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

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 4: Advanced Component Development & Prototypes (ACD&P)	R-1 Program Element (Number/Name) PE 0604021A / Electronic Warfare Technology Maturation (MIP)
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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	-	0.000	23.043	22.840	-	22.840	0.000	0.000	0.000	0.000	0.000	45.883
AW7: Electronic Warfare Technology Maturation (MIP)	-	0.000	23.043	22.840	-	22.840	0.000	0.000	0.000	0.000	0.000	45.883

A. Mission Description and Budget Item Justification

Terrestrial Layer System (TLS) provides Army maneuver forces integrated full spectrum Signals Intelligence (SIGINT), Electronic Warfare (EW), and Cyber-enabling non-kinetic offensive operation options to Brigade Combat Team (BCT) and Expeditionary-Military Intelligence Brigade (EMIB) commanders. TLS' information superiority provides Indications and Warnings, Force Protection and Situational Awareness to influence the commander's decision cycle, improve targeting timeliness and accuracy, and provide the maneuver commander with electronic attack and offensive cyber warfare options to deny, degrade, disrupt, or otherwise manipulate the targeted force. TLS employs technologically advanced systems with a modular open-system approach for multiple operation configurations that can be efficiently sustained and effectively upgraded to provide capabilities against changing near peer and emerging threats to address multi-domain capability gaps.

B. Program Change Summary (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	0.000	18.043	18.800	-	18.800
Current President's Budget	0.000	23.043	22.840	-	22.840
Total Adjustments	0.000	5.000	4.040	-	4.040
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	5.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	4.040	-	4.040

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

Project: AW7: Electronic Warfare Technology Maturation (MIP)

Congressional Add: Counter drone RF-signal based targeting

	FY 2019	FY 2020
	-	5.000
Congressional Add Subtotals for Project: AW7	-	5.000
Congressional Add Totals for all Projects	-	5.000

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Appropriation/Budget Activity
2040: *Research, Development, Test & Evaluation, Army / BA 4: Advanced Component Development & Prototypes (ACD&P)*

R-1 Program Element (Number/Name)
PE 0604021A / *Electronic Warfare Technology Maturation (MIP)*

Change Summary Explanation

Additional \$4.040 million required in FY 2021 to continue TLS development activities.

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Appropriation/Budget Activity 2040 / 4					R-1 Program Element (Number/Name) PE 0604021A / <i>Electronic Warfare Technology Maturation (MIP)</i>				Project (Number/Name) AW7 / <i>Electronic Warfare Technology Maturation (MIP)</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
AW7: <i>Electronic Warfare Technology Maturation (MIP)</i>	-	0.000	23.043	22.840	-	22.840	0.000	0.000	0.000	0.000	0.000	45.883
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Terrestrial Layer System (TLS) provides Army maneuver forces integrated full spectrum Signals Intelligence (SIGINT), Electronic Warfare (EW), and Cyber-enabling non-kinetic offensive operation options to Brigade Combat Team (BCT) and Expeditionary-Military Intelligence Brigade (EMIB) commanders. TLS' information superiority provides Indications and Warnings, Force Protection and Situational Awareness to influence the commander's decision cycle, improve targeting timeliness and accuracy, and provide the maneuver commander with electronic attack and offensive cyber warfare options to deny, degrade, disrupt, or otherwise manipulate the targeted force. TLS employs technologically advanced systems with a modular open-system approach for multiple operation configurations that can be efficiently sustained and effectively upgraded to provide capabilities against changing near peer and emerging threats to address multi-domain capability gaps.

Justification:
FY 2021 Base funding in the amount of \$22.840 million provides for, but is not limited to, the development and evaluation of component level TLS technologies.

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

	FY 2019	FY 2020	FY 2021
<p>Title: Technical / Program Management</p> <p>Description: Funds will provide for technical engineering and program management.</p> <p>FY 2020 Plans: FY 2020 technical engineering and program management support for TLS.</p> <p>FY 2021 Plans: FY 2021 technical engineering and program management support for TLS.</p>	-	2.282	2.282
<p>Title: Systems Engineering and Component Prototyping</p> <p>Description: Funds will provide for, but are not limited to development, engineering and evaluation of component level technologies to include antennas, radios, software architecture and other Signals Intelligence (SIGINT), Electronic Warfare Support (ES), Electronic Attack (EA) and Cyber enabling components to mature technical feasibility and reduce Critical Technology Element (CTE) risks. Funds will support, but are not limited to the development capabilities to enhance and integrate Signals of Interest, develop system level designs, reduce Size, Weight and Power (SWaP), to mature components into an emerging Program of Record (PoR) level technology maturation level, and to support the evaluation environment to conduct required developmental events.</p>	-	15.761	20.558

