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 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0603827A / *Soldier Systems - Advanced Development*							
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	-	22.251	31.120	20.239	-	20.239	20.846	14.976	23.030	28.287	Continuing	Continuing
ET8: *Personnel Airdrop System Development*	-	0.000	0.690	0.495	-	0.495	0.400	0.300	1.282	1.280	0.000	4.447
S51: *Aircrew Integrated Sys Ad*	-	0.146	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.146
S53: *Clothing And Equipment*	-	9.758	3.582	2.612	-	2.612	1.845	2.495	1.831	2.445	Continuing	Continuing
S54: *Small Arms Improvement*	-	7.153	10.554	6.851	-	6.851	10.377	9.312	15.421	19.595	Continuing	Continuing
VS4: *Soldier Protective Equipment*	-	5.194	16.294	10.281	-	10.281	8.224	2.869	4.496	4.967	Continuing	Continuing

A. Mission Description and Budget Item Justification

This Program Element (PE) for Advanced Component Development and Prototypes manages the Soldier as a system in order to increase combat effectiveness, test and deliver tangible products that save Soldier's lives, and improve Soldier's quality of life. It evaluates, develops, and tests emerging technologies and critical Soldier support systems to reduce technology risk.

Project ET8 funding (Personnel Airdrop System) supports efforts to improve Static Line (SL) and Military Free Fall (MFF) personnel parachutes and associated equipment to include canopy improvements based on integration of new technology with the goal of enhancing the insertion capability of the airborne soldier and increasing the performance, safety and durability of personnel airdrop equipment.

Project S51 funding (Aircrew Integrated Systems) supports component development and prototyping of critical Soldier support systems and other combat service support equipment that will improve unit sustainability and combat effectiveness.

Project S53 funding (Clothing and Equipment) supports development of state-of-the-art technology to improve tactical and non-tactical clothing and individual equipment to enhance the lethality, survivability, and mobility of the individual Soldier.

Project S54 funding (Small Arms Improvement) provides funds to develop, demonstrate and evaluate emerging technology for integration of systems, subcomponents and prototypes designed to enhance lethality, target acquisition, fire control, training effectiveness and reliability for current and future small arms weapon systems and ammunition.

Project VS4 funding (Soldier Protective Equipment) supports efforts to evaluate integrated technologies and representative or prototype systems that help expedite Individual Soldier Ballistic Protection technology transition from the laboratory to operational use.

Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army					Date: May 2017
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*		R-1 Program Element (Number/Name) PE 0603827A / *Soldier Systems - Advanced Development*			
B. Program Change Summary ($ in Millions)	**FY 2016**	**FY 2017**	**FY 2018 Base**	**FY 2018 OCO**	**FY 2018 Total**
Previous President's Budget	22.994	31.120	23.067	-	23.067
Current President's Budget	22.251	31.120	20.239	-	20.239
Total Adjustments	-0.743	0.000	-2.828	-	-2.828
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.758	-			
• Adjustments to Budget Years	0.015	0.000	-2.841	-	-2.841
• Other Adjustments 1	0.000	0.000	0.013	-	0.013

Change Summary Explanation

FY 2018 decrease of $2.828 million realigned to meet other Army higher priority requirements.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603827A / *Soldier Systems - Advanced Development*	Project (Number/Name) ET8 / *Personnel Airdrop System Development*	

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
ET8: *Personnel Airdrop System Development*	-	0.000	0.690	0.495	-	0.495	0.400	0.300	1.282	1.280	0.000	4.447
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Funding line established in FY17 for the Personnel Airdrop System Development. Efforts were previously executed in Program Element 0603827A S53.

A. Mission Description and Budget Item Justification

This funding supports efforts to improve Static Line (SL) and Military Free Fall (MFF) personnel parachutes and associated equipment to include canopy improvements based on integration of new technology with the goal of enhancing the insertion capability of the airborne soldier and increasing the performance, safety and durability of personnel airdrop equipment. Includes integration and interface on the Soldier system.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: Personnel Airdrop System Development	-	0.690	0.495
Description: Funding line is newly established in FY17. Efforts were previously executed in Program Element 0603827A S53. ***FY 2017 Plans:*** Continue to evaluate component and subsystem technologies across the airdrop portfolio to meet objective requirements for static line and military free fall parachutists and transition to ES9 to prove out capability insertions through Developmental Testing (DT) and Operational Testing (OT). Perform a market survey, system integration and initial evaluation of the performance modeling and analysis of parachute deployment to improve canopy performance. ***FY 2018 Plans:*** Investigate and initiate T-11 improvements to address improved packability and weight reduction to include packing methods as agreed to during Army Airborne Board. Validate average oxygen consumption during high altitude / high opening assessment to verify future oxygen requirements prior to integration into the Parachutists Oxygen Delivery System (PODS).			
Accomplishments/Planned Programs Subtotals	-	0.690	0.495

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603827A / *Soldier Systems - Advanced Development*	**Project (Number/Name)** ET8 / *Personnel Airdrop System Development*	

C. Other Program Funding Summary ($ in Millions)

Line Item	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
• RDTE 654601 ES9: *RDTE 0604601A ES9 Advanced Tactical Parachute System*	-	1.487	5.840	-	5.840	7.200	6.694	1.851	3.000	0	26.072
• OPA MA7801: *OPA MA7801 Advanced Tactical Parachute System*	30.862	16.111	28.440	-	28.440	41.610	48.819	60.280	54.264	0	280.386

Remarks

D. Acquisition Strategy

Programs pursue technology maturation and prototype development, culminating in the transition of mature technologies (TRL 6-7) to Engineering and Manufacturing Development.

