Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Army												Date: March 2019
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 0605053A / *Ground Robotics*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	-	60.530	71.435	41.308	-	41.308	25.872	18.081	11.647	12.320	0.000	241.193
FB2: *Man Transportable Robotic System (MTRS) Inc II*	-	8.871	4.299	4.646	-	4.646	0.000	0.000	0.000	0.000	0.000	17.816
FB3: *Robotics Architecture*	-	1.930	1.851	2.876	-	2.876	3.902	4.952	4.989	6.196	0.000	26.696
FB4: *Common Robotic Systems*	-	22.569	29.301	7.796	-	7.796	2.354	0.000	0.000	0.000	0.000	62.020
FB6: *Squad Multipurpose Equipment Transport (SMET)*	-	16.130	11.125	17.804	-	17.804	18.407	11.896	5.400	4.841	0.000	85.603
FB7: *Robotics Enhanced Program (REP)*	-	7.683	9.387	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	17.070
FB8: *Soldier Borne Sensor (SBS)*	-	2.197	3.465	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	5.662
FB9: *MTRS Standardization*	-	1.150	9.043	7.000	-	7.000	0.000	0.000	0.000	0.000	0.000	17.193
FG8: *Common Robotic Controller*	-	0.000	2.964	1.186	-	1.186	1.209	1.233	1.258	1.283	0.000	9.133

A. Mission Description and Budget Item Justification

This Program Element supports modernization of the current Ground Robotic fleets by investigating technology insertions including, but not limited to: condition based maintenance, vetronics, Robotic Architecture, autonomous operations and other emerging technologies. Funding also supports developing initial prototypes to enable refinement of Operational Requirements and early user feedback to support future sustainment and operational movement operating concepts.

FB2: The Man Transportable Robotic System (MTRS) Inc. II is the Army's Soldier transportable, remotely operated, medium size (<= 164 lbs.) common robotic system. The system utilizes both radio and tethered communications allowing dismounted Soldiers to perform hazardous missions from a safe standoff distance. The MTRS Inc. II system consists of an operator control unit (OCU), a suite of various mission payloads, and a mobility platform. Open architecture and the Ground Robotic Autonomous Systems (RAS) Interoperability Profile (IOP) requirements are employed to reduce obsolescence risks and to maximize efficiency in acquiring future capabilities. MTRS Inc. II will support current and future payload missions for the Engineer's route clearance platoons, Special Operational Forces (SOF) detachments, Chemical Biological Radiological and Nuclear (CBRN), and Explosive Ordnance Disposal (EOD) Units.

FY 2020 RDTE funds in the amount of $4.646 million will enable the MTRS Inc. II program to progress through Low Rate Initial Production (LRIP) and into Full Rate Production (FRP). Major FY 2020 activities planned include: Delta Production Qualification Testing asset modifications, test support, Engineering Change Proposals (ECPs) (i.e. Payload development, Universal Robotic Controller (URC), etc.), logistic product development, logistic product demonstration and verification, provisioning, development of final Multimedia (TM), and Virtual Clearance Training Suite (VCTS) integration.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Army	Date: March 2019
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605053A *I Ground Robotics*

FB3: Robotic Architecture (RA) provides the engineering and development resources to manage the overarching architecture for robotic systems that are both modular and interoperable across the Joint Force in order to facilitate future modernization efforts. It will manage the interoperability standards, modular payload interfaces, common software and common architecture for robotics & autonomous platforms, payloads & universal controllers. It will establish a Common Specifications Reference (CSR) to provide a repository codifying the Army Robotic Autonomous Systems (RAS) standards for open architecture, interoperability interfaces, and common control. RA includes the construction of program specific Interoperability Profiles (IOP) (i.e. Squad Multipurpose Equipment Transport (SMET), Tactical Wheeled Vehicle-Leader Follower (TWV-LF), Route Clearance Interrogation System Type I (RCIS Type I), Common Robotics System (Vehicle) (CRS(V)), Common Robotics System (Individual) (CRS(I)) Inc. II, Common Robotics System (Heavy) (CRS(H)), Enhanced Robotic Payload (ERP), Light Reconnaissance Robot (LRR), Optionally Manned Fighting Vehicle (OMFV), Robotic Combat (RCV), etc.), new standards addressing emerging requirements and Modular Mission Payloads (MMP) (i.e. Cyber Security, new autonomous behaviors & artificial intelligence, new payloads, lethality, etc.).

FY 2020 RDTE funds in the amount of $2.876 million supports the initial scoping & development of the Robotics and Autonomous Systems, Ground (RAS-G) Interoperability Profile (IOP) Version 5.0. IOP V5.0 will provide the required modular open interfaces and compliance test tools for new programs including SMET Modular Mission Payloads (MMPs), LRR, TWV-LF, OMFV, RCV and ERP. Additionally, FY 2020 RDTE funds will support the development & hardening of Robotic Operating System, Military (ROS-M) software modules and ROS-M instantiation documents, and management of ROS-M registry & repository infrastructure.

FB4: The Common Robotic System - Individual (CRS(I)) is the Army's small sized (<25 lbs.) Soldier back-packable, remotely operated, common robotic system. The system provides dismounted Soldiers with increased standoff capability from hazardous threats. The system consists of a Universal Robotic Controller (URC), a suite of various payloads, and an open architecture common mobility platform allowing for future capability growth. The CRS(I) will allow the operator to quickly re-configure for other various missions by adding or removing modules and/or payloads. The CRS(I) will provide interrogation, detection, confirmation, and neutralization capabilities employed to support a wide spectrum of mobility missions for current and future forces. This capability provides commanders the ability to persistently monitor the Operating Environment (OE) while protecting and sustaining the force. The CRS(I) complements the Joint Integrated Warfighting Force by providing standoff to the Warfighter during major combat, stability, and homeland security operations.

FY 2020 RDTE funding in the amount of $7.796 million will complete execution of Production Qualification Test (PQT) activities in accordance with approved Test and Evaluation Master Plan (TEMP). This funding will also fund design updates from test, software updates, Engineering Change Proposals (ECPs), payload development, the development and verification of Operator Technical Manuals (TM), LOG Demo, development of training packages, execution of a Limited User Test (LUT) to support Conditional Materiel Release in 2QFY20, potential delta follow-on testing on unmet CDD thresholds, begin development of Maintainer Technical Manuals and other LOG products needed for Full Materiel Release (FMR) in 4QFY21. This funding also supports programmatic risk mitigation activities including, but not limited to: Cyber Security Controls (i.e. Risk Management Framework), commonality directives, payloads, sensors, condition based maintenance, electronics, standard interfaces and architectures, autonomous operations, and other emerging technologies, interoperability (IOP), and analysis of collaborative operations with various Unmanned Systems assigned at Battalion and below in addition to any program management support costs associated with these activities.

FB6: Squad Multipurpose Equipment Transport (SMET) will help to reduce Soldier loads by transporting mission specific equipment, resupply equipment, and supplies required for extended operations. The SMET will be capable of carrying the equipment currently required to support Infantry and Engineer Platoons in the Infantry

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Army	Date: March 2019
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605053A *I Ground Robotics*

Brigade Combat Team (IBCT) for a 72 hour mission without resupply. The SMET will reduce Soldier load, increase squad mobility during combat operations and dismounted maneuvers. SMET will have open architectures, a remote control, support casualty evacuation, power generation/offload and Modular Mission Payloads (MMP).

FY 2020 RDTE funding in the amount of $17.804 million supports the development integration of Technical Insertions and Modular Mission Payloads (MMP) to increase mission capabilities for Army wide stakeholders to include MEDCOM, MCOE, MSCOE, and CBRNE to meet requirements in the CDD. FY 2020 RDTE funding supports Developmental testing at Aberdeen and other remaining testing required for the Program of Record to include cyber testing and air drop certification. Program support to include salaries, travel and miscellaneous expense for the SMET program will also be funded.

FB7: The Robotics Enhanced Program (REP) uses a "buy/lease, try and inform" methodology to evaluate Commercial Off the Shelf (COTS), Government Off the Shelf (GOTS) and Non-Developmental Item (NDI) robotics products that have the potential to enhance Soldier combat effectiveness. Actual operational user feedback and evaluation results obtained will inform emerging capabilities and requirements documents in support of a return on investment to support future Army decision making.

The REP program does not have any FY 2020 RDTE funding.

FB8: The Soldier Borne Sensor (SBS) is a small unmanned aerial vehicle. The SBS provides a near term solution to three Army War-fighting Challenges at the Infantry Squad level: develop situational understanding, conduct air-ground reconnaissance, and conduct joint combined arms maneuver. The system is simple to deploy and use to support the squad leader's decision-making process. The system allows Soldiers to obtain local situational awareness and understanding of their immediate surroundings while remaining in covered or concealed positions. Funding in this project aligns with Army's priorities in support of the National Defense Strategy.

In FY20, this project and funding will transition to PE: 06044827A / Soldier Systems - Warrior Dem/Val project 0604827A.FK4.

FB9: The MTRS Standardization project provides the platforms to support integration and testing of payloads and technology for non-standard unmanned ground robotics systems used by Army Engineers, Explosive Ordnance Disposal (EOD), Chemical, Biological, Radiological, and Nuclear (CBRN) and Special Operational Forces (SOF) units. Current system characteristics include the following: a remote controlled articulated arm with a gripper, operating range up to 800 meters, multiple illuminated cameras, a pan/tilt surveillance camera, two-way radio, and a ruggedized operator control unit. The platforms provided will support development and testing of the following capabilities: High Dexterous Manipulation System (HDMS), Multi-Spectral Image Fusion System (MIFS), and Precision Aimed Multi-shot Disruptor (PAMD). The use of robotics allows the first approach, to potentially explosive hazards, to be made by a robot rather than a Soldier.

The Common Robotic System, Heavy (CRS(H)) is a modular large-sized system that provides enhanced protection to the EOD Soldier in order to support the Joint Force Commander with the ability to identify, render safe and dispose of explosive ordnance (EO) and improvised explosive devices (IEDs) in support of the Range of Military Operations (ROMO) and Home Land Defense (HLD) operations. CRS(H) will also enable EOD Soldiers to execute Defense Support of the Civil Authorities (DSCA) operations in response to requests from federal, state, local, and tribal authorities for domestic incidents, emergencies, disasters, designated law enforcement support and other activities. CRS(H) will support current and future missions for Explosive Ordnance Disposal (EOD) units.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Army	Date: March 2019
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605053A *I Ground Robotics*

FY 2020 RDTE funds in the amount of $7.000 million will enable the CRS(H) program to complete the following: System Engineering, Program Management, design and test support, refurbishment of test assets from Fly-off #2, development, integration and testing of system-enhancing payloads (eg: dual arm manipulation, autonomy, mapping, etc.), contract data procurement, travel, and other expenses related to the CRS(H) RDTE program.

FG8: The Universal Robotic Controller (URC) provides the capability to individually and/or concurrently control multiple Unmanned Systems (UxS) platforms and control/ monitor a mesh network without having to obtain and/or carry separate Operator Control Unit (OCUs) for each system. A controlled UxS may be mobile or stationary, can be smart learning, and self-adaptive. Two URCs will be used to hand-off control of a system to a receiver, reducing hand-off time and the need for the UxSs to have multiple OCUs. The URC will also be capable of "hot swapping" batteries where one of its two batteries can be replaced without the system being shut down, halting mission progress, and use current or new Soldier power sources that will maximize its operational time and minimize the number of replacement batteries needed for most missions. The intent of this requirement is allow the Soldier at battalion and below to use the URC to operate unmanned aerial systems (e.g. Raven, PUMA, Short Range Micro (SRM), etc.) and unmanned ground vehicles (e.g. CRS(I), CRS(V),CRS(H), SMET, MTRS INC II, Light Reconnaissance (LR), Wingman, etc.) and emerging unmanned air/ground systems. The URC is defined in the Common Robotic System (Individual) (CRS(I)) Capability Development Document (CDD) and is included in the CRS(I) acquisition. A standalone requirements document is being developed at a date TBD.

FY 2020 RDTE funding in the amount of $1.186 million will be utilized to complete test evaluation and Log product development under the CRS(I) contract, mature the Universal Robotic Controller to meet the requirements in the CDD and emerging programs of record, controller software updates, and integration and test the URC into other Unmanned Ground Vehicles (UGV) or Unmanned Aerial Vehicles (UAS) programs of record via an Engineering Change Proposal (ECP). This funding also supports programmatic risk mitigation activities including, but not limited to: Cyber Security Controls (i.e. Risk Management Framework), commonality directives, payloads, sensors, condition based maintenance, electronics, standard interfaces and architectures, autonomous operations and other emerging technologies, interoperability (IOP), and analysis of collaborative operations with various Unmanned Systems assigned at Battalion and below in addition to any program management support costs associated with these activities.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	70.760	86.167	92.181	-	92.181
Current President's Budget	60.530	71.435	41.308	-	41.308
Total Adjustments	-10.230	-14.732	-50.873	-	-50.873
• Congressional General Reductions	-0.050	-0.088			
• Congressional Directed Reductions	-7.750	-14.644			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-2.430	-			
• Adjustments to Budget Years	-	-	-50.873	-	-50.873

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Army	Date: March 2019
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*

Change Summary Explanation

The decrease in funding from FY 2019 to FY 2020 is due to two projects (Robotics Enhanced Program (FB7) and Soldier Borne Sensor (FB8)) being zeroed out starting in FY 2020.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605053A / *Ground Robotics*	Project (Number/Name) FB2 / *Man Transportable Robotic System (MTRS) Inc II*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
FB2: *Man Transportable Robotic System (MTRS) Inc II*	-	8.871	4.299	4.646	-	4.646	0.000	0.000	0.000	0.000	0.000	17.816
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Man Transportable Robotic System (MTRS) Inc. II is the Army's Soldier transportable, remotely operated, medium size (<= 164 lbs.) common robotic system. The system utilizes both radio and tethered communications allowing dismounted Soldiers to perform hazardous missions from a safe standoff distance. The MTRS Inc. II system consists of an operator control unit (OCU), a suite of various mission payloads, and a mobility platform. Open architecture and the Ground Robotic Autonomous Systems (RAS) Interoperability Profile (IOP) requirements are employed to reduce obsolescence risks and to maximize efficiency in acquiring future capabilities. MTRS Inc. II will support current and future payload missions for the Engineer's route clearance platoons, Special Operational Forces (SOF) detachments, Chemical Biological Radiological and Nuclear (CBRN), and Explosive Ordnance Disposal (EOD) Units.

