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 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603772A *I Advanced Tactical Computer Science and Sensor Technology*							
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	-	36.658	44.239	52.206	-	52.206	48.151	50.614	52.135	50.420	-	-
101: *Tactical Command and Control*	-	14.415	17.997	22.228	-	22.228	21.922	23.848	24.781	22.230	-	-
243: *Sensors And Signals Processing*	-	22.243	26.242	29.978	-	29.978	26.229	26.766	27.354	28.190	-	-

A. Mission Description and Budget Item Justification

This Program Element (PE) matures and demonstrates technologies that allow the Warfighter to effectively collect, analyze, transfer and display situational awareness information in a network-centric battlefield environment. It matures and demonstrates architectures, hardware, software and techniques that enable synchronized mission command (MC) during rapid, mobile, dispersed and Joint operations. Project 101 matures software, algorithms, services and devices to more effectively integrate MC across all echelons and enable more effective utilization of Warfighter resources including intelligent power management and distribution through accelerated information to decisions and rapid MC on the move. Project 243 matures and demonstrates signal processing and information/intelligence fusion software, algorithms, services and systems for Army sensors; radio frequency (RF) systems to track and identify enemy forces and personnel; and multi-sensor control and correlation software and algorithms to improve reconnaissance, surveillance, tracking, and target acquisition.

Work in this PE complements PE 0602120A (Sensors and Electronic Survivability), PE 0602270A (Electronic Warfare Technology), PE 0602303A (Missile Technology), PE 0602705A (Electronics and Electronic Devices), PE 0602782A (Command, Control, Communications Technology), and PE 0603270A (Electronic Warfare Technology), and is coordinated with PE 0602783A (Computer and Software Technology).

The cited work is consistent with the Assistant Secretary of Defense for Research and Engineering Science and Technology priority focus areas and the Army Modernization Strategy.

Work in this PE is performed by the Communications-Electronics Research, Development, and Engineering, Center (CERDEC), Aberdeen Proving Ground, MD.

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 3: *Advanced Technology Development (ATD)*			**R-1 Program Element (Number/Name)** PE 0603772A *I Advanced Tactical Computer Science and Sensor Technology*		
B. Program Change Summary ($ in Millions)	**FY 2016**	**FY 2017**	**FY 2018 Base**	**FY 2018 OCO**	**FY 2018 Total**
Previous President's Budget	38.147	44.239	52.496	-	52.496
Current President's Budget	36.658	44.239	52.206	-	52.206
Total Adjustments	-1.489	0.000	-0.290	-	-0.290
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.489	-			
• Adjustments to Budget Years	0.000	0.000	-0.371	-	-0.371
• Civ Pay Adjustment	0.000	0.000	0.081	-	0.081

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603772A / *Advanced Tactical Computer Science and Sensor Technology*	Project (Number/Name) 101 / *Tactical Command and Control*	

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
101: *Tactical Command and Control*	-	14.415	17.997	22.228	-	22.228	21.922	23.848	24.781	22.230	-	-

A. Mission Description and Budget Item Justification

This Project matures and demonstrates software, algorithms, services and devices that move and display timely and relevant information across the battlefield to provide commanders at all echelons with situational awareness (SA) that allows them to understand, decide and act faster than their adversaries. This project also matures and demonstrates software, algorithms and devices supporting information storage and retrieval; digital transfer and display of battlefield SA, with an emphasis on positioning, navigation, and timing (PNT) and power and energy resource information while keeping in mind the cognitive limit of the Soldier's use of software, algorithms and services optimized for expeditionary and uninterrupted mission command.