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603827A / *Soldier Systems - Advanced Development*	Project (Number/Name) S51 / *Aircrew Integrated Sys Ad*	

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
S51: *Aircrew Integrated Sys Ad*	-	0.146	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.146
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Funding for this Project of S51 ends with FY2016.

A. Mission Description and Budget Item Justification

This project supports the Advanced Component Development and Prototyping of select Air Soldier System (Air SS) technologies. The Air SS provides improved safety, survivability, and human performance that amplifies the Warfighter's effectiveness and facilitates full-spectrum dominance of Army aircraft. The Air SS addresses capability gaps identified during combat operations in Iraq and Afghanistan including the effects of weight and bulk, limited situational awareness, and lack of functionally integrated aircrew member life support equipment. The Air SS follows an evolutionary acquisition approach that integrates mature technologies to build to the full capability. Air SS reduces overall weight and bulk of aircrew equipment, increases situational awareness, and enhances aircrew mobility. This funding provides advanced development for the Air SS in technology areas supporting improved laser eye protection, integrated power, wireless personal area networks, lightweight protective clothing, and tactile situational awareness cueing. Includes integration and interface of products on Soldiers.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: Aircrew Integrated Systems (ACIS) Advanced Development	0.146	-	-
Description: Advanced Component Development and Prototyping (ACDP) of critical aircrew support systems technology improvements and Advanced Development (AD) and risk reduction efforts required for transition for insertion into Air Soldier System Program of Record. ***FY 2016 Accomplishments:*** Continue to resource laboratories to monitor and influence Air SS technologies to include advanced wireless battery charging and wireless personal area networks for transition into Air SS preplanned product improvements phase.			
Accomplishments/Planned Programs Subtotals	0.146	-	-

C. Other Program Funding Summary ($ in Millions)

Line Item	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
• ACIS Engineering Development: *RDTE, A PE 0604601A PROJ S61-SDD*	3.380	3.811	4.011	-	4.011	3.992	2.063	1.919	1.958	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603827A / *Soldier Systems - Advanced Development*	**Project (Number/Name)** S51 / *Aircrew Integrated Sys Ad*

C. Other Program Funding Summary ($ in Millions)

Line Item	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
• Aircrew Integrated Systems: *Aircraft Procurement, Army SSN AZ3110 - ACIS*	44.085	30.297	47.066	-	47.066	30.896	28.900	26.900	36.004	Continuing	Continuing

Remarks

D. Acquisition Strategy

Air SS employs an incremental acquisition approach to improve the mission effectiveness, survivability, Situational Awareness, and safety of Army aircrews. These funds resource various government agencies and labs in the transition of emerging technologies to the Air SS program.

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603827A / *Soldier Systems - Advanced Development*	Project (Number/Name) S53 / *Clothing And Equipment*	

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
S53: *Clothing And Equipment*	-	9.758	3.582	2.612	-	2.612	1.845	2.495	1.831	2.445	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This funding supports efforts to evaluate and integrate technologies and representative or prototype systems that help expedite Soldier uniform and clothing technology transition from the laboratory to operational use. Efforts focus on proving out commonality across as broad a spectrum of users as possible to provide a modular, integrated uniform/clothing system from skin out and head-to-toe. It funds efforts to investigate new technologies and domestically available fabrics with Flame Resistance (FR), moisture wicking, insect protection and camouflage technologies, including evaluation and integration of fabrics appropriate for uniforms and equipment used in jungle/tropical and arctic environments. New technologies are investigated to monitor health and improve Soldier survivability, reduce weight, and improve affordability, mobility and comfort in combat and training/administrative environments. Includes integration and interface on the Soldier system. It funds efforts to improve personnel parachutes, to include analysis of canopy cloth fabrics and pack volume techniques until transition to funding line ET8 in FY17.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: Soldier Uniforms and Clothing	6.691	2.768	2.042

Description: Develop and provide superior and sustainable integrated clothing for the Soldier in a rapidly changing global environment.

FY 2016 Accomplishments:

Tactical Clothing. Conducted evaluations of new technologies to mitigate spectral reflectance of combat uniforms. Evaluated current products to establish performance metrics for incorporation in future specifications. Developed accurate digital objective color assessment technology to provide pass/fail shade assessments for quality control. Evaluated improved lighter weight textiles which incorporate improved vector protection, FR protection, and environmental protection while providing comfort, utility, and functionality for the Jungle Ensemble (uniform). Continued development of alternate insect protection with lower toxicity for all combat uniform fabrics (i.e. Army Combat Shirt, Army Combat Pants, FR Army Combat Uniform).