FY 2020 RDTE funds will enable the MTRS Inc. II program to progress through Low Rate Initial Production (LRIP) and into Full Rate Production (FRP). Major FY 2020 activities planned include: Delta Production Qualification Testing asset modifications, test support, Engineering Change Proposals (ECPs) (i.e. Payload development, Universal Robotic Controller, etc.), logistic product development, logistic product demonstration and verification, provisioning, development of final Multimedia (TM), and Virtual Clearance Training Suite (VCTS) integration.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Title: MTRS Inc II RDTE	0.384	0.655	-
Description: MTRS Inc II RDTE funding to support engineering and logistics data, and various test efforts to include test articles, test execution, and test support staff salaries, and System Engineering Program Management (SEPM) costs.			
FY 2019 Plans: Funding will be used to acquire the remaining Production Qualification Test hardware and test support, fund design efforts and contract data, program management costs to include salaries, travel and miscellaneous expenses associated with the MTRS Inc II RDTE efforts. Funding will also be used for Initial development of the MTRS Inc II integration into the Virtual Clearance Training Suite (VCTS).			
FY 2019 to FY 2020 Increase/Decrease Statement: The efforts listed below are in support of continued developmental efforts for the MTRS Inc. II program.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FB2 / *Man Transportable Robotic System (MTRS) Inc II*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
FY 2019 to FY2020 funding levels remain consistent for the MTRS Inc II program. Efforts once grouped together in FY 2019 Accomplishments/Planned Programs are broken out in FY 2020 for increased transparency.			
Title: MTRS Inc II RDTE - Engineering Change Proposals ***Description:*** MTRS Inc. II RDTE funding to support Government initiated Engineering Change Proposals (ECP) to the MTRS Inc. II system. ***FY 2020 Plans:*** Funding to support engineering, testing, logistics, etc. activities to support MTRS Inc. II ECP efforts. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Delta due to breaking out funding into more detail for FY 2020 Plans.	-	-	0.400
Title: MTRS Inc II RDTE - IPT Matrix Support Salary ***Description:*** MTRS Inc. II RDTE funding to support engineering and various test efforts to include redesign of test articles, delta PQT test execution, software, engineering test support staff salaries, and System Engineering Program Management (SEPM) costs. ***FY 2019 Plans:*** Funding is for program management support for salaries, travel, and miscellaneous expenses related to the MTRS Inc. II program ***FY 2020 Plans:*** Funding to support engineering activities, test article redesign, testing and salaries for IPT and program management costs to include travel and miscellaneous expenses associated with the MTRS Inc. II RDTE efforts. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Delta due to breaking out funding into more detail for FY 2020 Plans.	1.337	0.660	0.746
Title: MTRS Inc II RDTE ? TARDEC Multi-Robot Operator Controll Unit (MOCU) Software Support ***Description:*** MTRS Inc. II RDTE funding to support the following TARDEC services to include software subject matter expert support, testing support, issue remediation, and transitioning MOCU software lead to TARDEC SEC as the software sustainment agency. ***FY 2019 Plans:*** Funding is for TARDEC MOCU software support ***FY 2020 Plans:***	0.736	1.073	0.900

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FB2 / *Man Transportable Robotic System (MTRS) Inc II*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Funding to support TARDEC SW and engineering activities to include travel and miscellaneous expenses associated with the MTRS Inc. II RDTE efforts. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Delta due to breaking out funding into more detail for FY 2020 Plans.			
Title: MTRS Inc II RDTE ? SPAWAR Multi-Robot Operator Control Unit (MOCU) 3 SW Support ***Description:*** MTRS Inc. II RDTE funding to provide subject matter expert support, software updates, incremental software drops for integration and testing, software test simulator, software drop test reports, debugging and issue remediation, and the transition of MOCU software to TARDEC for long term sustainment. ***FY 2019 Plans:*** Funding is for SPAWAR MOCU 3 software support. ***FY 2020 Plans:*** Funding to support SPAWAR MOCU 3.0 SW and engineering activities to include travel and miscellaneous expenses associated with the MTRS Inc. II RDTE efforts. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Delta due to breaking out funding into more detail for FY 2020 Plans.	0.772	1.200	0.700
Title: MTRS Inc II RDTE - Virtual Clearance Training Suite (VCTS) ***Description:*** MTRS Inc. II RDTE funding to support the development activities to incorporate MTRS Inc. II into the Virtual Clearance Training Suite. ***FY 2020 Plans:*** Funding to support simulator suite development and program management costs to include travel and miscellaneous expenses associated with the MTRS Inc. II RDTE efforts. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Delta due to breaking out funding into more detail for FY 2020 Plans.	-	-	1.000
Title: MTRS Inc II RDTE - Endeavor Logistic Product development, demonstration and verification ***Description:*** MTRS Inc. II RDTE funding to support the development of a MTRS Inc. II logistic products, demonstration and verification. ***FY 2020 Plans:***	4.833	-	0.500

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FB2 / *Man Transportable Robotic System (MTRS) Inc II*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Funding to support logistic activities and program management costs to include travel and miscellaneous expenses associated with the MTRS Inc. II RDTE efforts. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Delta due to breaking out funding into more detail for FY 2020 Plans.			
Title: MTRS Inc II RDTE - Testing ***Description:*** MTRS Inc. II delta Production Qualification Testing (PQT). ***FY 2019 Plans:*** Funding if for various entities for MTRS Inc. II test efforts ***FY 2020 Plans:*** MTRS Inc. II delta Production Qualification Testing (PQT) to include reliability and performance testing. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Delta due to breaking out funding into more detail for FY 2020 Plans.	0.809	0.554	0.400
Title: FY 2019 SBIR / STTR Transfer ***Description:*** FY 2019 SBIR / STTR Transfer ***FY 2019 Plans:*** SBIR/STTR ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Adjusted for FY 2019 SBIR / STTR Transfer	-	0.157	-
Accomplishments/Planned Programs Subtotals	8.871	4.299	4.646

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• R67050: *Man Transportable Robotic Sys Inc II (MTRS Inc II)*	-	6.615	36.254	-	36.254	64.043	57.979	2.213	-	0.000	167.104

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FB2 / *Man Transportable Robotic System (MTRS) Inc II*

D. Acquisition Strategy

The MTRS Inc II acquisition strategy will execute an abbreviated Engineering Manufacturing Development (EMD) phase followed by a Production Deployment phase to integrate available payloads into the MTRS Inc II materiel solution. This EMD/Production Deployment award was based on a selection from a full and open competition. The contract is Firm Fixed Price and includes a Critical Design Review (CDR) in FY18, design integration, Production Qualification Test (FY19), Low Rate Initial Production (LRIP) (FY19) and Full Rate Production (FRP) (FY20). The program will obtain First Unit Equipped (FUE) under a Conditional Materiel Release (CMR) in FY19 while working toward obtaining Full Materiel Release (FMR) in FY21.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605053A / *Ground Robotics*	Project (Number/Name) FB2 / *Man Transportable Robotic System (MTRS) Inc II*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Costs	MIPR	VARIOUS : MULTIPLE	-	1.721	Oct 2017	1.210	Nov 2018	0.746	Nov 2019	-		0.746	0.000	3.677	-
		Subtotal	-	1.721		1.210		0.746		-		0.746	0.000	3.677	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test Hardware	SS/FFP	Endeavor : Chelmsford, MA	-	1.977	Dec 2017	0.105	Apr 2019	-		-		-	0.000	2.082	-
Virtual Clearance Training Suite (VCTS)	Various	Various : Multiple	-	-		-		1.000	Oct 2019	-		1.000	0.000	1.000	-
FY 2019 SBIR / STTR Transfer	TBD	TBD : TBD	-	-		0.157	Oct 2018	-		-		-	0.000	0.157	-
		Subtotal	-	1.977		0.262		1.000		-		1.000	0.000	3.239	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MTRS Inc II MOCU development	Various	Various : Multiple	-	1.508	Jun 2018	2.273	Jan 2019	1.600	Oct 2019	-		1.600	0.000	5.381	-
MTRS Inc II contract data	SS/FFP	Endeavor : Chelmsford, MA	-	2.786	Dec 2017	-		0.500	Oct 2019	-		0.500	0.000	3.286	-
MTRS In II Engineering Change Proposals	TBD	TBD : TBD	-	-		-		0.400	Oct 2019	-		0.400	0.000	0.400	-
		Subtotal	-	4.294		2.273		2.500		-		2.500	0.000	9.067	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605053A / *Ground Robotics*	Project (Number/Name) FB2 / *Man Transportable Robotic System (MTRS) Inc II*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test site and test site support for FAT	MIPR	VARIOUS : MULTIPLE	-	0.879	Jan 2019	0.554	Dec 2018	0.400	Oct 2019	-		0.400	0.000	1.833	-
		Subtotal	-	0.879		0.554		0.400		-		0.400	0.000	1.833	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	8.871		4.299		4.646		-		4.646	0.000	17.816	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FB2 / *Man Transportable Robotic System (MTRS) Inc II*

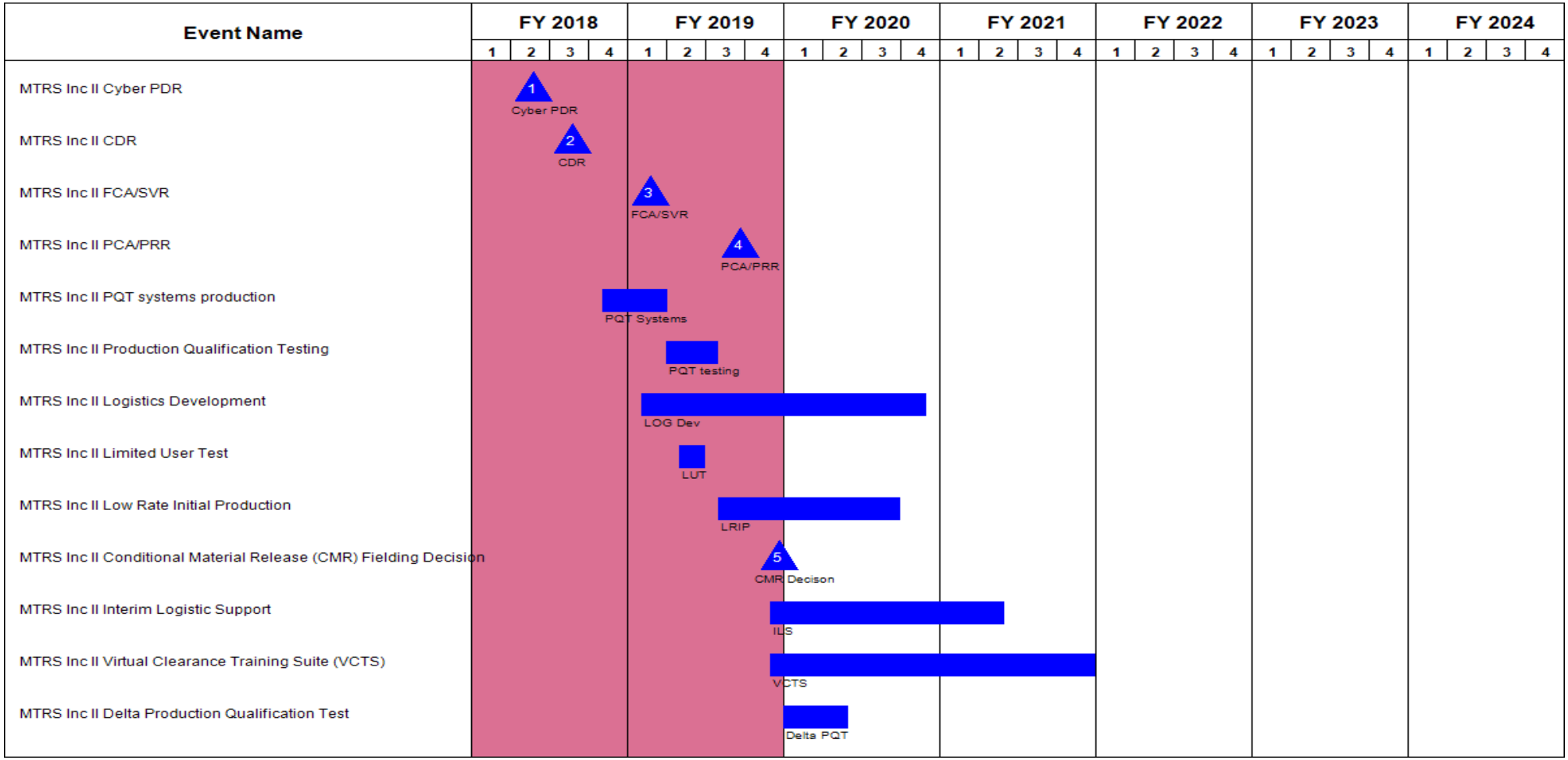

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FB2 / *Man Transportable Robotic System (MTRS) Inc II*

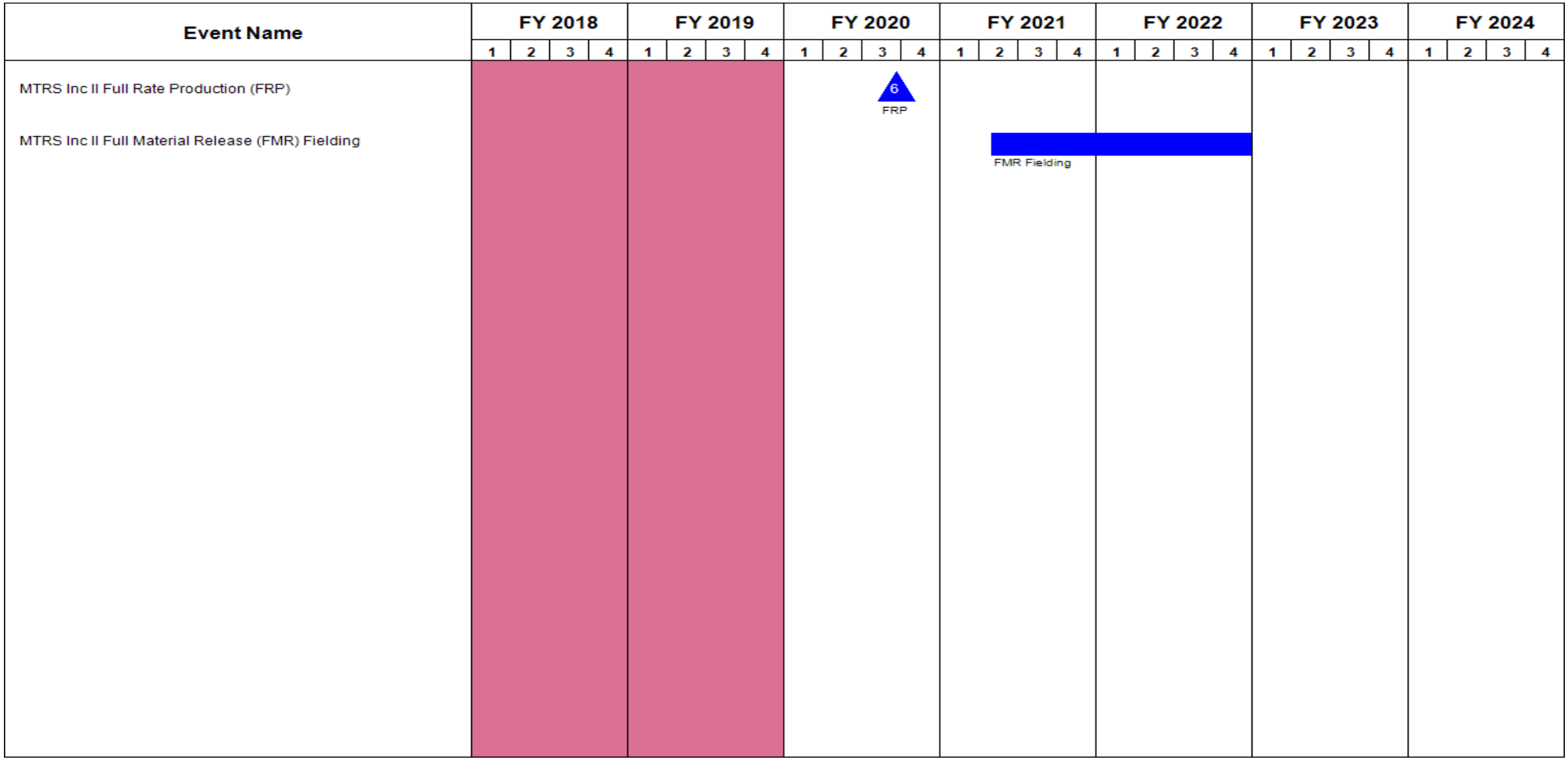

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FB2 / *Man Transportable Robotic System (MTRS) Inc II*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MTRS Inc II Cyber PDR	2	2018	2	2018
MTRS Inc II CDR	3	2018	3	2018
MTRS Inc II FCA/SVR	1	2019	1	2019
MTRS Inc II PCA/PRR	3	2019	3	2019
MTRS Inc II PQT systems production	4	2018	1	2019
MTRS Inc II Production Qualification Testing	2	2019	3	2019
MTRS Inc II Logistics Development	1	2019	4	2020
MTRS Inc II Limited User Test	2	2019	2	2019
MTRS Inc II Low Rate Initial Production	3	2019	3	2020
MTRS Inc II Conditional Material Release (CMR) Fielding Decision	4	2019	4	2019
MTRS Inc II Interim Logistic Support	4	2019	2	2021
MTRS Inc II Virtual Clearance Training Suite (VCTS)	4	2019	4	2021
MTRS Inc II Delta Production Qualification Test	1	2020	2	2020
MTRS Inc II Full Rate Production (FRP)	3	2020	3	2020
MTRS Inc II Full Material Release (FMR) Fielding	2	2021	4	2022