The cited work is consistent with the Assistant Secretary of Defense for Research and Engineering Science and Technology priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Communications-Electronics Research, Development, and Engineering Center (CERDEC), Aberdeen Proving Ground, MD.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: Integrated Mission Command (MC)	10.012	9.421	6.425
Description: This effort matures and demonstrates technologies to simplify MC software and data architectures and reduce complexity in all battlefield environments, to include command post (CP), mounted, and dismounted operations. Work accomplished under Program Element (PE) 0602782A/Project 779 complements this effort. Beginning in Fiscal Year (FY) 18, work supporting expeditionary mission command is moved to an “Expeditionary MC” program.			
FY 2016 Accomplishments: Matured and demonstrated modular extensible common hardware, commander focused MC software applications and next generation tactical software architectures resulting in smaller, simpler, and less complex command; demonstrated reduction in the complexity of MC software by focusing on specific commander tasks (e.g., visualize an end state, understand the current situation, and direct resources) rather than general staff functions and by providing data optimized for those tasks; demonstrated both CP and vehicle instantiations of the mission equipment package to examine strengths/weaknesses and trade-offs between the two; and matured and demonstrated MC software that dynamically assesses the mission and the battle space to help maximize mission success by managing limited and distributed resources, including operational energy, bandwidth and cognitive processing.			
FY 2017 Plans:			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603772A / *Advanced Tactical Computer Science and Sensor Technology*	**Project (Number/Name)** 101 / *Tactical Command and Control*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Will mature, and demonstrate innovative designs for Army CPs that are quicker/easier to set up and tear down, may be moved more quickly, can be easily customized for unique mission needs, and facilitate the rapid deployment of forces away from well-established bases (expeditionary operations); evaluate, design, integrate and demonstrate computer server hardware that will simplify CP setup, minimize needed computer and network configuration, and provide higher computer reliability; mature and demonstrate computer software that will provide the commander with needed information regardless of the commander's location, (in a CP, in a vehicle, or dismounted); demonstrate enhanced software collaboration tools that enable commanders and staffs to share ideas and information when they are not collocated by using voice, gestures, text, and maps across multiple digital device types (phones, tablets, laptops, and computers); optimize and demonstrate mobile user interfaces and advanced modes of human-computer interaction that make it easier to understand the presented information to simplify decision making. ***FY 2018 Plans:*** Will integrate and demonstrate software that provides the commander with information regardless of the commander's location, (e.g., command post (CP), mounted vehicle, or dismounted); demonstrate enhanced collaboration software tools that enable a mobile force to use voice, gestures, and text to interact with MC systems and services on the move; complete and demonstrate a collaborative, flexible environment that distributes data to the point of need, and supports rapid and effective decision support tools; and mature and demonstrate a human computer interface that provides a common user experience and adapts to differing screen sizes and device capabilities (phones, tablets, laptops, and computers) to enable enhanced situational understanding and decision making in CP, mounted and dismounted environments.			
Title: Expeditionary Mission Command ***Description:*** This effort matures and demonstrates hardware and software command post (CP) enabling technologies to support expeditionary maneuver and effective, uninterrupted MC operations. Work accomplished under PE 0602782A/project 779 complements this effort. This effort continues expeditionary MC work previously reported under Integrated MC. ***FY 2018 Plans:*** Will complete development and integration of innovative Army CP concept technology demonstrators to enable expeditionary maneuver and effective uninterrupted MC operations; demonstrate integrated CPs and configuration standards that can be customized to meet unique mission needs and enable rapid deployment and remote operations; complete and demonstrate tactical server hardware to minimize CP network setup time and lessen task burden on administrators while simplifying CP computing environment architecture and applications; complete and demonstrate a CP display system capability that reduces clutter; demonstrate expeditionary CP components that improve collaboration, decrease complexity, size, weight, and power (SWaP) - cost; demonstrate CP nodes to inform and validate CP requirements that explore new concepts for minimalistic solutions	-	-	6.147