FY 2017 Plans:

Tactical Clothing. Conduct evaluation and integration of fabrics appropriate for uniforms and equipment used in jungle/tropical and Arctic environments. Continue to evaluate at the technical levels means to improve protection against cold weather, insects, and flame while increasing moisture management, signature management, breathability, and durability for tactical clothing. Develop characteristics and procure boot samples to refine product description and conduct small feasibility study to support Jungle Combat Boot requirement. Evaluate and Integrate technologies to support the development of accurate digital objective color assessment to provide pass/fail shade assessments for quality control. Investigate new fabrics and conduct laboratory testing to

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603827A / *Soldier Systems - Advanced Development*	**Project (Number/Name)** S53 / *Clothing And Equipment*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
support the New Army White Dress Shirt. Continue evaluation of new technologies to mitigate spectral reflectance Short Wave Infrared (SWIR) for combat uniforms. ***FY 2018 Plans:*** Tactical Clothing. Continue to evaluate and integrate technologies to support the development of accurate digital objective color assessment to provide pass/fail shade assessments for quality control and transition to DLA-TS. Evaluate improved lighter weight textiles which incorporate improved vector protection, FR protection, and environmental protection while providing comfort, utility, and functionality. Continue evaluation of new technologies to mitigate spectral reflectance Short Wave Infrared (SWIR) for combat uniforms. Develop durable antimicrobial technology transitioning from the S&T community to PdM SCIE for use in textiles used in combat uniforms and next-to-skin layers. Conduct evaluation and integration of insulative fabrics and technologies appropriate for clothing, handwear and footwear worn in extreme cold weather environments to be incorporated into environmental clothing, and hand and footwear systems. Initiate effort to improve the durability and reduce the fabric weight and cost to the sniper Flame Resistant Ghillie Suit.			
Title: Individual Equipment	3.067	0.814	0.570
Description: Develop and provide superior and sustainable integrated individual equipment for the Soldier in a rapidly changing global environment. ***FY 2016 Accomplishments:*** Conducted Front End Analysis on Integrated Load Carriage System (ILCS) in 3QFY16 to inform technology integration requirements to ensure ILCS fully integrates with Soldier Protection System (SPS). Airdrop. Evaluated potential material solutions at the component level to enhance the T-11 and T-11R parachute systems to include potential pack tray redesign, packing loop configurations, and potential improvements to the slider, deployment sleeve and bridle. Determined technology readiness level and feasibility of integration an automatic opening device on static line parachute systems. ***FY 2017 Plans:*** Integrated Load Carriage. Obtain Material Development Decision (MDD) and initiate technical testing on the Integrated Load Carriage System (ILCS). The ILCS will provide an integrated load carriage that interfaces with the Soldier Protection System (SPS). Transition to S60 with MS B in 2QFY18. ***FY 2018 Plans:***			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603827A / *Soldier Systems - Advanced Development*	**Project (Number/Name)** S53 / *Clothing And Equipment*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Individual Equipment. Evaluate lighter textiles and component hardware to reduce bulk and weight of individual equipment items. Continue evaluation of new technologies to mitigate spectral reflectance of Short Wave Infrared (SWIR) of nylon used in load carriage.			
Accomplishments/Planned Programs Subtotals	9.758	3.582	2.612

C. Other Program Funding Summary ($ in Millions)

Line Item	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
• 0604601A S60: *RDTE, 0604601A.S60, Clothing and Equipment*	5.814	10.166	7.022	-	7.022	5.413	7.528	8.803	5.075	Continuing	Continuing
• 121017 CFF OMA: *OMA, 121017, Central Funding and Fielding*	36.649	37.527	-	-	-	-	-	-	-	Continuing	Continuing
• MA7801 OPA: *OPA, MA7801, Advanced Tactical Parachute System*	30.862	16.611	28.440	-	28.440	41.610	48.819	60.280	54.264	Continuing	Continuing
• 121018 FR OMA: *OMA, 121018, Force Readiness Operations Support*	-	-	79.417	-	79.417	38.000	39.800	39.100	40.113	Continuing	Continuing

Remarks

D. Acquisition Strategy

Programs pursue technology maturation and prototype development, culminating in the transition of mature technologies (TRL 6-7) to Engineering and Manufacturing Development. This project continues to exercise competitively awarded contracts using best value source selection procedures.

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603827A / *Soldier Systems - Advanced Development*	Project (Number/Name) S54 / *Small Arms Improvement*	

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
S54: *Small Arms Improvement*	-	7.153	10.554	6.851	-	6.851	10.377	9.312	15.421	19.595	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

FY 2018 New Starts include Recoil Reduction Mechanisms, Armaments for Robots, Small Arms Deployable Observation Network, Sniper Rifle Round Counter, Lightweight Rifle/Machinegun Barrel Evaluations, Rifle/Machinegun Suppressor Evaluations, Next Generation Spotting Scope, Next Generation Binocular, and Sniper Missed Distance Corrective Offset.