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605053A / *Ground Robotics*	Project (Number/Name) FB3 / *Robotics Architecture*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
FB3: *Robotics Architecture*	-	1.930	1.851	2.876	-	2.876	3.902	4.952	4.989	6.196	0.000	26.696
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Robotic Architecture (RA) provides the engineering and development resources to manage the overarching architecture for robotic systems that are both modular and interoperable across the Joint Force in order to facilitate future modernization efforts. It will manage the interoperability standards, modular payload interfaces, common software and common architecture for robotics & autonomous platforms, payloads & universal controllers. It will establish a Common Specifications Reference (CSR) to provide a repository codifying the Army Robotic Autonomous Systems (RAS) standards for open architecture, interoperability interfaces, and common control. RA includes the construction of program specific Interoperability Profiles (IOP) (i.e. Squad Multipurpose Equipment Transport (SMET), Tactical Wheeled Vehicle-Leader Follower (TWV-LF), Route Clearance Interrogation System Type I (RCIS Type I), Common Robotics System (Vehicle) (CRS(V)), Common Robotics System (Individual) (CRS(I)) Inc. II, Common Robotics System (Heavy) (CRS(H)), Enhanced Robotic Payload (ERP), Light Reconnaissance Robot (LRR), Optionally Manned Fighting Vehicle (OMFV), Robotic Combat (RCV), etc.), new standards addressing emerging requirements and Modular Mission Payloads (MMP) (i.e. Cyber Security, new autonomous behaviors & artificial intelligence, new payloads, lethality, etc.).

FY 2020 RDTE funds in the amount of $1.792 million support the initial scoping & development of the Robotics and Autonomous Systems, Ground (RAS-G) Interoperability Profile (IOP) Version 5.0. IOP V5.0 will provide the required modular open interfaces and compliance test tools for new programs including SMET Modular Mission Payloads (MMPs), LRR, TWV-LF, OMFV, RCV and ERP. Additionally, FY 2020 RDTE funds will support the development & hardening of Robotic Operating System, Military (ROS-M) software modules and ROS-M instantiation documents, and management of ROS-M registry & repository infrastructure.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Title: Robotics Architecture	1.930	1.792	2.876
Description: Provide architecture tools and support for current Programs of Record (PoR) & new requirements to allow for interoperability within the Joint community for Robotics & Autonomous Systems.			
FY 2019 Plans: FY 2019 funding for Robotics Architecture will apply IOP Conformance Validation Tools on programs of record including the Route Clearance and Interrogation System (RCIS), Man-Transportable Robotic System (MTRS) Inc II, Common Robotic System (Individual) (CRS(I)) Inc II, CRS(LR) and Universal Controller. It will complete and update IOP and tools to evaluate and assess the Common Robotic System, Heavy (CRS(H)) and Enhanced Robotics Payloads (ERP) and refine tools for Leader Follower (LF) and Squad Multi Equipment Transport (SMET). It will continue development and finalization of IOP V4 which will provide interfaces for near term emerging programs such as Lightweight Recon Robot (LRR), Robotic Combat Vehicle, and Autonomous Convoy Operations. The CRS(H) program is a new start effort in FY 2019.			
FY 2020 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FB3 / *Robotics Architecture*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
FY 2020 funding for Robotics Architecture will develop & apply Interoperability (IOP) & ROS-M artifacts and Conformance Validation Tools for programs of record including the Squad Multipurpose Equipment Transport (SMET), SMET Modular Mission Payloads (MMPs), Tactical Wheeled Vehicle-Leader Follower (TWV-LF), Route Clearance Interrogation System Type I (RCIS Type I), Common Robotics System (Vehicle) (CRS(V)), Common Robotics System (Individual) (CRS(I)) Inc. II, Common Robotics System (Heavy) (CRS(H)), Enhanced Robotic Payload (ERP), Light Reconnaissance Robot (LRR), Optionally Manned Fighting Vehicle (OMFV), Optionally Manned Tank (OMT), and Robotic Combat (RCV). It will develop and update IOP and tools to evaluate and assess the RCIS Type I, SMET MMPs, LRR, and Enhanced Robotics Payloads (ERP) and refine tools for TWV-LF, CRS(I), MTRS Inc. II & SMET. It will establish a Common Specifications Reference (CSR) to provide a repository codifying the Army RAS standards for open architecture, interoperability interfaces, and common control. It will initiate the development of IOP V5 which will provide interfaces for near term emerging programs such as key SMET MMPs & ERP payloads, CRS(V), LRR, RCV, and Autonomous Convoy Operations. Additionally, FY2020 RDTE funds will support the development & hardening of Robotic Operating System, Military (ROS-M) software modules and ROS-M instantiation documents, and management of ROS-M registry & repository infrastructure. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase in funding from FY 2019 to FY 2020 is for Robotic Operating System - Military (ROS-M) artifacts/module development and larger focus on stress testing of IOP and ROS-M artifacts.			
Title: FY 2019 SBIR / STTR Transfer ***Description:*** SBIR/STTR ***FY 2019 Plans:*** SBIR/STTR ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Adjust for FY 2019 SBIR / STTR Transfer	-	0.059	-
Accomplishments/Planned Programs Subtotals	1.930	1.851	2.876

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

In FY 2020 the Robotics Architecture line funds supporting matrix personnel & related contracts to develop IOP & ROS-M tools and supporting infrastructure. It leverages intellectual capital and products which allow for Joint interoperability and helps meet Army Program of Record (PoR) cost and schedule while delivering high quality products for fielding. The architecture and tools developed under this line provide enterprise wide efficiencies and are central to the Army's acquisition

philosophy of a modular open systems approach between the major subsystems of robotics and autonomous systems, as described throughout the Army approved Robotic Autonomous Systems (RAS) Initial Capabilities Document (ICD).

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605053A / *Ground Robotics*	Project (Number/Name) FB3 / *Robotics Architecture*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	MIPR	Various : Multiple	-	0.766	Dec 2017	0.925	Nov 2018	0.130	Oct 2019	-		0.130	0.000	1.821	-
		Subtotal	-	0.766		0.925		0.130		-		0.130	0.000	1.821	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
IOP V4	Various	Various : Multiple	-	0.914	May 2018	0.617	May 2019	-		-		-	0.000	1.531	-
Instantiation Tool Development	SS/CPFF	DCS : Warren, MI	-	-		-		0.100	Jun 2020	-		0.100	0.000	0.100	-
Conformance Verification Testing (CVT) Update	MIPR	TARDEC : Warren, MI	-	-		-		0.300	Apr 2020	-		0.300	0.000	0.300	-
IOP V5 Development	Various	Various : Multiple	-	-		-		1.070	Jan 2020	-		1.070	0.000	1.070	-
Robotic Operating System - Military (ROS-M)	Various	Various : Multiple	-	-		-		0.800	Apr 2020	-		0.800	0.000	0.800	-
IOP V4 Radio Interfaces Development	MIPR	NAVSEA : Washington D.C.	-	0.250	Sep 2018	0.250	Jun 2019	-		-		-	0.000	0.500	-
FY 2019 SBIR / STTR Transfer	TBD	TBD : TBD	-	-		0.059	Oct 2018	-		-		-	0.000	0.059	-
		Subtotal	-	1.164		0.926		2.270		-		2.270	0.000	4.360	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Conformance Verification Testing (CVT) Maintenance	MIPR	TARDEC : Warren, MI	-	-		-		0.126	Jan 2020	-		0.126	0.000	0.126	-
Robotic Operating System - Military (ROS-M) Infrastructure Management	MIPR	TARDEC : Warren, MI	-	-		-		0.150		-		0.150	0.000	0.150	-
		Subtotal	-	-		-		0.276		-		0.276	0.000	0.276	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army			Date: March 2019
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Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
New IOP & ROS-M Artifacts Stress Testing	MIPR	TARDEC : Warren, MI	-	-		-		0.200	Apr 2020	-		0.200	0.000	0.200	-
		Subtotal	-	-		-		0.200		-		0.200	0.000	0.200	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	1.930		1.851		2.876		-		2.876	0.000	6.657	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FB3 / *Robotics Architecture*

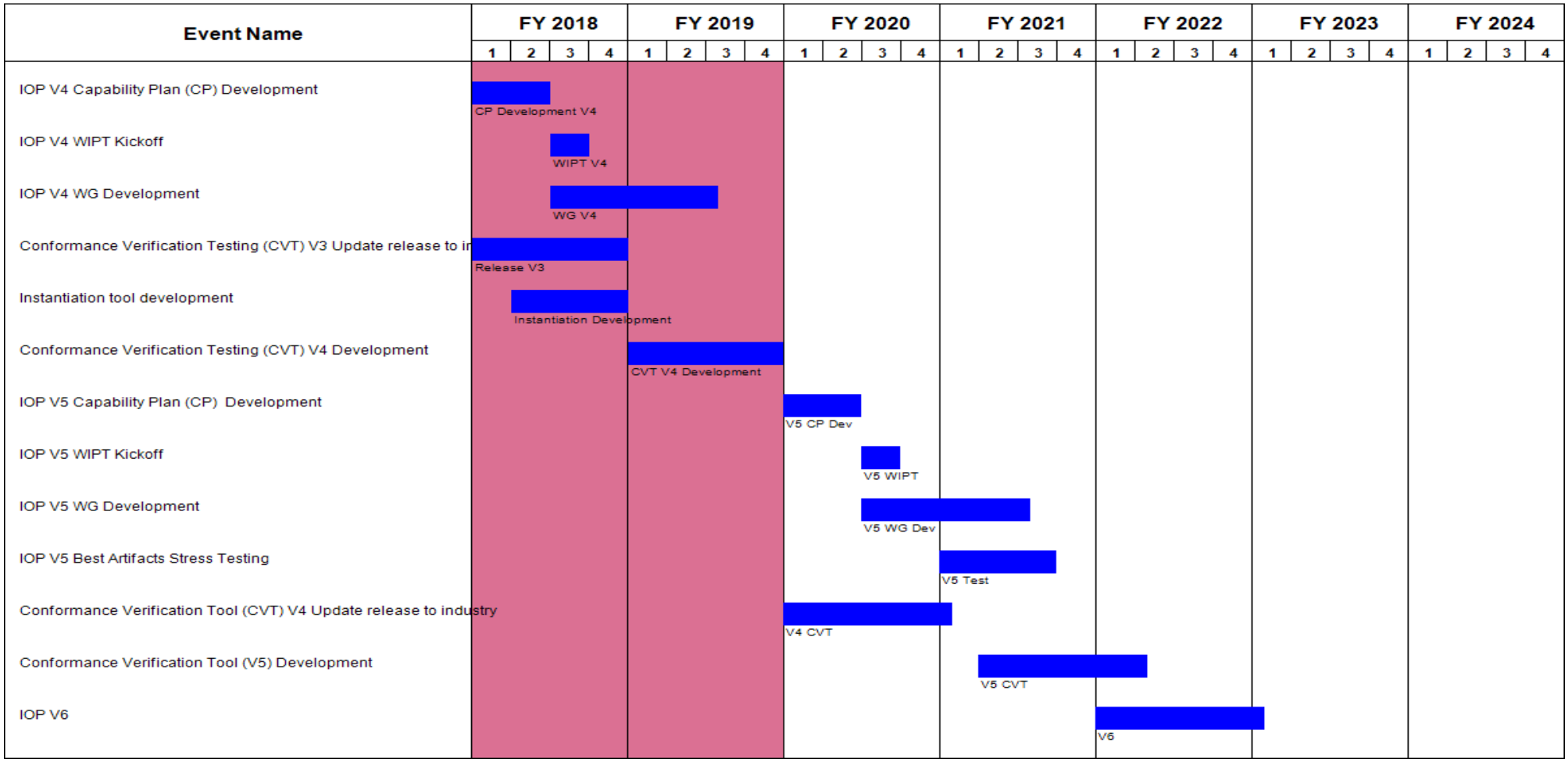

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FB3 / *Robotics Architecture*

