Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Army											Date: February 2020	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 2: *Applied Research*					R-1 Program Element (Number/Name) PE 0602270A / *Electronic Warfare Technology*							
COST ($ in Millions)	**Prior Years**	**FY 2019**	**FY 2020**	**FY 2021 Base**	**FY 2021 OCO**	**FY 2021 Total**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**Cost To Complete**	**Total Cost**
Total Program Element	-	25.127	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	25.127
906: *Tactical Electronic Warfare Applied Research*	-	19.962	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	19.962
CYB: *Applied Offensive Cyber*	-	5.165	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	5.165

Note

In Fiscal Year (FY) 2020 this Program Element (PE) is realigned with continuity of effort to the following PEs:
* 0602146A Network C3I Technology
* 0602148A Future Vertical Lift Technology
* 0602150A Air and Missile Defense Technology
* 0602213A C3I Applied Cyber

A. Mission Description and Budget Item Justification

This PE designs and validates electronic warfare (EW) components, both hardware and software, that deny, disrupt, or degrade the enemy's use of the electromagnetic spectrum for offensive or defensive operations. This is accomplished through the investigation of electronic support measures (ESM); countermeasures against communications systems and networks; the design and fabrication of sensors used to identify and locate threat forces in an asymmetric environment; and threat warning and electronic countermeasures (ECM) against munitions sensors, missile guidance systems, targeting systems, and explosive hazards. Project 906 supports protection of high-value ground platforms, aircraft and the Soldier from threat surveillance and tracking systems, imaging systems, and advanced radio frequency (RF)/electro-optical (EO)/infrared (IR) guided missiles, artillery, and smart munitions. Information fusion research addresses sensor correlation and fusion, relationship discovery, and management services through use of automated processing, as well as software that applies higher level reasoning techniques to support automated combat assessment. Project 906 also supports research and application of key EW sensors, direction finders and jammers to intercept, locate, and disrupt current and emerging communications and non-communications threat emitters to provide vital quality combat information directly to users in a timely and actionable manner. It focuses on detection of threat sensors and emitters associated with weapon systems, targeting systems and command, control, communications, computers, and intelligence systems and networks. Project CYB designs, creates, evaluates, and applies emerging cyber techniques and cyber situational awareness technologies to enhance Army capabilities and to mitigate risks and investigates cyber collection and mapping technologies to offer real time cyber situational awareness to enable interpretation of current threats and predict future enemy activities.

Work in this PE complements PE 0602120A (Sensors and Electronic Survivability), PE 0602782A (Command, Control, Communications Technology), PE 0603270A (Electronic Warfare Technology), and PE 0603772A (Advanced Tactical Computer Science and Sensor Technology); and is coordinated with PE 0603710A (Night Vision Advanced Technology) and PE 0603794A (C3 Advanced Technology).

All FY20 adjustments align program financial structure to Army Modernization Priorities in support of the National Defense Strategy.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Army	Date: February 2020
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 0602270A / *Electronic Warfare Technology*

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

Work in this Project is performed by the United States Army Futures Command (AFC).

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	25.558	0.000	0.000	-	0.000
Current President's Budget	25.127	0.000	0.000	-	0.000
Total Adjustments	-0.431	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.431	-			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 2	R-1 Program Element (Number/Name) PE 0602270A / *Electronic Warfare Technology*	Project (Number/Name) 906 / *Tactical Electronic Warfare Applied Research*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
906: *Tactical Electronic Warfare Applied Research*	-	19.962	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	19.962

Note

In Fiscal Year (FY) 2020 this Project is realigned to:
Program Element (PE) 0602146A Network C3I Technology
* Project AN7 COE - Every Receiver is a Sensor Technology
* Project AO2 Stand-In Advanced RF Effects (STARE)
* Project AQ2 EW Techniques Technology
* Project AQ3 Network Access and Effects
* Project AV3 Foundational S&T for Network C3I Technology
PE 0602148A Future Vertical Lift Technology
* Project AK2 Aviation Survivability Technology

A. Mission Description and Budget Item Justification

This Project designs, fabricates, evaluates, and applies key electronic warfare (EW)/information operations technologies to enhance platform survivability (to include ground combat vehicles, aircraft, and the dismounted Soldier) and to intercept, track and locate current and emerging threat munitions, communications and non-communications threat emitters. This Project applies recent advances in radio frequency (RF), infrared (IR), and electro-optical (EO) sensors and jamming sources to detect, locate, deceive, and jam threats (to include radar directed target acquisition systems, target-tracking sensors, surface-to-air missiles (SAMs), air-to-air missiles (AAMs), top attack weapons, and electronically fused munitions). This project also pursues the ability to neutralize improvised explosive devices. This project designs information systems to provide vital, quality combat information directly to users in a timely, actionable manner in accordance with concepts for future force intelligence operations. This Project investigates RF collection and mapping technologies to offer real time emitter detection, location, and identification. In addition, this project enables a remote capability to disrupt, deny, or destroy threat communication signals and enables fusion (automated assimilation and synthesis) of battlefield intelligence data to enable interpretation of current threats and future enemy activities. This allows commanders to develop operational courses of action in time to act decisively and in a pre-emptive manner.