A. Mission Description and Budget Item Justification

The Small Arms Improvement Advanced Component Development and Prototypes (ACD&P) program provides funds to mature, demonstrate, test and evaluate emerging technology from Joint Service Small Arms Program (JSSAP), Project 627, Program Element 0603607A, (Budget Activity 3), Defense Advanced Research Projects Agency (DARPA), Department of Energy National Laboratories, Research Development & Engineering Centers (RDECs) and other domestic and foreign sources for small arms weapons systems and technology. Small arms systems include weapons ranging up to 40 millimeter in caliber. Current and future efforts focus on improvements designed to enhance lethality, target acquisition and tracking, fire control, usability, training effectiveness and reliability of weapons to include ammunition when developing and/or evaluating standard and non-standard weapons. Focus areas include the maturing of technology through testing and evaluation of sub-system or system prototypes which demonstrates light weight materials, wear resistant/protective/anti-reflective coatings, observation/situational awareness improvements, human-systems integration, robotic armament capability and equipment enhancements. Benefits include continuous improvements to small arms weapons, fire control equipment, optics, gun barrels, training devices, suppressors, component mounts, weapon mounts, and weapon/ammunition interface. Includes costs associated with efforts for integration and interface of products on Soldiers' head, body and weapons.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: New Weapons	1.122	1.733	0.100
Description: Development of new small arms weapons			
FY 2016 Accomplishments: Next Generation Squad Automatic Rifle: Continued development of Acquisition Strategy, and supported Capability Development Document and provided Analysis of Alternatives for stakeholders. Externally Powered Mounted Machine Gun: Continued evaluation of metrics for externally powered weapon stations requirements. Provided engineering design and development activities to demonstrate capabilities of an Externally Powered Weapon system.			
FY 2017 Plans:			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603827A / *Soldier Systems - Advanced Development*	**Project (Number/Name)** S54 / *Small Arms Improvement*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Next Generation Squad Automatic Rifle: Continuing coordination and development of Acquisition Strategy, Capability Development Document, Capability Production Document, and provide data from various technologies to better inform stakeholders for transition to Infantry Support Weapons. Externally Powered Mounted Machine Gun: Providing engineering design and development activities to demonstrate capabilities of an Externally Powered Weapon system to inform MCoE on the Capability Development Document. Functional objectives include increased lethality, expansion of mission roles and operational utility (using a single weapon) through enhanced precision and multiple firing modes, lightening of the load, reduction in physical footprint, and minimization of required electrical power consumption. Emphasis will also be placed on maintaining a proper balance with operational implementation and manufacturing producibility of the Externally Powered Weapon. ***FY 2018 Plans:*** Next Generation Squad Automatic Rifle: Will continue to support the finalization of the Capability Development Document and Acquisition Strategy/Plan and schedule to support the Engineering and Manufacturing Development phase for the Next Generation Squad Automatic Rifle and determine details for technologies that will be pursued to meet the Soldier requirements. Externally Powered Mounted Machine Gun: Will continue to support the development of the Capability Development Document with Maneuver Center of Excellence using data received from initial engineering design and prototype testing of functional objectives including increased lethality, expansion of mission roles and operational utility (using a single weapon) through enhanced precision and multiple firing modes. New Weapons Evaluations and Assessments: Will continue to perform initial evaluation and assessment of new weapons.			
Title: Small Arms Weapons Enhancements ***Description:*** Enhancements and developments of small arms weapons ***FY 2016 Accomplishments:*** Individual Non-Lethal System: Completed testing on commercial items and provided data to users for requirements preparation. Increased Barrel Life/Replace Chrome: Optimized choice of refractory material for barrel liner. Tailored explosive bonding methodology for liner emplacement to .50 caliber and 7.62mm barrels. Developed rifling capability using water jet technology for .50 caliber. Received prototype barrels and performed testing at Aberdeen. Evaluated test results and used lessons learned to optimize liner thickness for next round of test assets.	1.085	1.686	0.100

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603827A / *Soldier Systems - Advanced Development*	**Project (Number/Name)** S54 / *Small Arms Improvement*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Non-Standard Weapons Assessments: Conducted baseline testing of commercial weapon systems and perform capability analysis of unique weapon characteristics. Tested information will be used to conduct trade off assessments of Non-Developmental Item solutions for pending requirements as well as establish safety parameters for the training mission. Continued to conduct market research of commercially available weapon systems. Small Business Innovative Research Enhancements: Continued to evaluate proposed improvement designs to enhance lethality, target acquisition and tracking, fire control, training effectiveness and reliability of weapons. Protective Weapons Coating: Continued to develop manufacturing technology to support production of super hydrophobic and other coatings in support of Small Arms Weapons. Weapon Upgrades and Accessories: Continued to test, evaluate and analyze ongoing and new activities to enhance small arms weapons.			
FY 2017 Plans: Individual Non-Lethal System: Complete Technology Transition Agreement between Program Executive Office Soldier and Armament Research Development and Engineering Center. Increased Barrel Life/Replace Chrome: Continue to conduct barrel studies to improve/enhance barrel life and eliminate chrome-lined weapon parts. Monitor progress in the Small Arms Ammunition Configuration Study and evaluate the effects on future barrel life/chrome requirements, e.g., caliber change or higher pressures. Develop needed technical approaches. Non-Standard Weapons Assessments: Continue to conduct baseline testing of commercial weapon systems and perform capability analysis of unique weapon characteristics. Continue to utilize test information to conduct trade off assessments of Non-Developmental Item solutions for pending requirements as well as establish safety parameters for the training mission of Regionally Aligned Forces. Continue to conduct market research of commercially available weapon systems. Small Business Innovative Research Enhancements: Continue to focus on improvements designed to enhance lethality, target acquisition and tracking, fire control, training effectiveness and reliability of weapons. Protective Weapons Coating: Continue to develop manufacturing technology to support production of super hydrophobic and other coatings in support of Small Arms Weapons.			