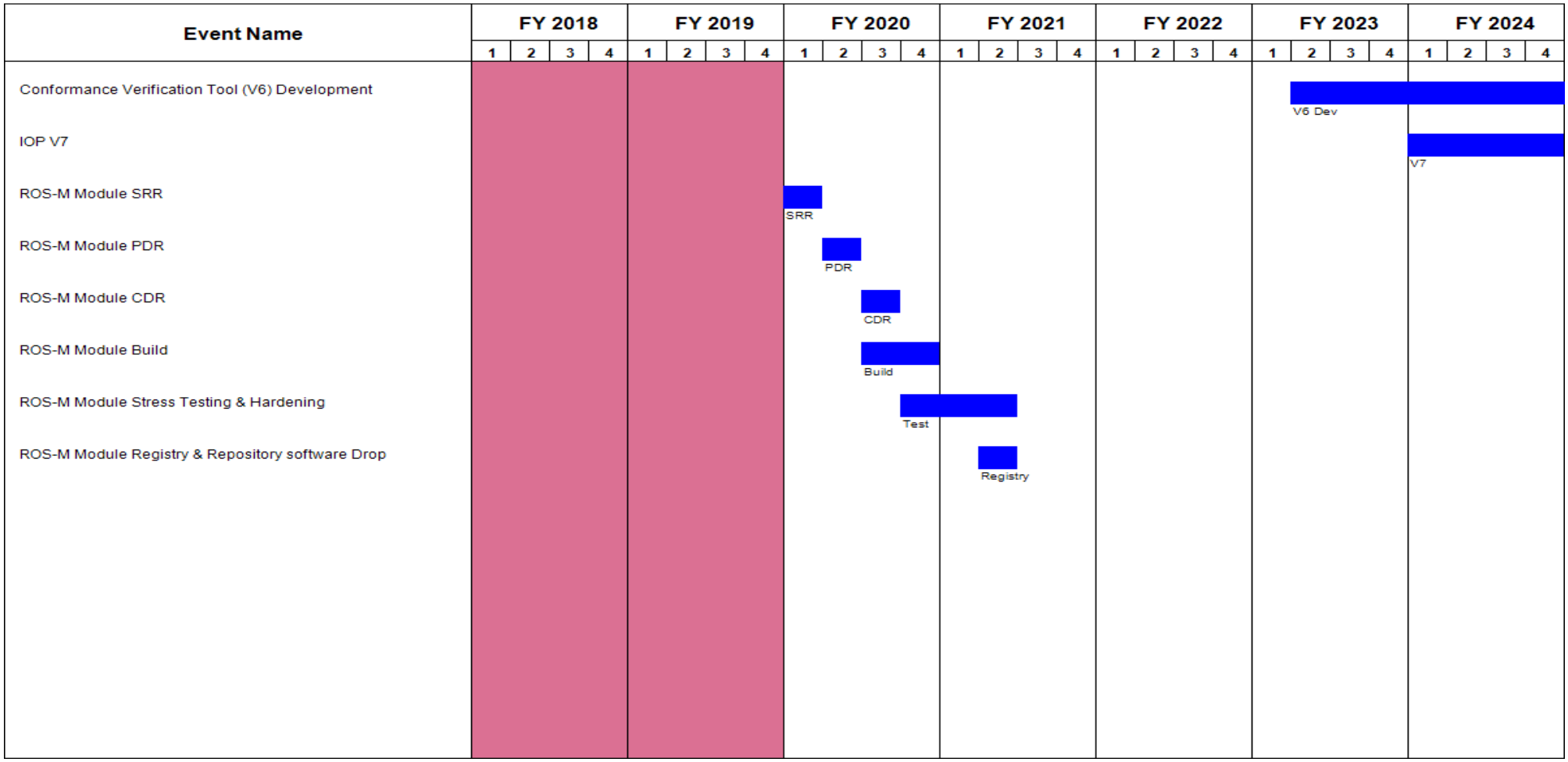

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FB3 / *Robotics Architecture*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
IOP V4 Capability Plan (CP) Development	1	2018	2	2018
IOP V4 WIPT Kickoff	3	2018	3	2018
IOP V4 WG Development	3	2018	3	2019
Conformance Verification Testing (CVT) V3 Update release to industry	1	2018	4	2018
Instantiation tool development	2	2018	4	2018
Conformance Verification Testing (CVT) V4 Development	1	2019	4	2019
IOP V5 Capability Plan (CP) Development	1	2020	2	2020
IOP V5 WIPT Kickoff	3	2020	3	2020
IOP V5 WG Development	3	2020	3	2021
IOP V5 Best Artifacts Stress Testing	1	2021	3	2021
Conformance Verification Tool (CVT) V4 Update release to industry	1	2020	1	2021
Conformance Verification Tool (V5) Development	2	2021	2	2022
IOP V6	1	2022	1	2023
Conformance Verification Tool (V6) Development	2	2023	1	2025
IOP V7	1	2024	4	2024
ROS-M Module SRR	1	2020	1	2020
ROS-M Module PDR	2	2020	2	2020
ROS-M Module CDR	3	2020	3	2020
ROS-M Module Build	3	2020	4	2020
ROS-M Module Stress Testing & Hardening	4	2020	2	2021
ROS-M Module Registry & Repository software Drop	2	2021	2	2021

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605053A / *Ground Robotics*	Project (Number/Name) FB4 / *Common Robotic Systems*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
FB4: *Common Robotic Systems*	-	22.569	29.301	7.796	-	7.796	2.354	0.000	0.000	0.000	0.000	62.020
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Common Robotic System - Individual (CRS(I)) is the Army's small sized (<25 lbs.) Soldier back-packable, remotely operated, common robotic system. The system provides dismounted Soldiers with increased standoff capability from hazardous threats. The system consists of a Universal Robotic Controller (URC), a suite of various payloads, and an open architecture common mobility platform allowing for future capability growth. The CRS(I) will allow the operator to quickly re-configure for other various missions by adding or removing modules and/or payloads. The CRS(I) will provide interrogation, detection, confirmation, and neutralization capabilities employed to support a wide spectrum of mobility missions for current and future forces. This capability provides commanders the ability to persistently monitor the Operating Environment (OE) while protecting and sustaining the force. The CRS(I) complements the Joint Integrated War-fighting Force by providing standoff to the Warfighter during major combat, stability, and homeland security operations.

FY 2020 RDTE funding in the amount of $7.796 million will complete execution of Production Qualification Test (PQT) activities in accordance with approved Test and Evaluation Master Plan (TEMP). This funding will also fund design updates from test, software updates, Engineering Change Proposals (ECPs), payload development, the development and verification of Operator Technical Manuals (TM), LOG Demo, development of training packages, execution of a Limited User Test (LUT) to support Conditional Materiel Release in 2QFY20, potential delta follow-on testing on unmet CDD thresholds, begin development of Maintainer Technical Manuals and other LOG products needed for Full Materiel Release (FMR) in 4QFY21. This funding also supports programmatic risk mitigation activities including, but not limited to: Cyber Security Controls (i.e. Risk Management Framework), commonality directives, payloads, sensors, condition based maintenance, electronics, standard interfaces and architectures, autonomous operations, and other emerging technologies, interoperability (IOP), and analysis of collaborative operations with various Unmanned Systems assigned at Battalion and below in addition to any program management support costs associated with these activities.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Title: CRS(I) Engineering Manufacturing Design (EMD)	18.930	5.546	-
Description: Up to two vendors will enter the Engineering & Manufacturing Design (EMD) Phase and support activities up to the Critical Design Review (CDR) to include providing robots to test during the Government run-off.			
FY 2019 Plans: FY 2019 RDTE funding support up to two vendors to develop prototypes for submission to government down-select. An option will be issued for Low Rate Initial Production (LRIP) to provide 15 RDTE Production Qualification Test (PQT) articles. This funding also supports a government IPT to provide program management, test and evaluation, and programmatic risk mitigation to address Cyber Security Controls, interoperability (IOP), and analysis of collaborative operations with various Unmanned Systems (i.e. MTRS Inc. II, Light Reconnaissance, Short Range Reconnaissance UAS, etc.) assigned at Battalion and below.			
FY 2019 to FY 2020 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FB4 / *Common Robotic Systems*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
The efforts listed below are in support of continued developmental efforts for the CRS(I) program. FY 2019 to FY2020 funding levels for the CRS(I) program are decreasing as developmental efforts draw down and Milestone C is scheduled for FY 2019. Efforts once grouped together in FY 2019 Accomplishments/Planned Programs are broken out in FY 2020 for increased transparency.			
Title: CRS(I) Contractor support to test and design updates ***Description:*** CRS(I) contractor to provide support to Production Qualification Test (PQT) and Limited User Test (LUT) and make critical design fixes. ***FY 2019 Plans:*** need to enter description ***FY 2020 Plans:*** Funding for contractor to provide direct onsite support to PQT and LUT and well as provide reach back Engineering support to troubleshoot systems under test and make design updates for critical issues found in test. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Delta due to breaking out funding into more detail for FY 2020 Plans.	-	0.653	1.400
Title: CRS(I) PQT and LUT execution ***Description:*** ATEC costs to execute Production Qualification Test (PQT) and Limited User Test (LUT). ***FY 2019 Plans:*** need to enter description ***FY 2020 Plans:*** Funding for ATEC to execute PQT and LUT in accordance with program TEMP. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Delta due to breaking out funding into more detail for FY 2020 Plans.	0.115	9.202	2.400
Title: CRS(I) Log manuals ***Description:*** CRS(I) RDTE funding for contractor to develop Technical Manuals. ***FY 2019 Plans:*** need to enter description ***FY 2020 Plans:***	-	4.184	1.700

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FB4 / *Common Robotic Systems*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Funding for the development and verification of Technical Manuals (TM), LOG Demo, development of training packages to support CRS(I) PQT and LUT to support Conditional Materiel Release (CMR) and towards Full Materiel Release (FMR). ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Delta due to breaking out funding into more detail for FY 2020 Plans.			
Title: CRS(I) TARDEC Software Support ***Description:*** CRS(I) RDTE funding to support the following TARDEC services to include software subject matter expert support, testing support, issue remediation, and transitioning Multi-robot Operator Control Unit (MOCU) software lead to TARDEC SEC as the software sustainment agency. ***FY 2019 Plans:*** need to enter description ***FY 2020 Plans:*** Funding to support TARDEC software and engineering activities to include travel and miscellaneous expenses associated with the CRS(I) RDTE efforts. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Delta due to breaking out funding into more detail for FY 2020 Plans.	0.862	3.250	0.900
Title: CRS(I) IPT Matrix Support Salary ***Description:*** CRS(I) RDTE funding to support engineering and various test efforts to include redesign of test articles, delta PQT test execution, and software, engineering test support staff salaries, and System Engineering Program Management (SEPM) costs. ***FY 2019 Plans:*** need to enter description ***FY 2020 Plans:*** Funding to support engineering activities, test article redesign, testing and salaries for IPT and program management costs to include travel and miscellaneous expenses associated with the CRS(I) RDTE efforts. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Delta due to breaking out funding into more detail for FY 2020 Plans.	2.662	4.392	0.700
Title: CRS(I) SPAWAR MOCU software support	-	1.000	0.696

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FB4 / *Common Robotic Systems*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Description: CRS(I) RDTE funding to provide subject matter expert support, software updates, incremental software drops for integration and testing, software test simulator, software drop test reports, debugging and issue remediation, and the transition of Multi-robot Operator Control Unit (MOCU) software to TARDEC for long term sustainment. ***FY 2019 Plans:*** need to enter description ***FY 2020 Plans:*** Funding to support SPAWAR MOCU software and engineering activities to include travel and miscellaneous expenses associated with the MTRS Inc II RDTE efforts. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Delta due to breaking out funding into more detail for FY 2020 Plans.			
Title: FY 2019 SBIR / STTR Transfer ***Description:*** SBIR/STTR ***FY 2019 Plans:*** SBIR/STTR ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Adjust for FY 2019 SBIR / STTR Transfer	-	1.074	-
Accomplishments/Planned Programs Subtotals	22.569	29.301	7.796

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• G99595: *Common Robotic System-Individual (CRS-I)*	-	3.161	2.285	-	2.285	3.952	4.135	4.438	4.632	0.000	22.603
• G93696: *Common Robotic System - Individual (CRS-I)*	-	-	30.387	-	30.387	37.981	9.000	-	-	0.000	77.368

Remarks

D. Acquisition Strategy

The CRS(I) acquisition strategy includes awarding a competitive Cost-Plus/Fixed-Fee (CPFF) contract for two contractors to compete in the Engineering and Manufacturing Development (EMD) Phase following Milestone (MS) B (FY 2018) approval. The EMD phase includes a Critical Design Review (CDR) (FY 2018), the

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
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procurement of Production Qualification Test (PQT) (FY 2019) assets and a "Government Run-Off" to determine which contractor will proceed into the Production and Deployment (P&D) Phase following MS C (FY 2019) approval. P&D includes a Firm-Fixed Price (FFP) option for Low Rate Initial Production (LRIP) (FY 2019), execution of Production Qualification Testing (FY 2019), Safety Release, Limited User Test (LUT), Conditional Material Release (CMR) (FY 2020) development of logistics products, Full Material Release (FMR)(FY 2021) and Full Rate Production (FRP) (FY 2021).

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605053A / *Ground Robotics*	Project (Number/Name) FB4 / *Common Robotic Systems*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	MIPR	Combat Support - Combat Service Support : Warren MI	-	2.662	Dec 2017	4.392	Nov 2018	0.700	Oct 2019	-		0.700	0.000	7.754	-
		Subtotal	-	2.662		4.392		0.700		-		0.700	0.000	7.754	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Manufacturing & Design	C/CPFF	tbd : tbd	-	18.930	Mar 2018	5.999	Nov 2018	1.400	Oct 2019	-		1.400	0.000	26.329	-
Government Furnished Equipment	Various	Various : Multiple	-	-		0.200	Sep 2019	-		-		-	0.000	0.200	-
FY 2019 SBIR / STTR Transfer	TBD	TBD : TBD	-	-		1.074	Oct 2018	-		-		-	0.000	1.074	-
		Subtotal	-	18.930		7.273		1.400		-		1.400	0.000	27.603	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Log manuals	C/CPFF	Multiple : Various	-	-		4.184	May 2019	1.700	Oct 2019	-		1.700	0.000	5.884	-
		Subtotal	-	-		4.184		1.700		-		1.700	0.000	5.884	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Production Qualification Testing (PQT) & Limited User Testing (LUT)	Various	Various : Multiple	-	0.115	Oct 2018	9.202	Jan 2019	2.400	Dec 2019	-		2.400	0.000	11.717	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605053A / *Ground Robotics*	Project (Number/Name) FB4 / *Common Robotic Systems*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
TARDEC software support	Various	TARDEC : Warren, MI	-	0.862	Mar 2018	3.250	Jan 2019	0.900	Oct 2019	-		0.900	0.000	5.012	-
SPAWAR software support	Various	SPAWAR : San Diego, CA	-	-		1.000	Apr 2019	0.696	Oct 2019	-		0.696	0.000	1.696	-
		Subtotal	-	0.977		13.452		3.996		-		3.996	0.000	18.425	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	22.569		29.301		7.796		-		7.796	0.000	59.666	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FB4 / *Common Robotic Systems*

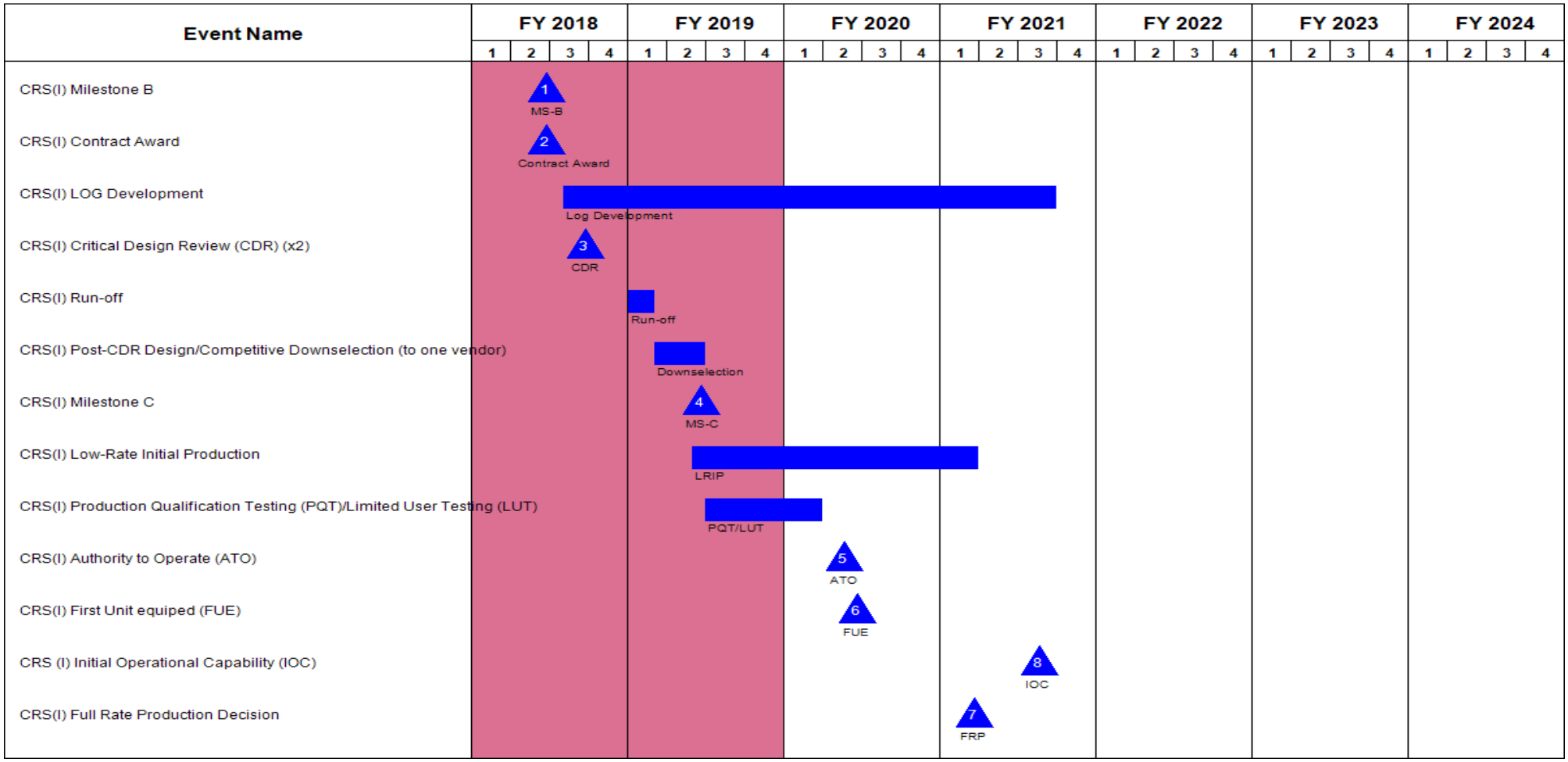

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FB4 / *Common Robotic Systems*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
CRS(I) Milestone B	2	2018	2	2018
CRS(I) Contract Award	2	2018	2	2018
CRS(I) LOG Development	3	2018	3	2021
CRS(I) Critical Design Review (CDR) (x2)	3	2018	3	2018
CRS(I) Run-off	1	2019	1	2019
CRS(I) Post-CDR Design/Competitive Downselection (to one vendor)	1	2019	2	2019
CRS(I) Milestone C	2	2019	2	2019
CRS(I) Low-Rate Initial Production	2	2019	1	2021
CRS(I) Production Qualification Testing (PQT)/Limited User Testing (LUT)	3	2019	1	2020
CRS(I) Authority to Operate (ATO)	2	2020	2	2020
CRS(I) First Unit equiped (FUE)	2	2020	2	2020
CRS (I) Initial Operational Capability (IOC)	3	2021	3	2021
CRS(I) Full Rate Production Decision	1	2021	1	2021

