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

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 1: Basic Research</i>	R-1 Program Element (Number/Name) PE 0601101A / <i>In-House Laboratory Independent Research</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	-	11.391	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
91A: <i>ILIR-AMC</i>	-	10.432	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
F16: <i>ILIR-SMDC</i>	-	0.959	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Note
 In Fiscal Year (FY) 2020 this Program Element (PE) is realigned with continuity of effort to the following:
 ? PE 0601102A Defense Research Sciences

A. Mission Description and Budget Item Justification

This PE supports basic research at the Army laboratories through the In-House Laboratory Independent Research (ILIR) program. Basic research lays the foundation for future developmental efforts by identifying fundamental principles governing various phenomena and appropriate pathways to exploit this knowledge. The ILIR program serves as a catalyst for major technology breakthroughs by providing laboratory directors flexibility in implementing novel research ideas, by nurturing promising young scientists and engineers, and is used to attract and retain top doctoral degreed scientists and engineers. The ILIR program also provides a source of competitive funds for peer reviewed efforts at Army laboratories to stimulate high quality, innovative research with significant opportunity for payoff to Army warfighting capability.

This PE supports ILIR at the United States (U.S.) Army Futures Command's six Research, Development, and Engineering Centers (Project 91A), and at the U.S. Space and Missile Defense Command (SMDC) (Project F16).

Work in the PE provides a foundation for applied research initiatives at the Army laboratories and research, development and engineering centers.

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.

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B. Program Change Summary (\$ in Millions)	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>
Previous President's Budget	11.579	0.000	0.000	-	0.000
Current President's Budget	11.391	0.000	0.000	-	0.000
Total Adjustments	-0.188	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.188	-			

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Appropriation/Budget Activity 2040 / 1					R-1 Program Element (Number/Name) PE 0601101A / <i>In-House Laboratory Independent Research</i>				Project (Number/Name) 91A / <i>ILIR-AMC</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
91A: <i>ILIR-AMC</i>	-	10.432	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Note

In Fiscal Year (FY) 2020, this Project is being realigned to:
 Program Element (PE) 0601102A Defense Research Sciences
 * Project AA1 ILIR - AMC

A. Mission Description and Budget Item Justification

This Project funds basic research within the Army Future Command's (AFC) six Research, Development, and Engineering Centers (RDECs) and lays the foundation for future developmental efforts by identifying the fundamental principles governing various phenomena and appropriate pathways to exploit this knowledge.

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

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

	FY 2019	FY 2020	FY 2021
Title: Edgewood Chemical Biological Center	0.955	-	-
Description: Funds basic research in chemistry, biology, biotechnology, and aerosol for countering improvised explosive devices (IEDs), obscurants, and/or target defeat. Work in this effort provides theoretical underpinnings for PE 0602622A (Chemical, Smoke, and Equipment Defeating Technologies).			
Title: Armaments Research, Development and Engineering Center	1.409	-	-
Description: Funds basic research in weapons component development, explosives synthesis/detection and area denial. Work in this effort provides theoretical underpinnings for PE 0602307A (Advanced Weapons Technology).			
Title: Tank-Automotive Research, Development and Engineering Center	1.207	-	-
Description: Funds basic research in ground vehicle technologies to include power, mobility, and unmanned systems. Work in this effort provides theoretical underpinnings for PE 0602601A (Combat Vehicle and Automotive Technology).			
Title: Natick Soldier Research, Development, and Engineering Center	1.102	-	-
Description: Funds basic research in food sciences, textiles, and lightweight materials with potential for individual protection. Work in this effort provides theoretical underpinnings for PE 0601102A (Defense Research Sciences), Project H52 (Equipment for the Soldier).			
Title: Aviation and Missile Research, Development and Engineering Center: Missile Efforts	2.302	-	-

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Appropriation/Budget Activity 2040 / 1	R-1 Program Element (Number/Name) PE 0601101A / <i>In-House Laboratory Independent Research</i>	Project (Number/Name) 91A / <i>ILIR-AMC</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Description: Funds basic research in guided missile and rocket systems, directed energy weapons, unmanned vehicles, and related components. Work in this effort provides theoretical underpinnings for PE 0602303A (Missile Technology).			
Title: Aviation and Missile Research, Development and Engineering Center: Aviation Efforts	1.313	-	-
Description: Funds basic research for aviation enabling technologies in the areas of aerodynamics, structural dynamics, and material science. Work in this effort provides theoretical underpinnings for PE 0602211A (Aviation Technology).			
Title: Communications-Electronics Research, Development, and Engineering Center	2.143	-	-
Description: Funds basic research for communication and network enabling technologies in the areas of antenna design, network management, power generation and storage, and sensors. Work in this effort provides theoretical underpinnings for PE 0602705A (Electronics and Electronic Devices).			
Title: FY 2018 NDAA SEC 825 MDAP Cost Overrun	0.001	-	-
Description: FY 2018 NDAA SEC 825 MDAP Cost Overrun			
Accomplishments/Planned Programs Subtotals	10.432	-	-

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

N/A

Remarks

D. Acquisition Strategy

N/A

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Appropriation/Budget Activity 2040 / 1					R-1 Program Element (Number/Name) PE 0601101A / <i>In-House Laboratory Independent Research</i>				Project (Number/Name) F16 / <i>ILIR-SMDC</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
F16: <i>ILIR-SMDC</i>	-	0.959	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Note

In Fiscal Year (FY) 2020, this Project is being realigned to:
 Program Element (PE) 0601102A Defense Research Sciences
 * Project AA2 ILIR - SMDC

A. Mission Description and Budget Item Justification

This Project provides In-house Laboratory Independent Research (ILIR) at the United States (US) Army Space and Missile Defense Command/Army Forces Strategic Command (USASMDC/ARSTRAT). This basic research on lasers and directed energy lays the foundation for future developmental efforts on high energy lasers and directed energy systems by identifying the fundamental principles governing various directed energy phenomena.

Work in this Project is related to, and fully coordinated with, efforts in PE 0602307A (Advanced Weapons Technology).

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

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

	FY 2019	FY 2020	FY 2021
Title: SMDC In-house Laboratory Independent Research	0.959	-	-
Description: Funds basic research to investigate laser propagation phenomenology for application in modeling and simulation and future directed energy weapons design. Activities in this effort transition to High Energy Laser Technology in PE 0602307A (Advanced Weapons Technology).			
Accomplishments/Planned Programs Subtotals	0.959	-	-

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

N/A

Remarks

D. Acquisition Strategy

N/A