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
Weapon Upgrades and Accessories: Continue to test, evaluate and analyze ongoing and new activities to enhance small arms weapons. ***FY 2018 Plans:*** FY 2018 New Start: Recoil Reduction Mechanisms: Will assess and evaluate selected Recoil Reduction Mechanisms prototypes will be fabricated and tested for both individual and crew served weapons. FY 2018 New Start: Armaments for Robots: Will begin to initiate the intelligence/networking and weapons design and functions for a man-in-the-loop, small caliber defensive armaments system on an unmanned ground vehicle including the Warfighter/Robot interface. FY 2018 New Start: Small Arms Deployable Observation Network: Will begin research of a low cost, prototype device from Armament Research, Development and Engineering Center and integration with a grenade launcher system. The grenade launcher will remotely deploy an observation device comprised of grenade nodes containing an Electro Optical camera, acoustic and magnetic sensor components networked via robust ad-hoc wireless communications capable of transmitting streaming audio and imagery to provide increased situational awareness. FY 2018 New Start: Sniper Rifle Round Counter: Will perform feasibility, analysis of alternatives, and cost-benefit analysis studies for a sniper weapon mounted shot counter (and support devices) and also assess the required Army Information Technology infrastructure and required data analysis with Army logistical elements to include Assistant Secretary of the Army (Acquisition, Logistics and Technology), Combined Arms Support Command and Tank-Automotive and Armaments Command. The Sniper Rifle Round Counter: is inherently a shot counter for reliability and maintainability system that collects a weapon's firing impulse/shock profile that is translated into diagnostic data to provide life cycle prognosis on individual weapon maintenance. It will increase a weapon’s life span, reduce maintenance costs, and supports Army Condition Based Maintenance initiatives. FY 2018 New Start: Lightweight Rifle/Machinegun Barrel Evaluations: Will assess and evaluate new gun barrel technologies for both lightweight rifles and machine guns. Evaluation will consider technologies which are mature to where construction of test barrels can begin immediately for live fire evaluation. Technologies include dual and multilayer material gun barrels with refractory material bores, powdered metal liners, novel material (titanium/aluminum and other non-standard alloys) barrels. FY 2018 New Start: Rifle/Machinegun Suppressor Evaluations: Will assess and evaluate current technologies for small arms suppressors to address signature reduction requirements for Rifles and Machine Guns. Also determine characteristics for requirements for suppressors from evaluations to determine if new design is possible to meet requirements.			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603827A / *Soldier Systems - Advanced Development*	**Project (Number/Name)** S54 / *Small Arms Improvement*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Individual Non-Lethal System: Will continue to monitor status of Capability Development Document and provide input into programmatic documents as necessary. Increased Barrel Life/Replace Chrome: Will conduct test and evaluation of prototype barrels delivered in FY 2017. Will pursue barrel and liner designs that can withstand higher pressures per the Small Arms Ammunition Configuration Study outputs. Will further investigate and mature additive manufacturing and cold spray methodology for barrels. Non-Standard Weapons Assessments: Will continue to conduct baseline testing of commercial weapon systems and perform capability analysis of unique weapon characteristics. Will continue to utilize test information to conduct trade off assessments of Non-Developmental Item solutions for pending requirements as well as establish safety parameters for the training mission of Regionally Aligned Forces and establish a sustainment strategy for long term support of weapons procured to support the Regionally Aligned Forces training mission. Will continue to conduct market research of commercially available weapon systems. Small Business Innovative Research Enhancements: Future efforts will continue to focus on improvements designed to enhance lethality, target acquisition and tracking, fire control, training effectiveness and reliability of weapons. Protective Weapons Coatings: (includes Adaptive Lubricious Coatings): Will continue to develop manufacturing technology to support production of super hydrophobic and other coatings in support of Small Arms Weapons. Will assess and evaluate current manufacturing process studies and assessments to adapt the coating technology into weapon Original Equipment Manufacturer manufacturing processes. Weapon Upgrades and Accessories: Will continue to test, evaluate and analyze ongoing and new activities to enhance small arms weapons.			
Title: Ammunition	0.941	1.271	0.100
Description: Small arms ammunition improvement ***FY 2016 Accomplishments:*** Small Arms Ammunition Configuration Study: Continued execution of tasks to support evaluation of feasible technical approaches that mitigate capability gaps prescribed in the Small Arms Capabilities Based Assessment. ***FY 2017 Plans:***			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603827A / *Soldier Systems - Advanced Development*	**Project (Number/Name)** S54 / *Small Arms Improvement*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Small Arms Ammunition Configuration Study: Complete execution of tasks to support evaluation of feasible technical approaches that mitigate capability gaps prescribed in the Small Arms Capabilities Based Assessment. ***FY 2018 Plans:*** Ammunition Upgrades: Will continue to evaluate the effect of new ammunition on small arms weapons.			
Title: Combat Optics ***Description:*** Improvement of small arms combat optics ***FY 2016 Accomplishments:*** Optics Upgrades: Continued engineering evaluation, verification and validation of weapon optics performance requirements. ***FY 2017 Plans:*** Optics Upgrades: Will evaluate state of the art advances in optical component technologies for inclusion in future products, including Mounted Machinegun Optic Capability Production Document, Fire Control Capability Development Document, and its associated annexes. ***FY 2018 Plans:*** Optics Upgrades: Will continue to evaluate state of the art advances in optical component technologies for inclusion in future products, including Mounted Machinegun Optic Capability Production Document, Fire Control Capability Development Document, and its associated annexes.	0.053	0.400	0.100
Title: Fire Control ***Description:*** Small arms fire control ***FY 2016 Accomplishments:*** Advanced Hyperspectral Target Acquisition: Evaluated and analyzed advance approaches to acquire targets with the use of hyperspectral imaging and demonstrated capability. Small Arms Ballistic Kernel: Validated ballistic models through live fire evaluation and expand models to incorporate future weapon platforms. Fire Control Upgrades: Worked with the Infantry School to define the scope and assist in the development of Capability Development Document for the Army's Fire Control Upgrades for Small Arms Weapons consisting of individual weapons, sniper/ precision, crew served weapons, low and high velocity 40mm. ***FY 2017 Plans:***	3.852	5.364	6.350