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605053A / *Ground Robotics*	Project (Number/Name) FB6 / *Squad Multipurpose Equipment Transport (SMET)*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
FB6: *Squad Multipurpose Equipment Transport (SMET)*	-	16.130	11.125	17.804	-	17.804	18.407	11.896	5.400	4.841	0.000	85.603
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Squad Multipurpose Equipment Transport (SMET) will help to reduce Soldier loads by transporting mission specific equipment, resupply equipment, and supplies required for extended operations. The SMET will be capable of carrying the equipment currently required to support Infantry and Engineer Platoons in the Infantry Brigade Combat Team (IBCT) for a 72 hour mission without resupply. The SMET will reduce Soldier load, increase squad mobility during combat operations and dismounted maneuvers. SMET will have open architectures, a remote control and support casualty evacuation, power generation/offload and reintegration of Modular Mission Payloads (MMP) and technical insertions.

FY 2020 RDTE funding supports the development integration and purchase of Technical Insertions and Modular Mission Payloads (MMP) to increase mission capabilities to meet objective requirements in the CDD. FY 2020 RDTE funding supports Developmental testing at Aberdeen and other remaining testing required for the Program of Record to include cyber testing and air drop certification. Program support to include salaries, travel and miscellaneous expense for the SMET program will also be funded.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Title: SMET	16.130	10.461	17.804
Description: Squad Multipurpose Equipment Transport (SMET)			
FY 2019 Plans: Funding supports the development and purchase of Technical Insertions, Modular Mission Payloads (MMP) Development, Logistics Support Data, and SMET Program of Record (POR) production contract development to include the Statement of Work (SOW) and Request for Proposal (RFP) under the Phase III Other Transaction Agreement (OTA). FY2019 RDTE funding also supports Developmental testing at Aberdeen and TARDEC and the completion of the Technology Demonstration, Program Management costs to include salaries, travel and miscellaneous expense for the SMET program.			
FY 2020 Plans: FY 2020 RDTE funding supports the development and purchase of Technical Insertions and Modular Mission Payloads (MMP). FY 2020 RDTE funding supports Developmental testing at Aberdeen and other remaining testing required for the Program of Record to include cyber testing and air drop certification. Program support to include salaries, travel and miscellaneous expense for the SMET program will also be funded.			
FY 2019 to FY 2020 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FB6 / *Squad Multipurpose Equipment Transport (SMET)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Funding increase due to development of Modular Mission Payload (MMP) and Technical Insertions, remaining Program of Record (POR) testing at Aberdeen Test Center (ATC).			
Title: FY 2019 SBIR/ STTR Transfer	-	0.664	-
FY 2019 Plans: Adjusted for SBIR/STTR Transfer			
FY 2019 to FY 2020 Increase/Decrease Statement: Adjusted for SBIR/STTR Transfer			
Accomplishments/Planned Programs Subtotals	16.130	11.125	17.804

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• R12154: *Squad Multipurpose Equipment Transport (SMET)*	-	-	8.768	-	8.768	20.332	42.964	43.989	46.663	0.000	162.716

Remarks

D. Acquisition Strategy

The Squad Multipurpose Equipment Transport (SMET) Assessment effort was completed as part of the Robotics Development effort under the Tactical Unmanned Ground Vehicle (654641DV7) funding line in FY2017. This Phase I Assessment supported a rapid start to establish an Other Transaction Authority (OTA) Acquisition Strategy supporting the Directed Requirement, signed 14 April 2017. The OTA began with a Request For Project Proposal (RPP), followed by an evaluation and down select to 10 vendors in FY17 as part of the Robotic Enhancement Program under the Tactical Unmanned Ground Vehicle (654641DV7) funding line. In FY18 a down select from 10 to 4 vendors decided which platforms would participate in the OTA Phase II 12 month Technology Demonstration, 20 systems were purchased from each of the 4 vendors issued to IBCTs. This Technology Demonstration will guide the development of the Capability Development Document (CDD) leading to a Army Requirements Oversight Council (AROC) decision in 3QFY19.

Following the OTA Phase II Technology Demonstration, a source selection will occur to award a Program of Record (POR) contract(s) for LRIP and production to the system that best meets the Army's needs. Project Manager Force Projection (PM FP) is requesting authority from the Army Acquisition Executive (AAE) to pursue a Rapid Fielding pathway under Section 804 Middle Tier Acquisition (MTA) in accordance with Fiscal Year (FY) 2016 National Defense Authorization Act (NDAA) to meet Chief of Staff of the Army guidance to provide the Squad Multipurpose Equipment Transport (S-MET) capability to Soldiers by 2QFY20. Under an approved Section 804 Rapid Fielding pathway, the PM will down select to one or more of the four prototypes and award refurbishment of Phase II systems, LRIP, FRP, LOG development and System Technical Support under the Phase III Production OTA.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FB6 / *Squad Multipurpose Equipment Transport (SMET)*

It is the Army's intent to maximize the use of an Open Systems Architecture (OSA), as well as the approved Unmanned Ground Vehicle (UGV) interoperability profiles (IOP) for SMET. The PdM plans to gather sufficient data during the SMET Technology Demonstration to reduce development efforts and provide cost savings by incorporating the developed SMET technology to include future technical insertions and Modular Mission Payloads (MMP) into the Program of Record. Throughout the life of the program, the Army will continue to survey the marketplace to identify opportunities for technology insertions and required Modular Mission Payloads (MMP), relying on competition to drive down costs.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605053A / *Ground Robotics*	Project (Number/Name) FB6 / *Squad Multipurpose Equipment Transport (SMET)*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Costs	MIPR	PM FP : Warren, MI	-	1.000		1.461	Oct 2018	2.304	Oct 2019	-		2.304	0.000	4.765	-
		Subtotal	-	1.000		1.461		2.304		-		2.304	0.000	4.765	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Directed Requirement Technology Demonstration	C/FFP	Year Long Excursion : TBD	-	10.328		2.200	Dec 2018	-		-		-	0.000	12.528	-
Technical Insertions	C/FFP	TBD : TBD	-	-		3.000	Nov 2018	3.000	Nov 2019	-		3.000	0.000	6.000	-
Modular Mission Payloads (MMP)	MIPR	Ft Benning : Ft Benning, GA	-	-		0.800	Mar 2019	7.000	Jan 2020	-		7.000	0.000	7.800	-
FY 2019 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.664		-		-		-	0.000	0.664	-
		Subtotal	-	10.328		6.664		10.000		-		10.000	0.000	26.992	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Cyber / Integration	MIPR	TBD : TBD	-	1.000		1.000	Oct 2018	1.500	Oct 2019	-		1.500	0.000	3.500	-
		Subtotal	-	1.000		1.000		1.500		-		1.500	0.000	3.500	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
ATEC Test Support	MIPR	Army Test Engineering Center : Various	-	3.802		1.600	Nov 2018	2.000	Nov 2019	-		2.000	0.000	7.402	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FB6 / *Squad Multipurpose Equipment Transport (SMET)*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Air Drop Testing	MIPR	NATICK : Various	-	-		0.400	Dec 2018	2.000	Oct 2019	-		2.000	0.000	2.400	-
		Subtotal	-	3.802		2.000		4.000		-		4.000	0.000	9.802	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	16.130		11.125		17.804		-		17.804	0.000	45.059	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FB6 / *Squad Multipurpose Equipment Transport (SMET)*

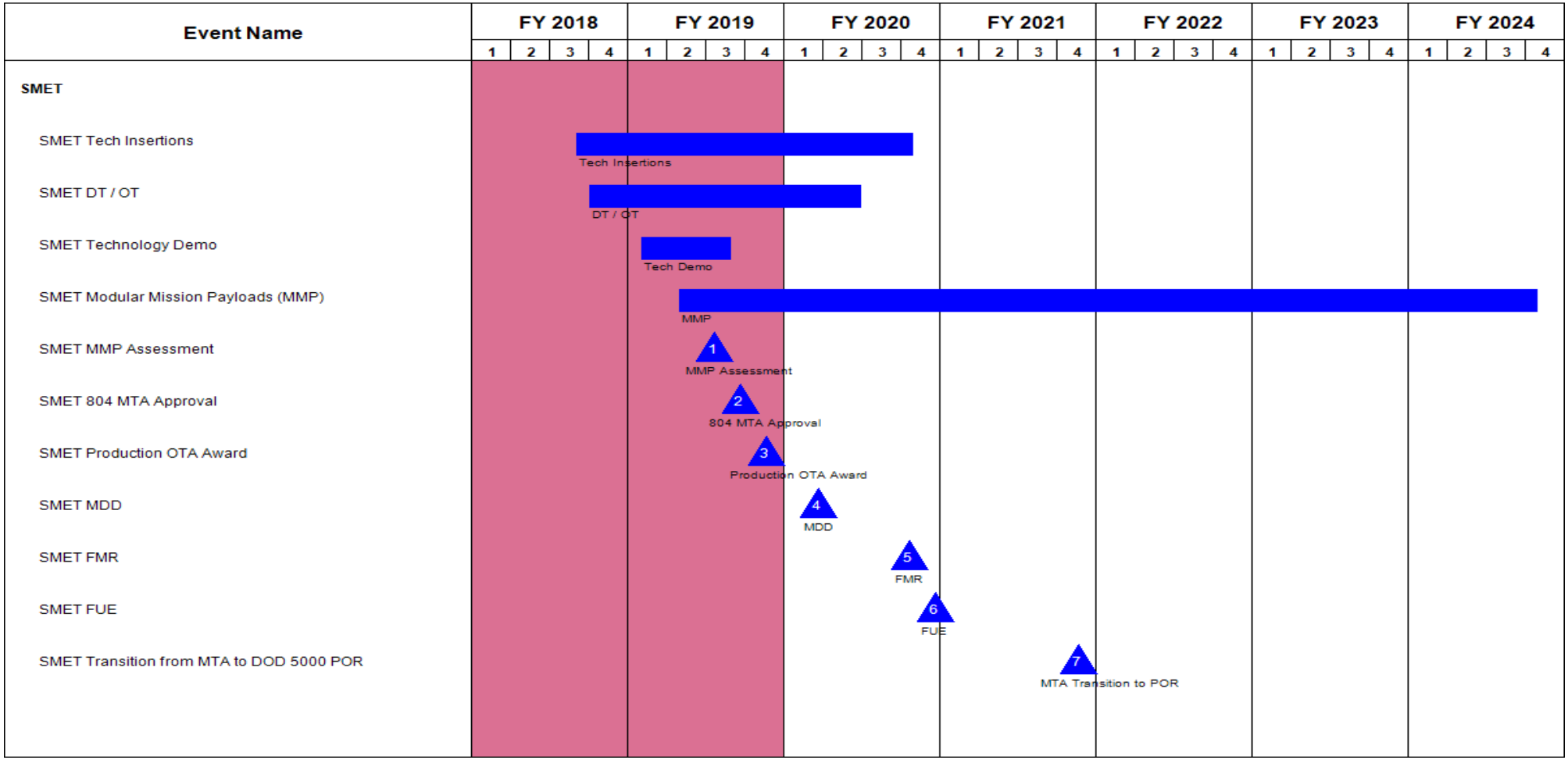

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FB6 / *Squad Multipurpose Equipment Transport (SMET)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
SMET	1	2018	4	2022
SMET Tech Insertions	3	2018	4	2020
SMET DT / OT	4	2018	2	2020
SMET Technology Demo	1	2019	3	2019
SMET Modular Mission Payloads (MMP)	2	2019	4	2024
SMET MMP Assessment	3	2019	3	2019
SMET 804 MTA Approval	3	2019	3	2019
SMET Production OTA Award	4	2019	4	2019
SMET MDD	1	2020	1	2020
SMET FMR	4	2020	4	2020
SMET FUE	4	2020	4	2020
SMET Transition from MTA to DOD 5000 POR	4	2021	4	2021

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army											Date: March 2019	
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0605053A / *Ground Robotics*				Project (Number/Name) FB7 / *Robotics Enhanced Program (REP)*			
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
FB7: *Robotics Enhanced Program (REP)*	-	7.683	9.387	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	17.070
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Robotics Enhanced Program (REP) uses a "buy/lease, try and inform" methodology to evaluate Commercial Off the Shelf (COTS), Government Off the Shelf (GOTS) and Non-Developmental Item (NDI) robotics products that have the potential to enhance Soldier combat effectiveness. Actual operational user feedback and evaluation results obtained will inform emerging capabilities and requirements documents in support of a return on investment to support future Army decision making.