All FY20 adjustments align program financial structure to Army Modernization Priorities in support of the National Defense Strategy.

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

Work in this Project is performed by the United States Army Futures Command (AFC).

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 2	**R-1 Program Element (Number/Name)** PE 0602270A / *Electronic Warfare Technology*	**Project (Number/Name)** 906 / *Tactical Electronic Warfare Applied Research*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
Title: Data Analytics for Situational Awareness ***Description:*** This effort researches and designs spectrum sensing, electronic sensing and intelligence collection technologies and analytics to enhance overall situational understanding within a contested battlespace. Efforts focus on developing the analytics necessary to taking advantage of the expanding number of data sources available by leveraging existing tactical receivers and other tactical data feeds.	2.946	-	-
Title: Offensive Information Operations Technologies ***Description:*** This effort designs, codes and evaluates techniques for RF network mapping, surgical disruption and unobtrusive operations in the presence of host nation networks. Electronic warfare capabilities include detection, location, classification, mapping and disruption of RF networks and providing data to a user.	2.470	-	-
Title: Multispectral Threat Warning and Countermeasures, formerly Multispectral Threat Warning ***Description:*** This effort investigates and evaluates software and warning sensor/countermeasure components to increase probability to detect and defeat current and evolving small arms and man-portable air defense system (MANPADS) type threats for aviation platforms using modeling and simulation (M&S) and hardware in the loop (HWIL) simulations. Work being accomplished under PE 0603270A (Electronic Warfare Technology) / K16 (Non-Commo Ecm Tech Dem) complements this effort.	6.800	-	-
Title: Multi-Function Intelligence, Surveillance and Reconnaissance Technologies ***Description:*** This effort investigates and codes software algorithms and techniques to intelligently integrate tactical Intelligence, Surveillance, and Reconnaissance (ISR) sensors, improve their individual performance and increase the effectiveness of battlespace awareness/intelligence data in an area of operations. Efforts focus on networking of sensors and open, scalable common RF architectures for terrestrial and aerial sensors.	7.242	-	-
Title: Multi Function Electronic Warfare (MFEW) Technique Development ***Description:*** This effort investigates and develops EW techniques critical to countering communications, such as networked command and control nodes or improvised explosive device threats, and radars, such as ground surveillance and counter-fire radars. The techniques developed are system agnostic and applicable to a wide variety of EW and electronic countermeasure applications, and they can be used to improve the performance and expand the functionality of both current and future EW system capabilities.	0.500	-	-
Title: FY 2018 NDAA SEC 825 MDAP Cost Overrun ***Description:*** FY 2018 NDAA SEC 825 MDAP Cost Overrun	0.004	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 2	**R-1 Program Element (Number/Name)** PE 0602270A / *Electronic Warfare Technology*	**Project (Number/Name)** 906 / *Tactical Electronic Warfare Applied Research*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
Accomplishments/Planned Programs Subtotals	19.962	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 2	R-1 Program Element (Number/Name) PE 0602270A / *Electronic Warfare Technology*	Project (Number/Name) CYB / *Applied Offensive Cyber*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
CYB: *Applied Offensive Cyber*	-	5.165	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	5.165

Note

In Fiscal Year (FY) FY 2020 this Project is realigned to:
Program Element (PE) 0602213A C3I Applied Cyber
* Project 3CY Network Access and Effects Technology
* Project 5CY Offensive Cyber Operations (OCO) Mirror Technology

A. Mission Description and Budget Item Justification

This Project designs, creates, evaluates, and applies emerging cyber techniques and cyber situational awareness technologies to enhance Army capabilities. This Project leverages behavioral Modeling and Simulation to mitigate risks and investigates cyber collection and mapping technologies to offer real time cyber situational awareness to enable interpretation of current threats and predict future enemy activities. This allows commanders to develop operational courses of action in time to act decisively and in a pre-emptive manner.

All FY20 adjustments align program financial structure to Army Modernization Priorities in support of the National Defense Strategy.

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

Work in this Project is performed by the United States Army Futures Command (AFC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
Title: Offensive Information Operations Technologies ***Description:*** This effort designs, codes and evaluates cyber architectures, software, tools and techniques that identify and capture data traversing targeted networks for the purpose of Cyber Electro Magnetic Activity (CEMA) or otherwise countering adversary communications. Cyber capabilities include detection, identification, exploitation, direction finding (DF), geolocation, and denial of service.	5.164	-	-
Title: FY 2018 NDAA SEC 825 MDAP Cost Overrun ***Description:*** FY 2018 NDAA SEC 825 MDAP Cost Overrun	0.001	-	-
Accomplishments/Planned Programs Subtotals	5.165	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 2	**R-1 Program Element (Number/Name)** PE 0602270A / *Electronic Warfare Technology*	**Project (Number/Name)** CYB / *Applied Offensive Cyber*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A