System, Linear Target Module, and surface response and penetration functions in burst point editor. These capabilities will enable more options to the Weaponeer and improve the underlying phenomenology representation in JWS. - Mature the JWS v3.x product line, building upon FY18 efforts to solidify detailed requirements, functionality, methodology, gaps, and acquisition plans. FY19 efforts will include implementation of FY18 efforts and findings to progress towards initial prototypes and engineering builds in endgame framework, with planned fielding of initial capabilities in 2020. - Support current use and future development requirements, by hosting and supporting JWS training sessions, OUWG, and User help desk support via the JPIAS and JWS newsletter. The training sessions allows users to optimize use of JWS capabilities, while providing JTCG/ME with critical input on Warfighter use for future development. OUWGs are critical venues for receiving direct User feedback and development of future requirements from the operational community in regards to needed software enhancements and capabilities to support AS and SS. - Continue to facilitate coalition interoperability and information exchange forums, by delivering JWS version releases and standalone Pk Lookup tools to key coalition partners in support of current operations under Foreign Military Sales agreements. This capability improves the effectiveness of U.S. fires and targeting personnel working in combined environments. - Continue to support the CJCSI 3160.01, by updating and accrediting CER Reference Tables for AS and SS weapons, which are the basic data that support the CDE methodology. The CER tables and CDE methodology are used in every planned kinetic strike in all AORs to meet Commanders' intent and to minimize civilian casualties. As such, it is critical to the Warfighters ability to meet urgent operational needs. DCiDE tool implements the latest CER and CDE methodology. DCiDE is an accredited and automated CDE tool that expedites and simplifies the CDE process and is interconnected with DIEE. - Field DIEE v2.2, which will include 3-D viewer capability, updates to connectivity interfaces, and greater format flexibility, while maintaining Warfighter support and future requirements through training and User forums. - Continue to execute multiyear plan to enhance and validate collateral damage. The enhancement will support improvements in weaponeering methodology to minimize risk to mission and risk to forces while not increasing risk of collateral damage by providing foundational data for the development of higher fidelity predictive tools. Specific efforts will generate buried ordnance characterization data based upon usage statistics from CCMD Expenditure reports, and AOR specific building debris data to enhance and validate current weaponeering/collateral damage estimation methodologies required by Strike Approval Authorities to make their strike decision calls. - Field J-ACE v5.4 that will include an enhanced BROWSE module for descriptive material to support new weapons in the JAAM and Endgame Manager. In addition, it will facilitate greater connectivity for debrief capabilities, target detection estimation with NASIC RF modeling, counter air defense prediction with greater ESAMS capability, and enhanced architecture to maximize re-use, interoperability, support future hardware/software compatibility, and optimize integration and validation testing.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
- Develop the next J-ACE version that will include rotary wing aircraft, as well increasing capability for SEAD/DEAD electronic warfare, and counter-measures. - Continue to support and interact with the User base thru training and User/External Interface working group forums. These forums are pivotal for J-ACE developers to understand requirements and align development with other external debrief and analytical capabilities that use J-ACE as the underlying analytical engine to underpin results. Many users leverage J-ACE API to link debrief and analysis tools at training and test ranges across the joint community. The EIWG meeting allows J-ACE external application developers to receive an updates and interact with J-ACE developer to refine requirements and plans. - Continue to develop J-NKE as the single source for operational Warfighters, analysts, targeteers, and planners to analyze offensive cyber capabilities and directed energy effectiveness. Specifically: -- Mature Cyber JMEM capabilities with continued execution of multiyear plan. FY19 efforts will build upon FY18 efforts. Specific planned efforts include maintaining User community interaction and stakeholder partnerships, refining weapon/target standards, initial COLE capabilities, initial User beta testing, and integration of uncertainty analytics. -- Mature DE effectiveness capabilities with continued execution of multiyear plan. FY19 efforts will build upon FY18 outcomes, while continuing the work and leveraging of the FY18/19 Joint Test Project, JLaSE. Leveraging and cooperation between JTCG/ME and JLaSE will facilitate lessons learned, data standards, methodology standards, and working relations imperative in the fruition of a DE effectiveness, weaponeering, and CDE solution for the Warfighter. FY19 outcomes will include initial prototype and methodologies for DE effectiveness estimation. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** The increase from FY 2018 to FY 2019 of $4.832 Million is consistent with inflation, planned program increases in collateral damage methodology improvements for buried ordinance characterization, and planned program increases for Battle Damage Assessment (BDA) an enhancement that offers updates to warfighter's Joint Munitions Effectiveness Manual (JMEM) Weaponeering System (JWS) intended to ensure effective and efficient munition expenditure rates and mitigate the stockpile stress while improving Combatant Commands' force effects.			
Accomplishments/Planned Programs Subtotals	48.316	59.500	64.332

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2019 Operational Test and Evaluation, Defense		Date: February 2018
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E. Performance Metrics

(U) Performance Measure: Percentage of required live fire test planning documents, assessments, munition effectiveness manuals, and reports applicable to acquisition programs on the OSD Test and Evaluation Oversight List and other special interest programs/legacy systems that are completed and delivered to the appropriate decision makers on time. Percentage of required products, such as test planning documents, munitions effectiveness manuals, tactic-techniques and reports that are developed and delivered to program managers and customers on time.