This program has no FY 2020 Base or OCO RDTE funding.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Title: Robotic Enhanced Program (REP) ***Description:*** Annual funding for the REP is broken up into two iterations occurring each fiscal year. RDTE funds are utilized in an experimental effort to inform Army User Communities (i.e. Centers of Excellence (CoE), TRADOC, ARCIC) determined requirements as outlined in the Robotic and Autonomous Systems (RAS) Strategy. ***FY 2019 Plans:*** FY 2019 funding for the REP will be utilized to fund Iteration 19.1 and 19.2 and out-of-cycle iterations which will fund salaries, travel, ERDC and ATEC support, RDECOM support, CoE support, Battle Lab support, and associated experiments. REP will also prepare for and complete Knowledge Point 3 (KP3) in 4QFY19, which will provide a status of the REP to the Program Executive Officer. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The REP program funding was zeroed out starting in FY 2020.	7.683	9.043	-
Title: FY 2019 SBIR / STTR Transfer ***Description:*** SBIR/STTR ***FY 2019 Plans:*** SBIR/STTR ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Adjust for FY 2019 SBIR/STTR Transfer	-	0.344	-
Accomplishments/Planned Programs Subtotals	7.683	9.387	-

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FB7 / *Robotics Enhanced Program (REP)*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Robotics Enhanced Program (REP) uses a "buy/lease, try and inform" methodology to evaluate Commercial Off the Shelf (COTS), Government Off the Shelf (GOTS) and Non-Developmental Item (NDI) robotics products that have the potential to enhance Soldier combat effectiveness. Actual operational user feedback and evaluation results obtained will inform emerging capabilities and requirements documents in support of a return on investment to support future Army decision making.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605053A / *Ground Robotics*	Project (Number/Name) FB7 / *Robotics Enhanced Program (REP)*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	MIPR	Various : Multiple	-	2.447	Nov 2017	2.823	Apr 2019	-		-		-	0.000	5.270	-
		Subtotal	-	2.447		2.823		-		-		-	0.000	5.270	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FY 2019 SBIR / STTR Transfer	TBD	TBD : TBD	-	-		0.344	Oct 2018	-		-		-	0.000	0.344	-
		Subtotal	-	-		0.344		-		-		-	0.000	0.344	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Iteration 18.1	Various	Various : Multiple	-	0.037	Jul 2018	-		-		-		-	0.000	0.037	-
Iteration 18.2	Various	Various : Multiple	-	1.707	Jul 2018	-		-		-		-	0.000	1.707	-
Iteration 19.1	Various	Various : Multiple	-	-		2.846	Apr 2019	-		-		-	0.000	2.846	-
		Subtotal	-	1.744		2.846		-		-		-	0.000	4.590	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Iteration 18.1	Various	Various : Multiple	-	0.854	Aug 2018	-		-		-		-	0.000	0.854	-
Iteration 18.2	Various	Various : Multiple	-	1.402	Sep 2018	-		-		-		-	0.000	1.402	-
Iteration 19.1	Various	Various : Multiple	-	0.638	Jan 2019	1.374	Jun 2019	-		-		-	0.000	2.012	-
REP Out-of-Cycle Initiatives	Various	Various : Various	-	0.598	Jul 2018	2.000	Aug 2019	-		-		-	0.000	2.598	-
		Subtotal	-	3.492		3.374		-		-		-	0.000	6.866	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605053A / *Ground Robotics*	Project (Number/Name) FB7 / *Robotics Enhanced Program (REP)*	

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	7.683		9.387		-		-		-	0.000	17.070	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FB7 / *Robotics Enhanced Program (REP)*

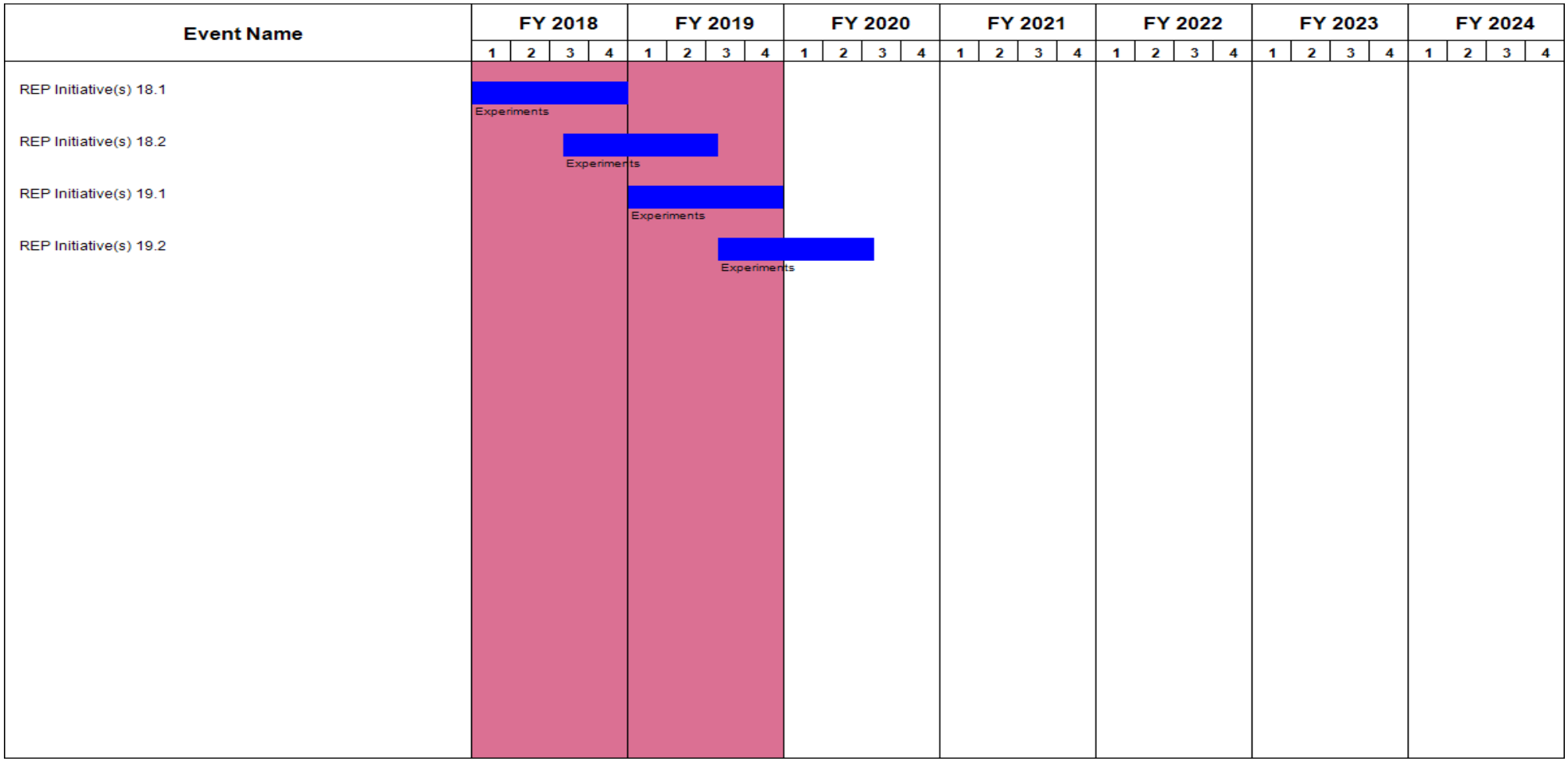

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FB7 / *Robotics Enhanced Program (REP)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
REP Initiative(s) 18.1	1	2018	4	2018
REP Initiative(s) 18.2	3	2018	3	2019
REP Initiative(s) 19.1	1	2019	4	2019
REP Initiative(s) 19.2	3	2019	3	2020

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605053A / *Ground Robotics*	Project (Number/Name) FB8 / *Soldier Borne Sensor (SBS)*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
FB8: *Soldier Borne Sensor (SBS)*	-	2.197	3.465	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	5.662
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Soldier Borne Sensor (SBS) is a small unmanned aerial vehicle. The SBS provides a near term solution to three Army War-fighting Challenges at the Infantry Squad level: develop situational understanding, conduct air-ground reconnaissance, and conduct joint combined arms maneuver. The system is simple to deploy and use to support the squad leader's decision-making process. The system allows Soldiers to obtain local situational awareness and understanding of their immediate surroundings while remaining in covered or concealed positions. Funding in this project aligns with Army's priorities in support of the National Defense Strategy.

In FY20, this project and funding will transition to PE: 0604827A / Soldier Systems - Warrior Dem/Val, Project FK4.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Title: Soldier Borne Sensor (SBS) ***Description:*** The SBS is a small Unmanned Aerial System that provides the small unit a "quick look" capability providing Situational Awareness (SA) of routes, building, tunnels, obstacles blocking line of sight, and similar concealed threat locations. ***FY 2019 Plans:*** FY 2019 Plans: The program will complete development of new technologies for Increment 2. The program will then utilize Other Transaction Authority (OTA) prototype projects to rapidly incorporate new technologies including GPS-denied operation and integration with the Soldier architecture into prototypes for evaluation. The OTA scope of work (technologies integrated) will be determined based on affordability. OTAs will be established with multiple manufacturers if affordable. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** In FY20, this program funding transitioned to PE: 0604827A / Soldier Systems - Warrior Dem/Val, Project FK4.	2.197	3.354	-
Title: FY 2019 SBIR / STTR Transfer ***Description:*** FY 2019 SBIR / STTR adjustment. ***FY 2019 Plans:*** FY 2019 SBIR / STTR adjustment. ***FY 2019 to FY 2020 Increase/Decrease Statement:***	-	0.111	-

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FB8 / *Soldier Borne Sensor (SBS)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
FY 2019 SBIR / STTR adjustment.			
Accomplishments/Planned Programs Subtotals	2.197	3.465	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• FK4: *Soldier Borne Sensor (SBS)*	-	-	1.512	-	1.512	1.213	2.239	3.548	1.317	0.000	9.829
• W63798: *Soldier Borne Sensor (SBS)*	24.000	21.680	23.362	-	23.362	25.927	11.160	19.101	25.293	Continuing	Continuing

Remarks

D. Acquisition Strategy

SBS achieved Milestone C September 2017. The program office is utilizing Defense Logistics Agency - Tailored Logistics Support contracts to procure Tranche 1 systems in FY18, FY19, and FY20.

SBS will initiate one or more prototype projects via other transaction agreement in FY19. The Tranche 2 SBS solution will be selected from these prototypes in FY21.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605053A / *Ground Robotics*	Project (Number/Name) FB8 / *Soldier Borne Sensor (SBS)*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	Allot	Project Manager Soldier Sensors and Lasers : Fort Belvior, Virginia 22060	-	0.394	Jul 2018	0.244	Dec 2018	-		-		-	0.000	0.638	-
		Subtotal	-	0.394		0.244		-		-		-	0.000	0.638	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Better Data Thermal Camera	MIPR	NVESD : Fort Belvoir, Virginia 22060	-	0.472	Jul 2018	1.933	Jan 2019	-		-		-	0.000	2.405	-
Obstacle Avoidance	MIPR	NSRDEC : NATICK, Massachusetts 01760	-	-		0.400	Nov 2018	-		-		-	0.000	0.400	-
OTA Incremental Development	MIPR	NSRDEC : NATICK, Massachusetts 01760	-	-		0.533	Jul 2019	-		-		-	0.000	0.533	-
FY 2019 SBIR / STTR Transfer	TBD	TBD : TBD	-	-		0.111		-		-		-	0.000	0.111	-
		Subtotal	-	0.472		2.977		-		-		-	0.000	3.449	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Matrix Support	MIPR	Various : Various	-	0.552	May 2018	0.244	Dec 2018	-		-		-	0.000	0.796	-
		Subtotal	-	0.552		0.244		-		-		-	0.000	0.796	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605053A / *Ground Robotics*	Project (Number/Name) FB8 / *Soldier Borne Sensor (SBS)*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test and Evaluation Support	MIPR	Army Test and Evauation Command : White Sands Missile Range, New Mexico	-	0.779	Sep 2018	-		-		-		-	0.000	0.779	-
		Subtotal	-	0.779		-		-		-		-	0.000	0.779	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	2.197		3.465		-		-		-	0.000	5.662	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FB8 / *Soldier Borne Sensor (SBS)*

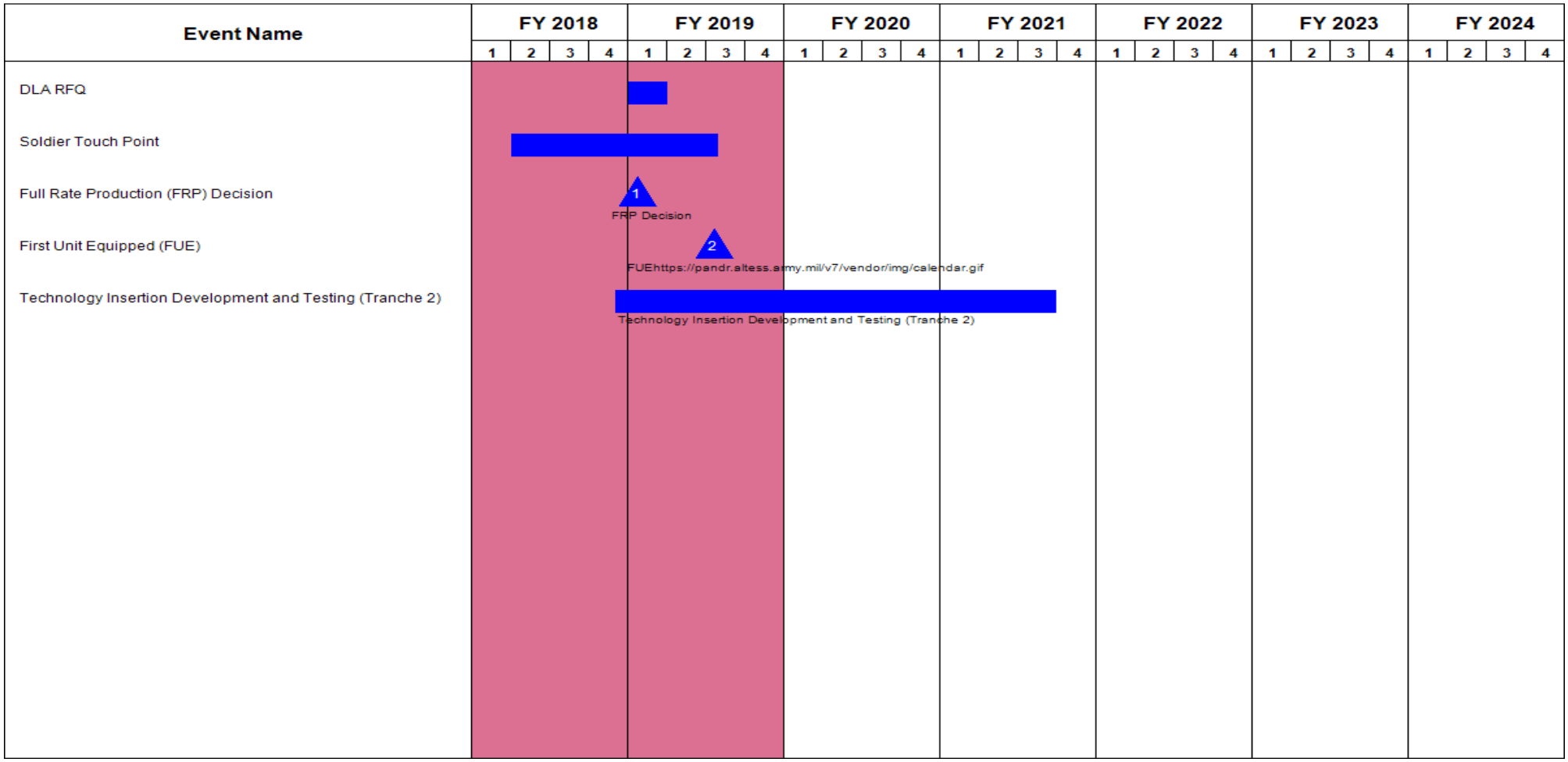

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FB8 / *Soldier Borne Sensor (SBS)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
DLA RFQ	1	2019	1	2019
Soldier Touch Point	2	2018	3	2019
Full Rate Production (FRP) Decision	1	2019	1	2019
First Unit Equipped (FUE)	3	2019	3	2019
Technology Insertion Development and Testing (Tranche 2)	4	2018	3	2021

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army											Date: March 2019	
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0605053A / *Ground Robotics*				Project (Number/Name) FB9 / *MTRS Standardization*			
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
FB9: *MTRS Standardization*	-	1.150	9.043	7.000	-	7.000	0.000	0.000	0.000	0.000	0.000	17.193
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Common Robotic System, Heavy (CRS(H)) is a modular large-sized system that provides enhanced protection to the EOD Soldier in order to support the Joint Force Commander with the ability to identify, render safe and dispose of explosive ordnance (EO) and improvised explosive devices (IEDs) in support of the Range of Military Operations (ROMO) and Home Land Defense (HLD) operations. CRS(H) will also enable EOD Soldiers to execute Defense Support of the Civil Authorities (DSCA) operations in response to requests from federal, state, local, and tribal authorities for domestic incidents, emergencies, disasters, designated law enforcement support and other activities. CRS(H) will support current and future missions for Explosive Ordnance Disposal (EOD) units.