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603827A / *Soldier Systems - Advanced Development*	**Project (Number/Name)** S54 / *Small Arms Improvement*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Small Arms Fire Control – Crew Program of Record: Will support Crew Served Fire Control requirements tests and studies, Milestone B documentation generation, and transition to 0604601AFF2: Infantry Support Weapons. Small Arms Fire Control – Squad Program of Record: Will conduct prototyping activities to advance fire control technologies on carbine and rifle weapon platforms. Will address Size, Weight, and Power trade space challenges associated with fire control on the individual squad weapons. Small Arms Fire Control – Crew Enhancements: Will support and oversight for exploring future fire control applications for Crew Served Weapons to include objective requirements of the Capability Development Document, Small Business Innovative Research, and digital enhancements. Small Arms Fire Control – Precision Enhancements: Will support the following precision fire control enhancements: target detection to improve battlefield reconnaissance and intelligence gathering capabilities, improve target acquisitions at extended ranges in all battlefield conditions, target tracking, down range wind sensing technology, bullet tracking, weapon bore sensor, automated muzzle velocity tracker to improve fire control accuracy, far-target location, battlefield networking, and augmented reality. To provide support to Small Business Innovative Research efforts that will explore the feasibility, scientific merit, research and development, and commercialization of future Precision fire control system. Small Arms Ballistic Kernel: Will integrate ballistic software into test hardware and platforms for validation of functionality. Will incorporate models for indirect 40mm weapon systems. Fire Control Upgrades: Will initiate testing of advanced fire control systems for small arms platforms to define the acquisition strategy in support of the Capability Development Document consisting of individual weapons, sniper/precision, crew served weapons, and low and high velocity 40mm. ***FY 2018 Plans:*** FY 2018 New Start: Next Generation Spotting Scope: Will consolidate readily available and mature fire-control/target acquisition component technologies into a variable magnification spotting scope. FY 2018 New Start: Next Generation Binocular: Will assess and evaluate incorporating existing target acquisition/fire control component technologies into binoculars. FY 2018 New Start: Sniper Missed Distance Corrective Offset: Will assess and evaluate from a sniper team (shooter's) location, tracks sniper's bullet trace to target to derive a missed distance correct offset for a follow-on shot.			

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
Small Arms Fire Control – Crew Program of Record: Will continue to support Crew Served Fire Control requirements tests and studies, Milestone B documentation generation, and transition to 0604601AFF2: Infantry Support Weapons. Small Arms Fire Control – Squad Program of Record: Will continue to conduct prototyping activities to advance fire control technologies on carbine and rifle weapon platforms. Will address Size, Weight, and Power trade space challenges associated with fire control on the individual squad weapons. Small Arms Fire Control – Crew Enhancements: Will continue support and oversight for exploring future fire control applications for Crew Served Weapons to include objective requirements of the Capability Development Document, Small Business Innovative Research, and digital enhancements. Small Arms Fire Control – Precision Enhancements: Will continue to support the following precision fire control enhancements: target detection to improve battlefield reconnaissance and intelligence gathering capabilities, improve target acquisitions at extended ranges in all battlefield conditions, target tracking, down range wind sensing technology, bullet tracking, weapon bore sensor, automated muzzle velocity tracker to improve fire control accuracy, far-target location, battlefield networking, and augmented reality. To provide support to Small Business Innovative Research efforts that will explore the feasibility, scientific merit, research and development, and commercialization of future Precision fire control system. Small Arms Ballistic Kernel: Will continue to integrate ballistic software into test hardware and platforms for validation of functionality. Will incorporate models for indirect 40mm weapon systems. Fire Control Upgrades: Will continue to initiate testing of advanced fire control systems for small arms platforms to define the acquisition strategy in support of the Capability Development Document consisting of individual weapons, sniper/precision, crew served weapons, low and high velocity 40mm.			
Title: Research and Analysis	0.100	0.100	0.101
Description: Research and analysis of small arms ***FY 2016 Accomplishments:*** Initiated Market Research and Benefit Analysis of armaments for robots and other small arms research. ***FY 2017 Plans:***			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603827A / *Soldier Systems - Advanced Development*	**Project (Number/Name)** S54 / *Small Arms Improvement*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Will initiate Market Research and Benefit Analysis of 360 degree situational awareness, active stabilization, advanced kinetic weapons, low flying drone engagement, and other small arms research. ***FY 2018 Plans:*** Will continue to initiate Market Research and Benefit Analysis of 360 degree situational awareness, active stabilization, advanced kinetic weapons, low flying drone engagement, and other small arms research.			
Accomplishments/Planned Programs Subtotals	7.153	10.554	6.851

