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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 3: Advanced Technology Development (ATD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0603270A / <i>Electronic Warfare Technology</i>
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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	-	40.461	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	40.461
CY3: <i>Offensive Cyber Operations Mirror Adv Tech</i>	-	6.238	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	6.238
K12: <i>EW Demonstrations (CA)</i>	-	10.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	10.000
K15: <i>Advanced Comm Ecm Demo</i>	-	2.439	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	2.439
K16: <i>Non-Commo Ecm Tech Dem</i>	-	21.784	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	21.784

**Note**

In Fiscal Year 2020 (FY20) this Program Element (PE) was realigned to the following PEs:

- \* 0603463A Network C3I Advanced Technology
- \* 0603465A Future Vertical Lift Advanced Technology Project:
- \* 0603462A Next Generation Combat Vehicle Advanced Technology
- \* 0603457A C3I Cyber Advanced Development

**A. Mission Description and Budget Item Justification**

This PE matures and demonstrates electronic warfare (EW) sensors and software intended to deny, disrupt, locate or destroy the enemy's command, control and communications (C3) systems and intelligence, surveillance and reconnaissance assets. This PE matures both countermeasures (CM) and counter-countermeasures (CCM) to deny the enemy the use of their systems while protecting United States (U.S.) assets from enemy deception and jamming. Project CY3 matures and demonstrates architecture, sensor and software techniques to provide operationally relevant capabilities for cyber support at Corps level and below and enables cyber situational awareness, command and control, mission rehearsal, observable reporting, and framework to incrementally advance cyber tool development. Project K15 matures and demonstrates capabilities to locate and exploit enemy communication systems including computer networks. Project K16 matures and demonstrates multifunctional EW capabilities (jamming) to enhance platform survivability and provide near real-time situational awareness to the Commander through the detection, identification and geo-location of emitters of interest.

Work in this PE complements PE 0602120A (Sensors and Electronic Survivability), PE 0602782A (Command, Control, Communications Technology), PE 0602270A (Electronic Warfare Technology), PE 0603772A (Advanced Tactical Computer Science) and PE 0603794A (Command, Control and Communications Advanced Technology), and is coordinated with PE 0602601A (Combat Vehicle and Automotive Technology), PE 0602618A (Ballistics Technology), PE 0603003A (Aviation Advanced Technology), PE 0603004A (Weapons and Munitions Advanced Technology), PE 0603005A (Combat Vehicle and Automotive Advanced Technology), PE 0603313A (Missile and Rocket Advanced Technology) and PE 0603794A (Command, Control and Communications Advanced Technology).

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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 3: Advanced Technology Development (ATD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0603270A / <i>Electronic Warfare Technology</i>
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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 U.S. Army Futures Command (AFC).

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Previous President's Budget	41.458	0.000	0.000	-	0.000
Current President's Budget	40.461	0.000	0.000	-	0.000
Total Adjustments	-0.997	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.997	-			

**Congressional Add Details (\$ in Millions, and Includes General Reductions)**

**Project:** K12: *EW Demonstrations (CA)*

Congressional Add: *Tactical Cyber-Electronic Warfare Readiness*

Congressional Add: *FY 2018 NDAA SEC 825 MDAP Cost Overrun*

	<b>FY 2019</b>	<b>FY 2020</b>
	9.998	-
	0.002	-
Congressional Add Subtotals for Project: K12	10.000	-
Congressional Add Totals for all Projects	10.000	-

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 3					<b>R-1 Program Element (Number/Name)</b> PE 0603270A / <i>Electronic Warfare Technology</i>				<b>Project (Number/Name)</b> CY3 / <i>Offensive Cyber Operations Mirror Adv Tech</i>			
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
CY3: <i>Offensive Cyber Operations Mirror Adv Tech</i>	-	6.238	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	6.238

**Note**

In Fiscal Year 2020 (FY20) this Project was realigned to:  
 Program Element (PE) 0603457 C3I Cyber Advanced Development:  
 \* Project 9CY Network Access and Effects  
 \* Project CB4 Offensive Cyber Operations (OCO) Mirror Advanced Technology

**A. Mission Description and Budget Item Justification**

This Project matures and demonstrates architecture, sensor and software techniques to provide operationally relevant capabilities for cyber support at Corps and Below. This Project enables cyber situational awareness, command and control, mission rehearsal, observable reporting, and framework to incrementally advance cyber tool development to realize the desired intent against any threat, to perform Cyber/EW/SIGINT operations and to assist in answering the commanders understanding of the battlespace in a hostile electromagnetic and cyber environment.