FY 2020 RDTE funds in the amount of $7.000 million will enable the CRS(H) program to complete the following: System Engineering, Program Management, design and test support, refurbishment of test assets from Fly-off #2, development, integration and testing of system-enhancing payloads (eg: dual arm manipulation, autonomy, mapping, etc.), contract data procurement, travel, and other expenses related to the CRS(H) RDTE program.

NOTE: $4.618 million of FY 2019 CRS(H) RDTE funds 655053FB9 Ground Robotics, MTRS Standardization, were reprogrammed to the FY 2019 CRS(H) OPA line W12001A EOD Robotics Systems Recapitalization during the Congressional enactment process.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Title: Platform to Support Payload Development & Test ***Description:*** Testing of multi-shot disruptor and fire set for EOD robotics systems.	1.150	-	-
Title: Additive Manufacturing ***Description:*** Supports 3D printed part evaluative efforts. ***FY 2019 Plans:*** Funds will test the operational capability of 3D printed parts with robotic systems. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** No funding required in FY20	-	0.524	-
Title: CRS(H) IPT Matrix Support Salary Support ***Description:*** CRS(H) RDTE funding to support engineering and various test efforts to include redesign of test articles, software, engineering test support staff salaries, and System Engineering Program Management (SEPM) costs.	-	1.004	1.000

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FB9 / *MTRS Standardization*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
FY 2019 Plans: Funding is for CRS(H) IPT Matrix salary support. ***FY 2020 Plans:*** Funding to support engineering activities, testing, logistics, and salaries for IPT and program management costs to include travel and miscellaneous expenses associated with the CRS(H) RDTE efforts. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Delta due to breaking out funding into more detail for FY 2020 Plans.			
Title: CRS(H) testing ***Description:*** CRS(H) cyber security and performance testing efforts. ***FY 2019 Plans:*** Funding is for testing of CRS(H) ***FY 2020 Plans:*** Funding is provided for cyber security testing, cyber security scans, and additional reliability and performance testing. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Delta due to breaking out funding into more detail for FY 2020 Plans.	-	6.970	2.000
Title: CRS(H) test article refurbishment ***Description:*** CRS(H) test article refurbishment for payloads. ***FY 2020 Plans:*** Funding is to refurbish test articles to "Like-New" condition to support payload integration activities. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Delta due to breaking out funding into more detail for FY 2020 Plans.	-	-	0.400
Title: CRS(H) contract data ***Description:*** CRS(H) data required to support Materiel Release. ***FY 2020 Plans:*** Funding is provided for Risk Management Framework (RMF) artifacts, Logistics data, provisioning, training development, and engineering data. ***FY 2019 to FY 2020 Increase/Decrease Statement:***	-	-	3.000

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FB9 / *MTRS Standardization*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Delta due to breaking out funding into more detail for FY 2020 Plans.			
Title: CRS(H) Payload Development ***Description:*** CRS(H) payload development, integration, and testing activities. ***FY 2020 Plans:*** Funding is provided for CRS(H) payload development, integration, and testing activities. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Delta due to breaking out funding into more detail for FY 2020 Plans.	-	-	0.600
Title: FY 2019 SBIR / STTR Transfer ***Description:*** SBIR / STTR ***FY 2019 Plans:*** SBIR / STTR ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Adjust for FY 2019 SBIR / STTR transfer	-	0.545	-
Accomplishments/Planned Programs Subtotals	1.150	9.043	7.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• W12001: *EOD Robotics Systems Recapitalization*	10.073	17.736	23.115	-	23.115	26.559	-	-	-	0.000	77.483

Remarks

This is a shared line with Robotic Logistic Support Center. Funding split is as follows:

Program	FY 2018	FY 2019	FY 2020	FY 2021
EOD	$10,073	$524	$6,515	$3,059
CRS(H)	$0	$4,618	$16,600	$23,500

NOTE: $10.000 million CRS(H) RDTE funds were reprogrammed to FY 2019 CRS(H) OPA line W12001A EOD Robotics Systems Recapitalization.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FB9 / *MTRS Standardization*

D. Acquisition Strategy

Procure mobility platforms from existing IDIQ contract. Utilize Other Transactional Authority contract for additive manufacturing effort.

The CRS(H) acquisition strategy will enter at Milestone C and award up to three Other Transactional Authority (OTA) agreements to conduct a dual phase fly-off. The CRS(H) program will utilize fly-off results to down-select to one OEM and proceed directly into production in FY 2019 and field under a Conditional Materiel Release (CMR) in FY 2020. The CRS(H) program will complete all required engineering and logistics activities to support Full Materiel Release (FMR) and Full Rate Production (FRP) in FY 2021.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605053A / *Ground Robotics*	Project (Number/Name) FB9 / *MTRS Standardization*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CRS(H) Program Management costs	Various	Various : Multiple	-	-		1.004	Dec 2018	1.000	Oct 2019	-		1.000	0.000	2.004	-
		Subtotal	-	-		1.004		1.000		-		1.000	0.000	2.004	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Platform to Support Payload Developement	C/TBD	Robot Logistics Support Center (RLSC) : Selfridge Air National Guard Base (SANG)	-	1.150	Feb 2018	-		-		-		-	0.000	1.150	-
CRS(H) Payload Development	Various	Various : Multiple	-	-		-		0.600	Dec 2019	-		0.600	0.000	0.600	-
FY 2019 SBIR / STTR Transfer	TBD	TBD : TBD	-	-		0.545	Oct 2018	-		-		-	0.000	0.545	-
		Subtotal	-	1.150		0.545		0.600		-		0.600	0.000	2.295	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CRS(H) Contract data	SS/FFP	TBD : TBD	-	-		-		3.000	Nov 2019	-		3.000	0.000	3.000	-
		Subtotal	-	-		-		3.000		-		3.000	0.000	3.000	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CRS(H) System Evaluation	Various	Various : Multiple	-	-		6.970	Feb 2019	2.000	Nov 2019	-		2.000	0.000	8.970	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605053A / *Ground Robotics*	Project (Number/Name) FB9 / *MTRS Standardization*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CRS(H) Test Article refurbishment	SS/FFP	TBD : TBD	-	-		-		0.400	Nov 2019	-		0.400	0.000	0.400	-
Additive Manufacturing524	TBD	TBD : TBS	-	-		0.524	Jan 2019	-		-		-	0.000	0.524	-
		Subtotal	-	-		7.494		2.400		-		2.400	0.000	9.894	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	1.150		9.043		7.000		-		7.000	0.000	17.193	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FB9 / *MTRS Standardization*

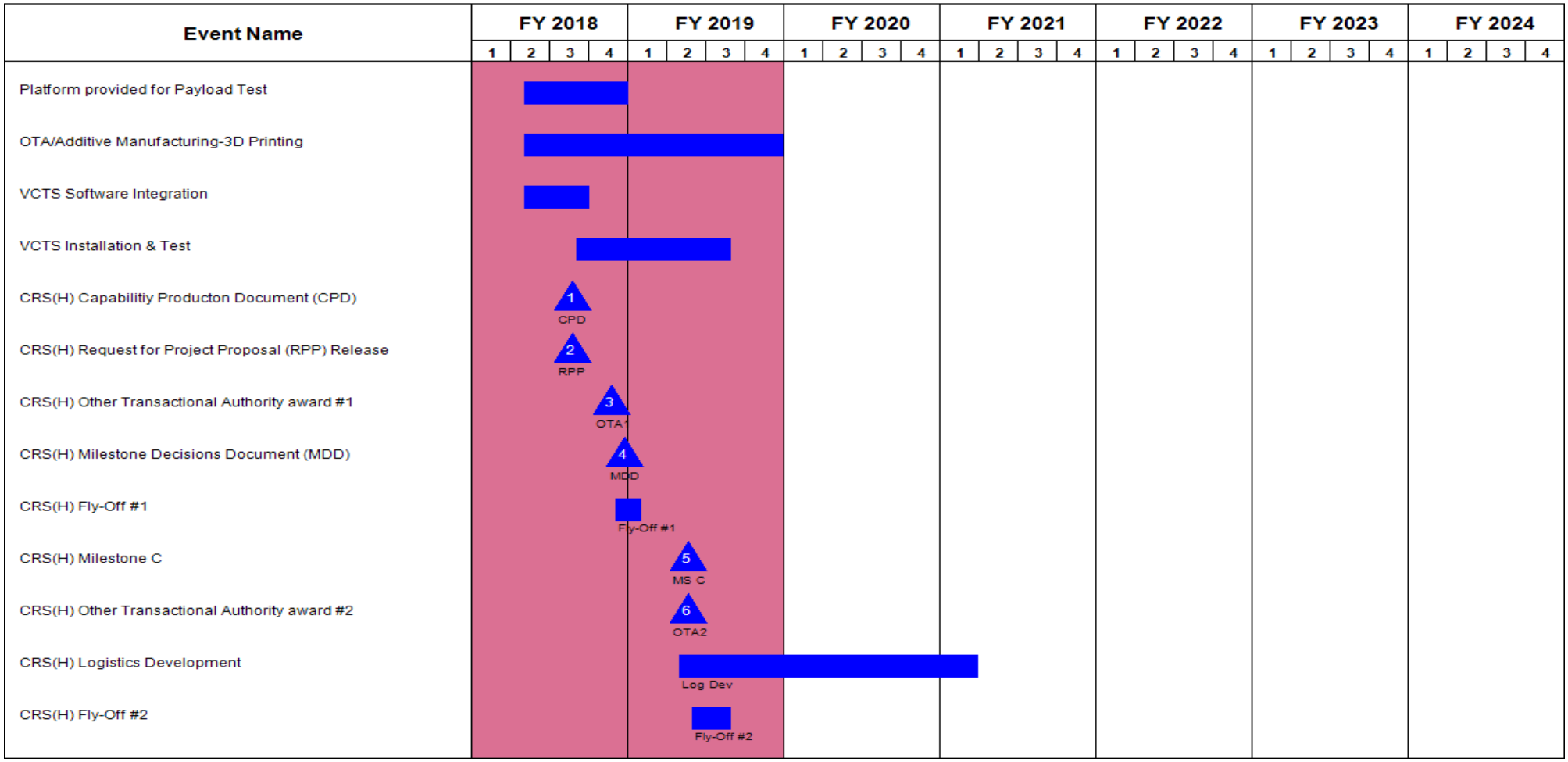

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FB9 / *MTRS Standardization*

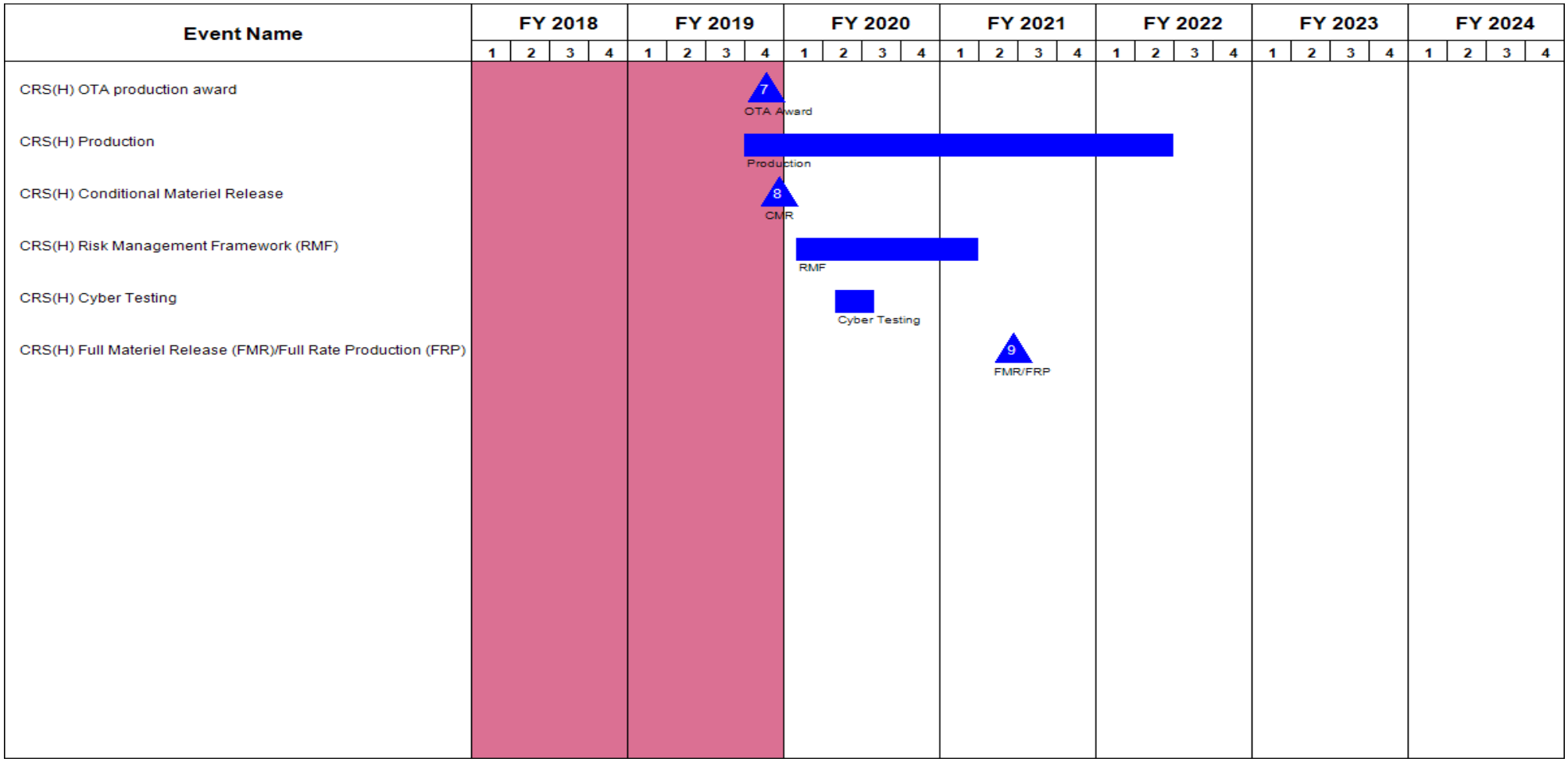

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FB9 / *MTRS Standardization*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Platform provided for Payload Test	2	2018	4	2018
OTA/Additive Manufacturing-3D Printing	2	2018	4	2019
VCTS Software Integration	2	2018	3	2018
VCTS Installation & Test	3	2018	3	2019
CRS(H) Capabilitiy Producton Document (CPD)	3	2018	3	2018
CRS(H) Request for Project Proposal (RPP) Release	3	2018	3	2018
CRS(H) Other Transactional Authority award #1	4	2018	4	2018
CRS(H) Milestone Decisions Document (MDD)	4	2018	4	2018
CRS(H) Fly-Off #1	4	2018	1	2019
CRS(H) Milestone C	2	2019	2	2019
CRS(H) Other Transactional Authority award #2	2	2019	2	2019
CRS(H) Logistics Development	2	2019	1	2021
CRS(H) Fly-Off #2	2	2019	3	2019
CRS(H) OTA production award	4	2019	4	2019
CRS(H) Production	4	2019	2	2022
CRS(H) Conditional Materiel Release	4	2019	4	2019
CRS(H) Risk Management Framework (RMF)	1	2020	1	2021
CRS(H) Cyber Testing	2	2020	3	2020
CRS(H) Full Materiel Release (FMR)/Full Rate Production (FRP)	2	2021	2	2021

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605053A / *Ground Robotics*	Project (Number/Name) FG8 / *Common Robotic Controller*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
FG8: *Common Robotic Controller*	-	0.000	2.964	1.186	-	1.186	1.209	1.233	1.258	1.283	0.000	9.133
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Universal Robotic Controller (URC) provides the capability to individually and/or concurrently control multiple Unmanned Systems (UxS) platforms and control/ monitor a mesh network without having to obtain and/or carry separate Operator Control Unit (OCUs) for each system. A controlled UxS may be mobile or stationary, can be smart learning, and self-adaptive. Two URCs will be used to hand-off control of a system to a receiver, reducing hand-off time and the need for the UxSs to have multiple OCUs. The URC will also be capable of "hot swapping" batteries where one of its two batteries can be replaced without the system being shut down, halting mission progress, and use current or new Soldier power sources that will maximize its operational time and minimize the number of replacement batteries needed for most missions. The intent of this requirement is allow the Soldier at battalion and below to use the URC to operate unmanned aerial systems (e.g. Raven, PUMA, Short Range Micro (SRM), etc.) and unmanned ground vehicles (e.g. CRS(I), CRS(V),CRS(H), SMET, MTRS INC II, Light Reconnaissance (LR), Wingman, etc.) and emerging unmanned air/ground systems. The URC is defined in the Common Robotic System (Individual) (CRS(I)) Capability Development Document (CDD) and is included in the CRS(I) acquisition. A standalone requirements document is being developed at a date TBD.