C. Other Program Funding Summary ($ in Millions)

Line Item	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
• 0604601AS63: *Infantry Support Weapons*	22.377	11.801	6.961	-	6.961	6.616	7.013	21.711	17.600	Continuing	Continuing
• 0604601AEW4: *Infantry Support Weapons*	-	14.447	9.251	-	9.251	9.952	10.229	23.388	19.045	Continuing	Continuing
• 0603607A: *Joint Service Small Arms Program*	4.903	5.839	5.796	-	5.796	5.885	6.004	6.124	6.249	Continuing	Continuing
• 0604601AFF2: *Infantry Support Weapons*	-	-	20.117	-	20.117	20.418	9.067	8.259	11.388	Continuing	Continuing

Remarks

In support of Small Arms Initial Capability and Capability Development Requirements, advanced technology of Small Arms Weapons is transitioned from Joint Service Small Arms Program (JSSAP), Project 627, Program Element 0603607A, (Budget Activity 3) to Small Arms Improvement, Project S54, Program Element 0603827A, (Budget Activity 4). After the technology is demonstrated and/or validated, the program transitions to Infantry Support Weapons, Program Element 0604601A, (Budget Activity 5) for engineering and manufacturing development.

D. Acquisition Strategy

Primary strategy is to study, develop, demonstrate and evaluate emerging technologies that ultimately lead to enhancing/improving the small arms inventory.

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603827A / *Soldier Systems - Advanced Development*	Project (Number/Name) VS4 / *Soldier Protective Equipment*	

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
VS4: *Soldier Protective Equipment*	-	5.194	16.294	10.281	-	10.281	8.224	2.869	4.496	4.967	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This funding supports efforts to evaluate integrated technologies and representative or prototype systems that help expedite Individual Soldier Ballistic Protection technology transition from the laboratory to operational use.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: Soldier Protective Equipment (SPS)	5.194	16.294	10.281

Description: Funding line established in FY12. Effort was previously executed in Program Element 0603827 S53. Effort is to increase the Warfighter lethality and mobility by optimizing Soldier protection while effectively managing all life cycle aspects of Personal Protective Equipment (PPE).

FY 2016 Accomplishments:
Continued efforts to synchronize the integration of new and emerging technologies at the component and subsystem level focusing on reducing weight and bulk at the subsystem and component level. Continued to evaluate component and subsystem technologies and enabling technologies across the Personal Protection Equipment (PPE) portfolio (extremities, torso and vital torso, head, eye and face protection) to counter known and emerging ballistic/blast threats. Continued efforts to characterize and increase durability and functional service life of existing personal protective systems.

FY 2017 Plans:
Continue efforts to synchronize the integration of new and emerging technologies at the component and subsystem level focusing on reducing weight and bulk at the subsystem and component level. Continue evaluation of component and subsystem technologies and enabling technologies across the Personal Protection Equipment (PPE) portfolio (extremities, torso and vital torso, head, eye and face protection) to counter known and emerging ballistic/blast threats. Continue efforts to characterize and increase durability and functional service life of existing personal protective systems.

FY 2018 Plans:
Initiate Technology/Maturation and Risk Reduction efforts across the PPE portfolio (extremities, torso and vital torso, head, eye and face protection) to support SPS requirements for lighter weight ballistic materials with improved performance and manufacturing/testing process improvements. If ready, initiate proof-of-principle demonstrations on promising new materials, technologies and or appliqué in simulated and instrumented field exercises (LEAP-A, etc.) to evaluate SPS upgrades and inform stakeholders of new operational capabilities to enhance SPS. Continue efforts to characterize and increase durability

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603827A / *Soldier Systems - Advanced Development*	**Project (Number/Name)** VS4 / *Soldier Protective Equipment*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
and functional service life of existing personal protective systems at the subsystem/component level. Continue to develop the methodology for PPE shelf and service life, and to advance the novel modeling method for PPE performance. Continue the development of improved projectile yaw and velocity measurement for existing systems and emerging requirements including evaluation of subsystem technologies to counter EOD threats.			
Accomplishments/Planned Programs Subtotals	5.194	16.294	10.281

C. Other Program Funding Summary ($ in Millions)

Line Item	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
• Soldier Protective Equipment VS5: *RDTE, 0604601A.VS5, Soldier Protective Equipment*	14.659	2.141	1.758	-	1.758	6.122	6.856	8.582	9.943	0.000	50.061
• Central Funding & Fielding: *OMA, 121017, Central Funding & Fielding*	30.000	93.330	74.486	-	74.486	78.550	78.794	78.540	78.578	0.000	512.278

Remarks

D. Acquisition Strategy

Programs pursue technology maturation and prototype development, culminating in the transition of mature technologies (TRL 6-7) to Engineering and Manufacturing Development. This project continues to exercise competitively awarded contracts using best value source selection procedures.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army			Date: May 2017
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Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	Allot	PM SPIE Various : Various	0.050	0.300		0.450		1.009		-		1.009	0.000	1.809	0.000
		Subtotal	0.050	0.300		0.450		1.009		-		1.009	0.000	1.809	0.000

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Dev/Sys Engineering Spt	MIPR	Various : Various	3.952	1.400		2.707		0.727		-		0.727	Continuing	Continuing	0.000
Dev/Integ Contracts	TBD	Various : Various	12.172	1.794		7.550		5.861		-		5.861	Continuing	Continuing	Continuing
		Subtotal	16.124	3.194		10.257		6.588		-		6.588	-	-	-