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603772A / *Advanced Tactical Computer Science and Sensor Technology*	**Project (Number/Name)** 101 / *Tactical Command and Control*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
for Initial Entry Operations, Forcible Entry Operations, and agile solutions for Main CP and Tactical CP pairings; and conduct field based demonstrations focused on risk reduction and informing future CP requirements and Army Concepts.			
Title: Assured Positioning, Navigation and Timing (A-PNT) (formerly titled Battle Space Awareness and Positioning)	4.403	6.576	7.651
Description: This effort matures, demonstrates and performs modeling and simulation (M&S) of PNT technologies to provide access to trusted PNT information in global positioning system (GPS)-denied or degraded environments. Work being accomplished under PE 0602782A/Project 779 complements this effort. ***FY 2016 Accomplishments:*** Matured multiple sensor fusion techniques to improve overall system performance for PNT on mounted, dismounted, and unmanned platforms; demonstrated aiding technologies such as cameras, ranging sensors, and velocimeters to augment the performance of inertial measurement unit (IMU)-based navigation when integrated into PNT systems to reduce GPS dependency; matured personal navigation system components for dismounted Soldier applications, including smaller IMUs, anti-jam antennas, and more efficient multi-Global Navigation Satellite System receivers requiring less power to operate; validated Military Code (M-Code) GPS receiver component performance for integration into PNT systems; and optimized and improved pseudolites for both ground and airborne platforms and anti-jam antenna performance while reducing size, weight and cost for mounted and dismounted platforms. ***FY 2017 Plans:*** Will assess the performance of anti-jam antennas on various mounted platforms to understand the benefits and tradeoffs of each configuration; validate the design and integration of dismounted PNT systems to determine the best configuration for reduced size, weight, and power (SWaP) and optimal sensor placement, to include ranging sensors, vision navigation sensors, and velocimeters; in conjunction with the Air Force, demonstrate M-code receivers for mounted application to show the increased performance and operation in challenge/denied environments; demonstrate Blue Force Electronic Attack capabilities with M-code receivers and provide PNT solutions that support navigational warfare requirements for Army systems; improve the integration of PNT sensor processing from multiple sensors through advanced sensor fusion techniques to provide an accurate, robust, and difficult to jam system that can be implemented on different pseudolite platforms; mature pseudolite navigation technologies to increase performance by incorporating Military GPS User Equipment and additional navigation sensors; exploit advances in technologies to reduce SWaP for mounted PNT solutions including supporting hardware convergence efforts; demonstrate a PNT simulation architecture and framework to integrate and execute models in system of systems scenarios to analyze performance of PNT components when integrated into Army and other Service systems. ***FY 2018 Plans:*** Will integrate M-Code GPS into mounted and dismounted PNT systems including systems utilizing Multi Global Navigation Satellite Systems (multi-GNSS) signals (signals from foreign nation navigation satellite systems); mature and integrate			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603772A / *Advanced Tactical Computer Science and Sensor Technology*	**Project (Number/Name)** 101 / *Tactical Command and Control*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
enhanced pseudolite capabilities to improve system performance and reduce reliance on GPS signals; improve upon the system performance of the Mounted Assured PNT System by integrating additional aiding sensors such as vision navigation and reduced SWAP-C inertial measurement units; assess technologies for PNT applications for autonomous systems to improve their navigation capabilities and reduce the overall cost of the platform sensor package; evaluate autonomous systems to integrate PNT technologies such as radio frequency (RF) ranging beacons for in-building navigation to augment PNT solutions for mounted and dismounted platforms; optimize improved atomic clocks and two way time transfer methods as solutions that will provide accurate time to tactical users and systems in the absence of GPS; mature and code advanced M&S of PNT sensors, systems, and platforms to support Joint analysis of effects of PNT and PNT based attacks to Joint United States (U.S.) forces; begin integration of vision navigation systems into dismounted and mounted PNT systems; And integrate radio frequency ranging and motion characterization algorithms into dismounted PNT system.			
Title: Advanced Intelligent Power Management & Distribution	-	2.000	2.005
Description: This effort matures and demonstrates advanced power management and distribution technologies as well as validates and integrates designs in prognostics and diagnostic capabilities and novel power distribution. Work accomplished under PE 0602705A/Project H11 complements this effort. ***FY 2017 Plans:*** Will conduct assessment of advanced renewable, alternative fuel, high fuel-efficiency power systems to improve performance of base power systems while further reducing logistics footprint; mature, code and demonstrate optimized software and algorithms as a status monitoring system to identify faults and errors in a power generation system to augment operational situational awareness for the unit commander with increased and timely mission power and energy status; mature predictive-analysis modeling software to validate and demonstrate the capability to select and employ energy sources attached to a tactical power grid system during the planning and execution mission phases as an efficient and integrated system for managing operational power. ***FY 2018 Plans:*** Mature, demonstrate and validate advanced renewable, alternative or high fuel-efficiency power systems such as optimizing the performance of a hybrid (generator, plus batteries, plus solar) power trailer as part of a microgrid to improve performance of base power systems while reducing logistics footprint; mature, code and demonstrate optimized software and algorithms to provide power situational awareness to unit commander and staff with the ability to identify faults and errors in power generation and assess timely mission power and energy status; validate predictive-analysis modeling of energy sources, to be used during the planning and execution mission phases, to determine if they are efficient and integrated systems for managing operational			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
power attached to a tactical power grid system; And integrate new hybrid power trailer with Joint and supporting systems (legacy generator based microgrids).			
Accomplishments/Planned Programs Subtotals	14.415	17.997	22.228