FY 2020 RDTE funding in the amount of $1.186 million will be utilized to complete test evaluation and LOG product development under the CRS(I) contract, mature the Universal Robotic Controller to meet the requirements in the CDD and emerging programs of record, controller software updates, and integration and test the URC into other Unmanned Ground Vehicles (UGV) or Unmanned Aerial Vehicles (UAS) programs of record via an Engineering Change Proposal (ECP). This funding also supports programmatic risk mitigation activities including, but not limited to: Cyber Security Controls (i.e. Risk Management Framework), commonality directives, payloads, sensors, condition based maintenance, electronics, standard interfaces and architectures, autonomous operations and other emerging technologies, interoperability (IOP), and analysis of collaborative operations with various Unmanned Systems assigned at Battalion and below in addition to any program management support costs associated with these activities.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Title: URC improves Soldier situational awareness while reducing cognitive load on Soldiers and the robotics portfolio logistics footprint	-	2.869	1.186
Description: The Universal Robotic Controller (URC) provides the capability to individually and/or concurrently control multiple Unmanned Systems (UxS) platforms and control/monitor a mesh network without having to obtain and/or carry separate Operator Control Unit (OCU)s for each system. A controlled UxS may be mobile or stationary, can be smart learning, and self-adaptive. Two URCs will be used to hand-off control of a system to a receiver, reducing hand-off time and the need for the UxSs to have multiple OCUs. The URC will also be capable of "hot swapping" batteries where one of its two batteries can be replaced without the system being shut down, halting mission progress, and use current or new Soldier power sources that will maximize its operational time and minimize the number of replacement batteries needed for most missions. The controller will also use haptic			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FG8 / *Common Robotic Controller*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
indicators inside the hand grips to give the user active feedback of the controlled system's movements if the UxS software is programmed to use them. If and when the use of lethal systems on the URC is approved, the weaponized payloads will be controlled via several fail-safe mechanisms to prevent accidental discharge. ***FY 2019 Plans:*** FY 2019 RDTE funds will be utilized to conduct user testing and select a Universal Controller. ***FY 2020 Plans:*** FY 2020 RDTE funds will be utilized to complete test evaluation and Log product development under the CRS(I) contract, mature the Universal Robotic Controller to meet the requirements in the CDD and emerging programs of record, controller software updates, risk mitigation activities, and integration and test the URC into other Unmanned Ground Vehicles (UGV) or Unmanned Aerial Vehicles (UAS) programs of record via an Engineering Change Proposal (ECP). ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The efforts listed below are in support of continued developmental efforts for URC Program Efforts once grouped together in FY 2019 Accomplishments/Planned Programs are broken out in FY 2020 for increased transparency.			
Title: FY 2019 SBIR / STTR Transfer ***Description:*** SBIR / STTR ***FY 2019 Plans:*** SBIR/STTR ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Adjust for FY 2019 SBIR / STTR Transfer	-	0.095	-
Accomplishments/Planned Programs Subtotals	-	2.964	1.186

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• G99595: *Common Robotic System-Individual (CRS-I)*	-	3.161	2.285	-	2.285	3.952	4.135	4.438	4.632	0.000	22.603
• G93696: *Common Robotic System - Individual (CRS-I)*	-	-	30.387	-	30.387	37.981	9.000	-	-	0.000	77.368

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FG8 / *Common Robotic Controller*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost

Remarks

D. Acquisition Strategy

The Universal Robotic Controller (URC) is a component of the CRS(I) and does not have its own Acquisition Strategy at this time.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605053A / *Ground Robotics*	Project (Number/Name) FG8 / *Common Robotic Controller*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management support	Various	Various : Multiple	-	-		0.187	Apr 2019	0.086	Oct 2019	-		0.086	0.000	0.273	-
		Subtotal	-	-		0.187		0.086		-		0.086	0.000	0.273	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Manufacturing & Development	C/CPFF	TBD : TBD	-	-		-		0.200	Oct 2019	-		0.200	0.000	0.200	-
Engineering Change Proposal	TBD	Various : Multiple	-	-		-		0.500	Oct 2019	-		0.500	0.000	0.500	-
Software support	Various	Various : Various	-	-		1.284	Apr 2019	-		-		-	0.000	1.284	-
FY 2019 SBIR / STTR Transfer	TBD	TBD : TBD	-	-		0.095	Oct 2018	-		-		-	0.000	0.095	-
		Subtotal	-	-		1.379		0.700		-		0.700	0.000	2.079	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Log Manuals	Various	Various : Multiple	-	-		0.738	May 2019	0.200	Oct 2019	-		0.200	0.000	0.938	-
		Subtotal	-	-		0.738		0.200		-		0.200	0.000	0.938	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
ATEC testing	Various	Varous : Multiple	-	-		-		0.200	Dec 2019	-		0.200	0.000	0.200	-
Contractor PQT	Various	Endeavor & QinetiQ : Massachusetts	-	-		0.660	Apr 2019	-		-		-	0.000	0.660	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605053A / *Ground Robotics*	Project (Number/Name) FG8 / *Common Robotic Controller*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Subtotal			-	-		0.660		0.200		-		0.200	0.000	0.860	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		2.964		1.186		-		1.186	0.000	4.150	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FG8 / *Common Robotic Controller*

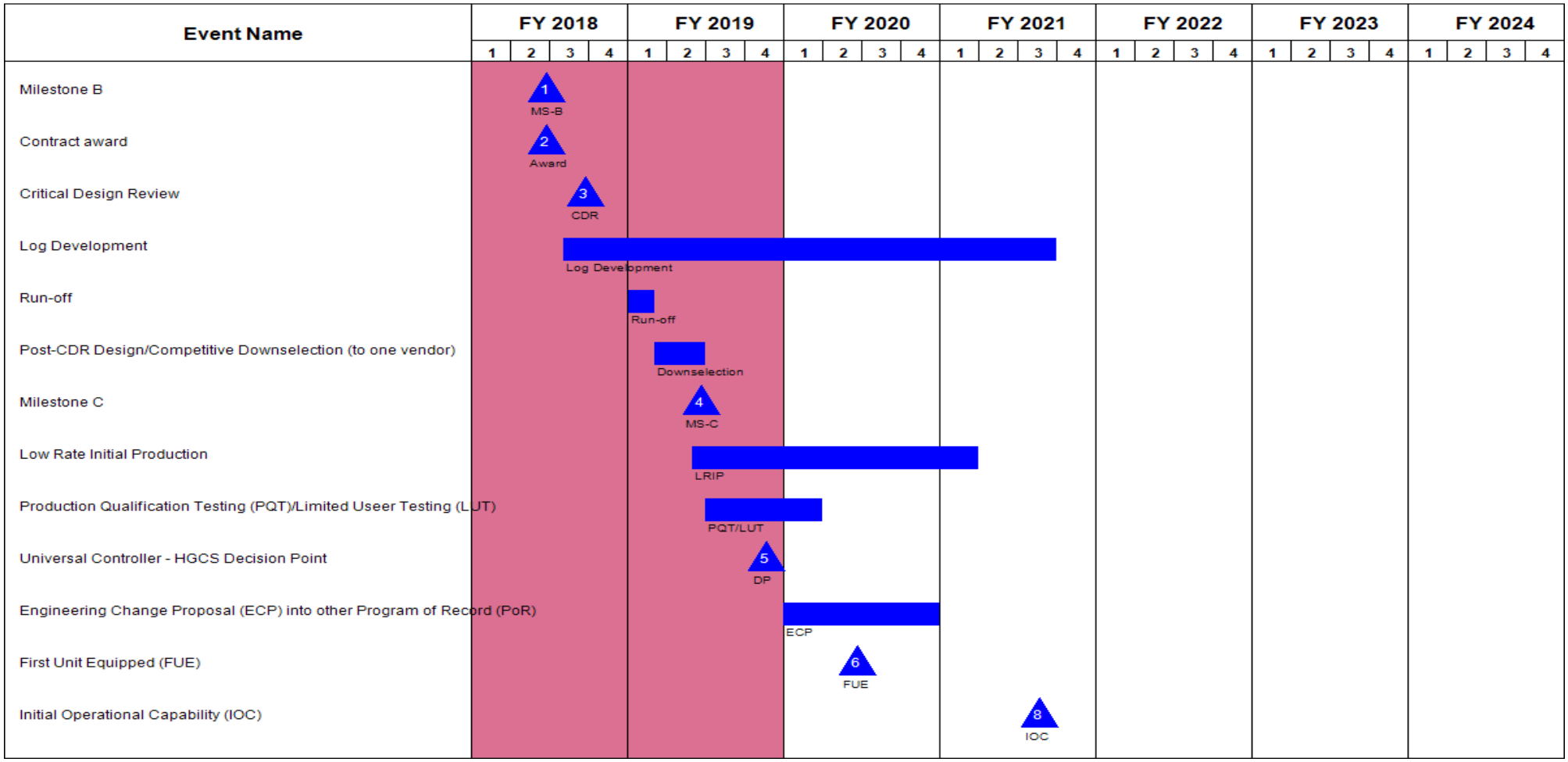

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FG8 / *Common Robotic Controller*

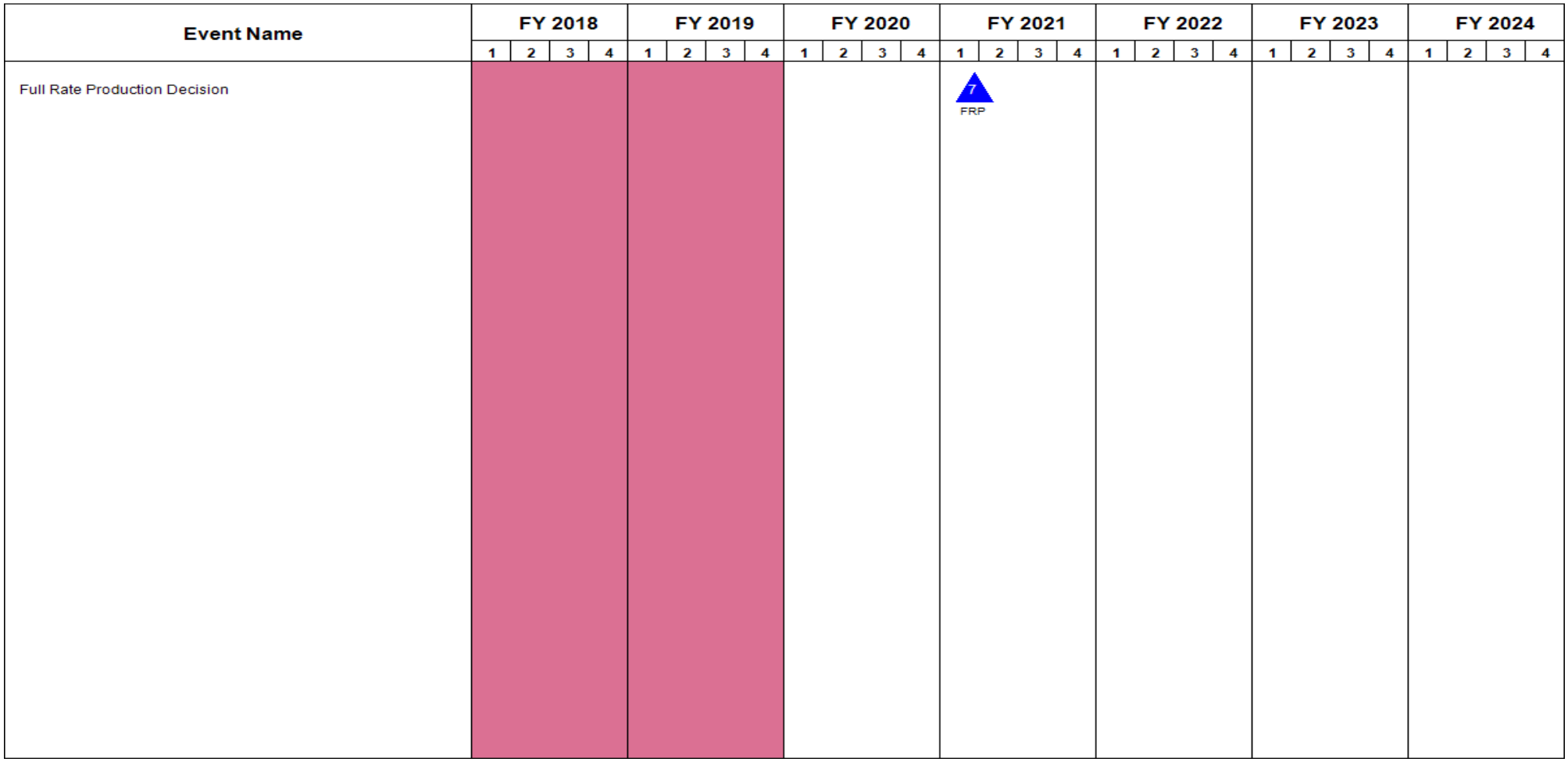

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605053A / *Ground Robotics*	**Project (Number/Name)** FG8 / *Common Robotic Controller*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Milestone B	2	2018	2	2018
Contract award	2	2018	2	2018
Critical Design Review	3	2018	3	2018
Log Development	3	2018	3	2021
Run-off	1	2019	1	2019
Post-CDR Design/Competitive Downselection (to one vendor)	1	2019	2	2019
Milestone C	2	2019	2	2019
Low Rate Initial Production	2	2019	1	2021
Production Qualification Testing (PQT)/Limited Useer Testing (LUT)	3	2019	1	2020
Universal Controller - HGCS Decision Point	4	2019	4	2019
Engineering Change Proposal (ECP) into other Program of Record (PoR)	1	2020	4	2020
First Unit Equipped (FUE)	2	2020	2	2020
Initial Operational Capability (IOC)	3	2021	3	2021
Full Rate Production Decision	1	2021	1	2021