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 U.S. Army Futures Command (AFC).

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2019	FY 2020	FY 2021
<b>Title:</b> Offensive Operations	6.237	-	-
<b>Description:</b> This effort matures and demonstrates integrated electronic attack (EA) and cyberspace electromagnetic activities (CEMA) hardware and software to execute force protection (FP), EA, electronic surveillance (ES), signals intelligence (SIGINT), electronic warfare (EW) and cyber missions in a dynamic, distributed and coordinated fashion. This results in the capability to engage a multitude of diverse multi-node, multi-waveform, multi-platform and cyber (internetworked computers) targets while maximizing overall network efficiency and effectiveness, and preserving Blue Force and non-combatant communications.			
<b>Title:</b> FY 2018 NDAA SEC 825 MDAP Cost Overrun	0.001	-	-
<b>Description:</b> FY 2018 NDAA SEC 825 MDAP Cost Overrun			
<b>Accomplishments/Planned Programs Subtotals</b>	6.238	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603270A / <i>Electronic Warfare Technology</i>	Project (Number/Name) CY3 / <i>Offensive Cyber Operations Mirror Adv Tech</i>

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603270A / <i>Electronic Warfare Technology</i>	<b>Project (Number/Name)</b> K12 / <i>EW Demonstrations (CA)</i>
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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
<i>K12: EW Demonstrations (CA)</i>	-	10.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	10.000

**A. Mission Description and Budget Item Justification**

Congressional Interest Item funding for Electronic Warfare Technology and Demonstrations.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2019	FY 2020
<b><i>Congressional Add:</i></b> Tactical Cyber-Electronic Warfare Readiness	9.998	-
<b><i>FY 2019 Accomplishments:</i></b> Tactical Cyber-Electronic Warfare Readiness		
<b><i>Congressional Add:</i></b> FY 2018 NDAA SEC 825 MDAP Cost Overrun	0.002	-
<b><i>FY 2019 Accomplishments:</i></b> FY 2018 NDAA SEC 825 MDAP Cost Overrun		
<b>Congressional Adds Subtotals</b>	10.000	-

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Army **Date:** February 2020

<b>Appropriation/Budget Activity</b> 2040 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603270A / <i>Electronic Warfare Technology</i>	<b>Project (Number/Name)</b> K15 / <i>Advanced Comm Ecm Demo</i>
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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
<i>K15: Advanced Comm Ecm Demo</i>	-	2.439	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	2.439

**Note**

In Fiscal Year 2020 (FY20) this Project was realigned to:  
 Program Element (PE) 0603463A Network C3I Advanced Technology:  
 \* Project AN8 COE - Every Receiver is a Sensor Advanced Tech  
 \* Project AO7 EW for Maneuver Operations (EMO) Adv Tech

**A. Mission Description and Budget Item Justification**

This Project matures and demonstrates sensor and software technologies to locate and identify modern tactical enemy and blue force (friendly) radio frequency (RF) communications, radars, signals of interest (SOI) and computer networks/nodes. This Project enables uninterrupted air and ground based intelligence collection and long range targeting operations in a hostile electromagnetic and cyber environment, and enables communications countermeasures (CM) and counter-countermeasures (CCM) to first intercept, identify and locate tactical communications; then degrade threat-computer networks and their components.

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 U.S. Army Futures Command (AFC).

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2019	FY 2020	FY 2021
<b>Title:</b> Stand-off Non-Cooperative Multi-Intelligence (Multi-INT) Technologies	2.438	-	-
<b>Description:</b> This effort matures and demonstrates hardware and software to conduct standoff electronic warfare (EW) intelligence, surveillance reconnaissance, planning and effects in a three dimensional urban battlespace.			
<b>Title:</b> FY 2018 NDAA SEC 825 MDAP Cost Overrun	0.001	-	-
<b>Description:</b> FY 2018 NDAA SEC 825 MDAP Cost Overrun			
<b>Accomplishments/Planned Programs Subtotals</b>	2.439	-	-

**C. Other Program Funding Summary (\$ in Millions)**

N/A

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 2040 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603270A / <i>Electronic Warfare Technology</i>	<b>Project (Number/Name)</b> K15 / <i>Advanced Comm Ecm Demo</i>