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603772A / *Advanced Tactical Computer Science and Sensor Technology*	Project (Number/Name) 243 / *Sensors And Signals Processing*	

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
243: *Sensors And Signals Processing*	-	22.243	26.242	29.978	-	29.978	26.229	26.766	27.354	28.190	-	-

A. Mission Description and Budget Item Justification

This Project matures and demonstrates improved radar, sensor fusion, and correlation software, services, devices and systems for wide area reconnaissance, surveillance, tracking and targeting of ground and aerial platforms and individuals, including complex and urban environments. Sensor fusion efforts mature and demonstrate software, algorithms and services for sensor management, data correlation, and relationship discovery for a multi-intelligence fusion system. Sensor and simulated sensor candidates may include moving-target-indicator/synthetic aperture radar, electro-optical/infrared (EO/IR), signals intelligence (SIGINT), measurements and signatures intelligence (MASINT), human intelligence (HUMINT), multiple intelligence (Multi-Int) and biometrics.

The cited work is consistent with the Assistant Secretary of Defense, Research and Engineering Science and Technology priority focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Communications - Electronics Research, Development, and Engineering Center (CERDEC), Aberdeen Proving Ground, MD.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: Collaborative Intelligence, Surveillance and Reconnaissance (ISR) Sensor processing and analytics (formerly titled Collaborative Intelligence, Surveillance and Reconnaissance (ISR) Sensors)	5.426	3.318	3.746
Description: This effort develops software that gathers data from multi-function Airborne ISR sensor sources into a single common operating environment to streamline analysts processing, exploitation and dissemination (PED) workflows. The focus centers on developing scalable software that provides a near real time PED capability on board the platform with applicability at the ground stations and reach back for forensics and pattern analysis. It will increase the utility of moving target indicator (MTI) radar to the greater multi-INT picture for better origin-to-destination tracking, which is crucial to understanding the higher-level threat picture and increases the effectiveness and action-ability of battlespace awareness/intelligence data throughout an area of operations. This effort implements an open architecture extensible throughout the tactical enterprise, allowing for growth to include future ISR sensors. Work being accomplished under PE 0602270/Project 906 complements this effort.			
FY 2016 Accomplishments: Examined methods for enriching meta-data from MTI tracks and developed quality standards for MTI track data that will be used to quantify track confidence and information content; enhanced existing algorithms to improve tracks by correlating data from other sources (SIGINT, full motion video, etc.) with MTI track data; conducted lab assessments of various hardware and software components of a low size, weight and power radar system capable of 360 degree search to detect and locate small arms fire, dismounts and vehicles; configured necessary interfaces to integrate radar capabilities with EO/IR pre-shot detection sensors;			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603772A / *Advanced Tactical Computer Science and Sensor Technology*	**Project (Number/Name)** 243 / *Sensors And Signals Processing*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
and encoded and matured software to implement the Army Mode 5 Level 2-Broadcast Identify Friend or Foe (IFF) capability, integrated it on existing ground based radar platforms and performed initial validation of IFF software. ***FY 2017 Plans:*** Will complete analysis for enriching MTI track meta-data and information content; develop data manipulation and presentation techniques to enhance user acceptance of track based workflows; use modeling and simulation to analyze and improve algorithm performance, mature and demonstrate in a collaborative laboratory environment SIGINT and radar fusion utilizing Multi-Int algorithms developed and built on the initial processing exploitation and dissemination architecture to improve operator productivity and provide greater track confidence to the intelligence analyst. ***FY 2018 Plans:*** Will evaluate, and integrate advanced processing modules and modify/mature existing on platform activity detection algorithms using spatial and temporal correlation of full motion video, electronic warfare (EW), and MTI data that trigger operator and analyst alerts to be executable at ground stationand reachback to operations centers for forensics and pattern analysis; assess fusion algorithms against baseline analyst workflows to document performance improvements; mature and code algorithms for alerting, analytics, time and position correlation and correlation with data collected through EW to enhance existing Distributed Common Ground Station-Army (DCGS-A) program of record capabilities; and begin integration activities to generically align all developed algorithms (i.e., platform, ground station and reachback for use in the PED framework for utilization throughout the tactical enterprise to support distributed fusion.			
Title: Omni-directional Situational Awareness (SA) Airborne radar technologies ***Description:*** This effort matures and demonstrates multi-function SA sensors for small unmanned air systems and other aircraft to improve sensing and detection capabilities in support of wide-area persistent surveillance. ***FY 2016 Accomplishments:*** Matured modeling and simulation (M&S) of subsystem and component level designs for the Ground Moving Target Indicator (GMTI) penetrating radar system; identified standards and interface requirements necessary to facilitate integration into a next generation airborne intelligence, surveillance and reconnaissance platform; matured and analyzed radar modes in synthetic aperture radar and GMTI for optimized utility under anticipated operational conditions; and identified techniques for waveform optimization to mitigate spectrum challenges. ***FY 2017 Plans:*** Will continue to mature modeling and simulation efforts of subsystem and system level hardware radar designs; continue to incrementally mature component and subsystems and integrate them into a system brassboard demonstrator; complete antenna	4.344	4.425	4.753