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Misc Support Costs	MIPR	Various : Various	1.200	0.700		2.025		0.200		-		0.200	Continuing	Continuing	Continuing
		Subtotal	1.200	0.700		2.025		0.200		-		0.200	-	-	-

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Ballistic/Blast/Nonballistic Testing	MIPR	Various : Various	2.228	1.000		3.562		2.484		-		2.484	Continuing	Continuing	Continuing
		Subtotal	2.228	1.000		3.562		2.484		-		2.484	-	-	-

	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	19.602	5.194		16.294		10.281		-		10.281	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603827A / *Soldier Systems - Advanced Development*	Project (Number/Name) VS4 / *Soldier Protective Equipment*	

	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603827A / *Soldier Systems - Advanced Development*	**Project (Number/Name)** VS4 / *Soldier Protective Equipment*

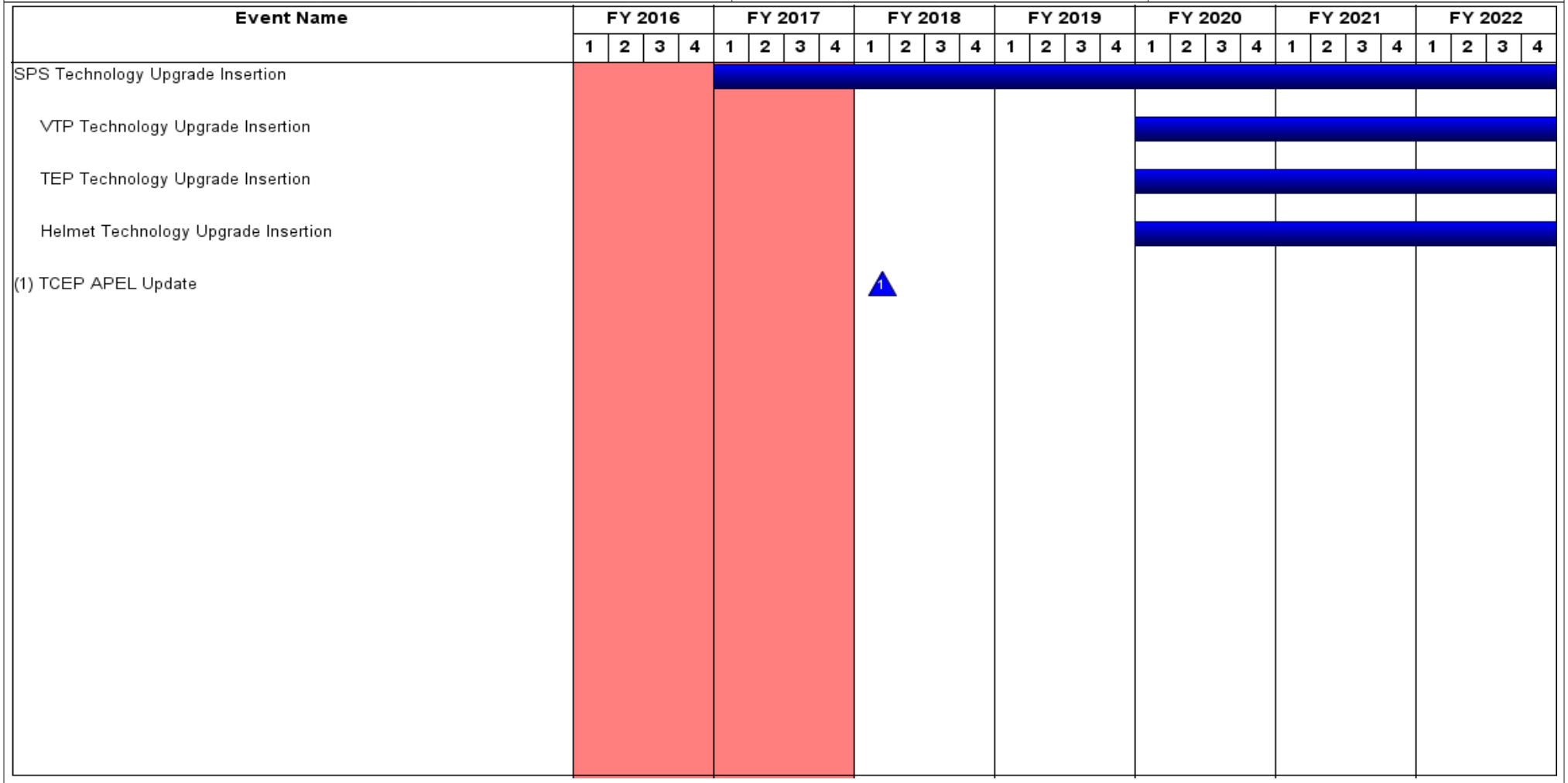

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603827A / *Soldier Systems - Advanced Development*	**Project (Number/Name)** VS4 / *Soldier Protective Equipment*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
SPS Technology Upgrade Insertion	1	2017	4	2023
VTP Technology Upgrade Insertion	1	2020	4	2023
TEP Technology Upgrade Insertion	1	2020	4	2023
Helmet Technology Upgrade Insertion	1	2020	4	2023
TCEP APEL Update	1	2018	1	2018