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Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0604021A / <i>Electronic Warfare Technology Maturation (MIP)</i>	Project (Number/Name) AW7 / <i>Electronic Warfare Technology Maturation (MIP)</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<i>FY 2020 Plans:</i> Conduct development of SIGINT, ES, EA and cyber enabling components and system alternatives. Award contract agreements to mature critical technologies, develop sub-systems, components and reduce component integration risks in a System solution that can be evaluated for affordability, feasibility, and technical maturity; all of which will reduce program technical and cost risks.			
<i>FY 2021 Plans:</i> Continue development of SIGINT, ES, EA and cyber enabling components and system alternatives. Continue to mature and evaluate critical technologies, co-develop Intelligence Community (IC) Signals of Interest (SOI), develop sub-systems, components and reduce component integration risks in a system solution that can be evaluated for affordability, feasibility, and technical maturity; all of which will reduce program technical and cost risks.			
<i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> Increased funding in FY 2021 due to multiple evaluation requirements.			
Accomplishments/Planned Programs Subtotals	-	18.043	22.840

	FY 2019	FY 2020
<i>Congressional Add:</i> Counter drone RF-signal based targeting	-	5.000
<i>FY 2020 Plans:</i> Counter drone RF-signal based targeting		
Congressional Adds Subtotals	-	5.000

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

Line Item	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
• FJ5: <i>Terrestrial Layer System (MIP)</i>	-	-	38.105	-	38.105	51.250	20.980	12.090	-	0.000	122.425
• B97610: <i>TERRESTRIAL LAYER SYSTEM (TLS) (MIP)</i>	-	-	8.081	-	8.081	39.710	88.133	167.066	186.448	0.000	489.438

Remarks

D. Acquisition Strategy

A competitive acquisition approach for component development and prototyping is planned for TLS using a tailored acquisition strategy to rapidly deliver an initial integrated signals intelligence, electronic warfare and cyber capability to the Army. These efforts will be used, but are not limited to identify, develop, prototype, evaluate, analyze, and demonstrate potential capabilities and alternative solutions. These efforts will quantify the respective maturity and effectiveness to mitigate capability gaps

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<p>against changing near peer representative enemy target sets and operational scenarios. Enhanced capability and other technologies to provide overmatch capabilities will be evaluated for merit and will provide increased performance for production of TLS systems in FY 2022.</p>		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army												Date: February 2020			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 4				PE 0604021A / <i>Electronic Warfare Technology Maturation (MIP)</i>				AW7 / <i>Electronic Warfare Technology Maturation (MIP)</i>							
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering and Prototyping	C/Various	TBD : TBD	-	-		15.761	Feb 2020	20.558	Feb 2021	-		20.558	0.000	36.319	-
Counter drone RF-signal based targeting	C/Various	TBD : TBD	-	-		5.000		-		-		-	0.000	5.000	-
Subtotal			-	-		20.761		20.558		-		20.558	0.000	41.319	N/A
Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Technical / Program Management	C/CPFF	AASKI Technology : Tinton Falls, NJ	-	-		1.141	Nov 2019	1.141	Nov 2020	-		1.141	0.000	2.282	-
Technical / Program Management	MIPR	Various Matrix Support Organizations : Aberdeen Proving Grounds, MD	-	-		1.141	Nov 2019	1.141	Nov 2020	-		1.141	0.000	2.282	-
Subtotal			-	-		2.282		2.282		-		2.282	0.000	4.564	N/A
Project Cost Totals			-	-		23.043		22.840		-		22.840	0.000	45.883	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
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Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Milestone A					▲ 1																											
Component Engineering and Prototyping																																
Developmental Testing (A)																																
Developmental Testing (B)																																
Milestone B (Transition from BA 4 to BA 5 RDT&E)													▲ 2																			
Integration & Evaluation on Platform 1																																
Developmental Testing (C)																																
Milestone C / Production Decision																	▲ 3															
Component Procurement																																
Production on Platform 1																																
Limited User Testing of TLS on Platform 1																	▲ 4															
First Unit Equipped with TLS on Platform 1																	▲ 5															
Iterative Prototyping																																

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Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Integration & Evaluation on Platform 2																												
Production on Platform 2																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0604021A / <i>Electronic Warfare Technology Maturation (MIP)</i>	Project (Number/Name) AW7 / <i>Electronic Warfare Technology Maturation (MIP)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Milestone A	2	2020	2	2020
Component Engineering and Prototyping	3	2020	2	2021
Developmental Testing (A)	4	2020	4	2020
Developmental Testing (B)	1	2021	1	2021
Milestone B (Transition from BA 4 to BA 5 RDT&E)	2	2021	2	2021
Integration & Evaluation on Platform 1	2	2021	1	2022
Developmental Testing (C)	3	2021	4	2021
Milestone C / Production Decision	1	2022	1	2022
Component Procurement	2	2021	1	2022
Production on Platform 1	2	2022	2	2025
Limited User Testing of TLS on Platform 1	4	2022	4	2022
First Unit Equipped with TLS on Platform 1	4	2022	4	2022
Iterative Prototyping	1	2022	1	2027
Integration & Evaluation on Platform 2	4	2021	1	2023
Production on Platform 2	1	2023	1	2027