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603772A / *Advanced Tactical Computer Science and Sensor Technology*	**Project (Number/Name)** 243 / *Sensors And Signals Processing*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
design and begin element range assessments by collecting real and simulated data to assess progress with respect to integration of both hardware and software at the signal processor. ***FY 2018 Plans:*** Will complete final subsystem and system level radar hardware and software designs and brassboard demonstrator; analyze radar modes and operations and conduct detailed system design review; perform M&S of the radar's full processing chain; perform laboratory and field assessments of technical performance; and refine human, vehicle, animal and clutter (HVAC) identification techniques and algorithms for feature-aided discrimination and tracking within the integrated radar system.			
Title: Counter-concealment Moving Target Indicator (MTI) Airborne Radar Demonstration ***Description:*** This effort will mature antenna design and signal processing and define the architecture to ensure simplified integration on a Multi-Int platform to deliver an advanced generation of airborne MTI radars. This will allow for third party mode development and exploitation techniques, with emphasis on automated target declaration and tracking. Efforts focus on antenna and signal processing advancements that allow the detection/tracking of targets despite camouflage, concealment and deception and a well-defined systems architecture to cover large areas and persistently scan named areas of interest. This effort leverages work being completed under the Omni-directional SA Airborne radar technologies effort in Fiscal Year (FY) 18. ***FY 2018 Plans:*** Will mature and implement a well-defined system processing architecture; conduct radar system derived requirements review and developmental system preliminary design review; develop detailed specifications and drawings for critical radar components and interfaces, including transmitter, receiver, advanced scalable robust polarimetric synthetic aperture radar (SAR)/MTI antenna, beam former, and processor; and integrate heating, ventilation, and air conditioning (HVAC) discrimination and tracking techniques into the system processor.	-	-	5.355
Title: Advanced All Source Fusion ***Description:*** This effort develops software technologies for intelligence/mission command (MC) mission collaboration to provide faster and higher quality decision making support for the commander and his key staff. Specific efforts focus on integrating ISR planning and execution at the Task Force/Battalion through troop-level, as well as efforts that provide the capability to identify, fuse, and trace/track specific targets in an asymmetric environment. Work accomplished under Program Element (PE) 0602270A/ Project 906 complements this effort. ***FY 2016 Accomplishments:*** Developed integration specifications for a virtualized, automated, full spectrum analytic agent for big data sources; integrated and matured software and algorithms to visualize (e.g., location, orientation, field of view) and virtually task all collection assets across echelons and classification domains in synchronization with MC and title authority control systems; and matured intelligence	4.746	4.055	4.953