**C. Other Program Funding Summary (\$ in Millions)**

**Remarks**

**D. Acquisition Strategy**

N/A

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army										<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 3					<b>R-1 Program Element (Number/Name)</b> PE 0603270A / <i>Electronic Warfare Technology</i>				<b>Project (Number/Name)</b> K16 / <i>Non-Commo Ecm Tech Dem</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
K16: <i>Non-Commo Ecm Tech Dem</i>	-	21.784	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	21.784

**Note**

In Fiscal Year 2020 (FY20) this Project was realigned to:  
 Program Element (PE) 0603465A Future Vertical Lift Advanced Technology:  
 \* Project AK3 Aviation Survivability Advanced Technology  
 PE 0603462A Next Generation Combat Vehicle Advanced Technology:  
 \* Project BG7 Ground Systems Active Defense (GSAD) Advanced Tech

**A. Mission Description and Budget Item Justification**

This Project matures and demonstrates non-communication, multi-functional electronic warfare (EW) capabilities that enhance the survivability of Army air and ground platforms and dismounted Soldiers. This Project matures and demonstrates radio frequency (RF), infrared (IR) and electro-optical (EO) sensors and jamming sources to detect, locate, deceive, and neutralize (jam) booby traps, radar-directed target acquisition systems, target-tracking sensors, surface-to-air missiles (SAMs), air-to-air missiles (AAMs), and top-attack and electronically-fuzed munitions. This Project also enables electronic support (ES) hardware and software to detect, identify and geolocate emitters of interest from an effective standoff distance to provide near real-time situational awareness.

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)**

	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<b>Title:</b> Multispectral Threat Detection and Countermeasure Technologies	6.269	-	-
<b>Description:</b> This effort matures and demonstrates countermeasure technologies that provide platform protection and integrated cueing against EO, IR, and RF guided threats.			
<b>Title:</b> Advanced Tactical EW Countermeasure Technologies	4.922	-	-
<b>Description:</b> This effort matures and demonstrates integrated EW direction finding technologies that provide protection of ground and dismounts from emerging RF threats at standoff distances.			
<b>Title:</b> EW Counter Countermeasures	3.382	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Army		<b>Date:</b> February 2020		
<b>Appropriation/Budget Activity</b> 2040 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603270A / <i>Electronic Warfare Technology</i>	<b>Project (Number/Name)</b> K16 / <i>Non-Commo Ecm Tech Dem</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
<b>Description:</b> This effort matures and demonstrates hardware and software to counter emerging EW threats to command, control, communications, computers, intelligence, surveillance and reconnaissance (C4ISR) platforms.				
<b>Title:</b> Active Protection System (APS) Soft Kill (SK)/Hard Kill (HK) Sensors (formerly titled Active Protection System (APS) Soft Kill)		3.345	-	-
<b>Description:</b> This effort matures and demonstrates hardware, software and techniques to provide an EW soft kill, and cueing/tracking capability to the APS suite. This effort supports the Army's APS program to mature and demonstrate technologies to reduce vehicle weight by reducing reliance on armor through the use of other means such as sensing, warning, hostile fire detection, and active countermeasures to achieve increased protection against current and emerging threats.				
<b>Title:</b> Modeling Simulation and Technique Maturation for Integrated RF Operations (formerly titled Integrated RF Operations)		1.207	-	-
<b>Description:</b> This effort matures and demonstrates a capability to perform modeling and simulation (M&S) of geographically dispersed RF systems to provide a coordinated, collaborative and interoperable suite of EW capabilities. A modular software architecture will allow for rapid, cost effective technique development and integration of new EW capabilities, arget signals of interest and environmental simulations.				
<b>Title:</b> Intelligence Processing and Architecture Modernization		2.654	-	-
<b>Description:</b> This effort will leverage Intelligence Community investments in software frameworks and exploits against threat SOIs to develop a library of open, modular, and scalable software solutions to address identified capability gaps and to provide the commander with electronic situational awareness while at the same time protecting his assets from enemy deception and jamming.				
<b>Title:</b> FY 2018 NDAA SEC 825 MDAP Cost Overrun		0.005	-	-
<b>Description:</b> FY 2018 NDAA SEC 825 MDAP Cost Overrun				
<b>Accomplishments/Planned Programs Subtotals</b>		21.784	-	-
<b>C. Other Program Funding Summary (\$ in Millions)</b>				
N/A				
<b>Remarks</b>				
<b>D. Acquisition Strategy</b>				
N/A				