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603772A / *Advanced Tactical Computer Science and Sensor Technology*	**Project (Number/Name)** 243 / *Sensors And Signals Processing*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
fusion software and algorithms to best tailor data streams, collection management processes and information displays to improve user understanding based on collected customer feedback and input from Soldiers. ***FY 2017 Plans:*** Will mature and demonstrate in a relevant environment an initial processing exploitation and dissemination architecture and framework capable of supporting both air and ground platforms; encode and mature collaborative intelligence software for data fusion, analysis and dissemination services that extend across echelons (i.e., tactical to theater) and into the broader intelligence enterprise; mature and demonstrate the application programming interfaces necessary for efficient intelligence data integration and alignment with the framework. ***FY 2018 Plans:*** Will integrate Multi-Int tracking, data fusion and analysis software capabilities into the PED framework; mature and demonstrate the architectures' scalability, ability to move data across the enterprise, to include air sensors and platforms, ground stations and the DCGS-A, and cloud/reach-back PED sites, to create an ISR common operational picture (COP) from the distributed fusion process; and develop and evaluate the software interfaces that will provide a "virtual analyst" for collaboration, visualization, alerting and dissemination capabilities across multiple nodes within the enterprise COP.			
Title: Multi-mode Air Defense Radar Demonstration ***Description:*** This effort matures the architectures, processing and components necessary to deliver next generation capability, flexibility and supportability to the fires family of radar systems. Efforts focus on development of a modular and scalable open architecture that is extensible to multiple radar systems technologies in support of air defense and area/base camp protection. Work being accomplished under PE 0602270A/Project 906, 0602120A/Project H16, 0602705A/Projects EM8 and H94, 0602303A/Project 214 and 0603270A/Project K16 complements this effort. ***FY 2016 Accomplishments:*** Developed and matured hardware and software interface specifications that will serve as the basis for a scalable radar open system architecture that is intended for use in multiple configurations and mission scenarios; and developed a Government owned data model standard for fires radar data at multiple levels of the data processing stack, from raw radar track data to processed targeting (meta) data, to enable netted sensor interoperability. ***FY 2017 Plans:*** Will mature common hardware and software interface specifications for the scalable radar open system architecture; complete initial back end signal processor system integration; optimize modeling and simulation for real-time back-end processing to utilize in laboratory assessments/demonstrations and mature a software development kit/mode development kit (tools and well defined interfaces) to allow non-proprietary integration of radar capabilities and modes such as identification friend or foe, counter fire target acquisition and air defense artillery algorithms and techniques; mature software algorithms to classify (using both radar	7.727	7.644	5.967

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
and electronic warfare data) and track unmanned aerial systems and demonstrate capability in a relevant environment during a maneuver and fires integration exercise. ***FY 2018 Plans:*** Will complete an open radar architecture processing environment for algorithm/mode design, and demonstrate capability to implement third party modes (e.g., including multi-mission and electronic protection); design interface definitions and demonstrate integration of radar antenna and processor hardware using the basic counter-fire target acquisition (CTA) mode to assess integration of software at the signal processor level; develop architecture definitions to reduce software dependence on processing hardware (not tied to speed/performance) to increased portability and upgradability; perform advanced radar concept M&S to refine concepts and requirements.			
Title: Degraded Visual Environment (DVE) – Air ***Description:*** This effort matures and demonstrates software and hardware for a millimeter wave radar system (conformal phased array radar) to provide obscurant penetration for terrain and object awareness while providing pilotage aids in all degraded visual environments. Work accomplished under PE 0603710A/Project K86 and 0603003A/Project 313 complements this effort. ***FY 2017 Plans:*** Will conduct radar trade space analysis and finalize existing radar selection for DVE radar application; mature software to provide capability for DVE operations (formation flight, all environments, 360 degrees of situational awareness), focusing on the cable/ obstacle avoidance, terrain following/terrain avoidance, and Global Positioning System (GPS) denied navigation modalities; begin radar integration efforts into a multiple sensor system (i.e., radar, light detection and ranging (LIDAR), electro-optic infrared) DVE demonstrator. ***FY 2018 Plans:*** Will complete integrated software mode development for high resolution SAR, DVE mapping (real beam imaging) and MTI/ dismount detection; complete integration and laboratory/tower assessments and data collection; integrate radar onto surrogate aircraft platform and conduct initial flight testing and data collection; and co-locate radar with additional imaging sensors for integrated sensor data collection.	-	4.800	5.204
Title: Intelligence Processing and Architecture Modernization ***Description:*** This effort will leverage Intelligence Community investments in software frameworks and exploits against threat signals of interest (SOIs) to develop a library of open, modular, and scalable software solutions to address identified capability gaps and to provide the commander electronic situational awareness while at the same time protecting his assets from enemy deception and jamming. Work accomplished under PE 0602270A/Project 906 and 0603270A/Project K15 complements this effort.	-	2.000	-

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
In FY18 efforts supporting Intelligence Processing and Architecture Modernization are being realigned to PE 0603270A/Project K15 as work within that PE better reflects the nature of the technology being developed under this effort. ***FY 2017 Plans:*** Will optimize and demonstrate current high frequency (HF) exploit capabilities on the next generation RF converged architecture; adapt and mature software solutions to search, intercept, and direction find (DF) three priority SOIs identified within the Army SIGINT Modernization Plan.			
Accomplishments/Planned Programs Subtotals	22.243	26.242	29.978

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A