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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Army **Date:** March 2023

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603386A / <i>Biotechnology for Materials - Advanced Research</i>
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COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	51.774	56.853	59.871	-	59.871	36.840	25.208	25.225	25.500	0.000	281.271
CP7: <i>Biotechnology Demonstration and Evaluation</i>	-	51.774	56.853	59.871	-	59.871	36.840	25.208	25.225	25.500	0.000	281.271

A. Mission Description and Budget Item Justification

This Program Element (PE) matures and demonstrates novel biotechnological methods, processes, and materials to enhance military supply chain resilience. The Army is responsible for centrally managing funding for Tri-Service Biotechnology for a Resilient Supply Chain (T-BRSC) efforts. T-BRSC leverages bio-industrial manufacturing to ensure critical domestic supply chain resilience for defense needs through domestic production of raw materials and critical products. The Army supports this Tri-Service effort under this PE with collaboration among sister Services and select allied partners to support a robust pipeline for biotechnology related manufacturing. Advanced research projects optimize and rapidly demonstrate future novel biotechnologies for disruptive breakthrough capabilities. This PE provides bio-engineered and biosynthetic materials to ensure domestic sourcing of critical products in the defense supply chain. Also under this PE, efforts mature and demonstrate rapid prototyping methods for rapid testing of bio-derived materials as well as optimize models for the design and bio-security of bio-engineered materials for defense applications.

This PE is coordinated with PE 0602386A (Biotechnology for Materials - Applied Research).

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

Research in this PE is performed by the United States (US) Army Futures Command (AFC).

B. Program Change Summary (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	53.736	56.853	38.881	-	38.881
Current President's Budget	51.774	56.853	59.871	-	59.871
Total Adjustments	-1.962	0.000	20.990	-	20.990
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-1.962	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	20.990	-	20.990

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Change Summary Explanation

Increase is due to the fact that additional technology demonstrations have to be conducted prior to transition to BA4.

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Appropriation/Budget Activity 2040 / 3					R-1 Program Element (Number/Name) PE 0603386A / <i>Biotechnology for Materials - Advanced Research</i>				Project (Number/Name) CP7 / <i>Biotechnology Demonstration and Evaluation</i>			
COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
<i>CP7: Biotechnology Demonstration and Evaluation</i>	-	51.774	56.853	59.871	-	59.871	36.840	25.208	25.225	25.500	0.000	281.271
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project collaborates with Joint Service partners to mature, optimize, and demonstrate novel biotechnologies and related methods to establish a domestic resilient supply chain for defense needs. Advanced research validates and provides bio-derived, bio-functionalized, and bio-manufactured materials. This Project matures and demonstrates high-throughput screening and small-scale prototyping, enhances material performance, and exploits biotechnologies to provide drop-in replacements and materials with enhanced properties for defense applications. Areas of focus may include high density, high performance fuels for high speed weapons, bio-based propellants, optical materials, and bio-derived systems that sense and respond to the presence of contaminants.

Work in this Project compliments Program Element (PE) 0602386A (Biotechnology for Materials - Applied Research) / CP6 (Foundational Biotechnology Design and Dev).

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.

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

	FY 2022	FY 2023	FY 2024
Title: Biosynthetic Material Demonstration	51.774	54.778	59.871
Description: This task matures and demonstrates novel and emerging biotechnologies related to bio-engineered or bio-manufactured materials to address vulnerabilities in the critical material supply chain for military needs.			
FY 2023 Plans:			
* Optimize and expand the Tri-Service capability for rapid maturation, demonstration, and evaluation of bio-products for defense applications by exploiting the use of robotics for semi-autonomous capabilities. This Tri-Service capability will support the rapid assessment of biotechnology solutions and biotechnologically derived materials with cutting-edge instrumentation.			
* Optimize bio-manufacturing methods and demonstrate the production of materials for defense needs at reduced cost compared to commercial sources to provide an alternative means of sourcing critical materials. Demonstrate the methods for the large scale bio-manufacture of a drop-in replacement high performance fuel blend to support high speed weapons in hypersonic flight.			

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2022	FY 2023	FY 2024
<p>* Optimize bio-manufacturing methods and capabilities for the production of a fire-resistant coating for high-temperature, fire-resistant composite materials supporting long-range missile cases and hypersonic flight. The result will be a bio-manufactured materials with improved performance that can be exploited as a viable resource for Warfighter dominance.</p> <p>FY 2024 Plans:</p> <p>* Will utilize Tri-Service capability for rapid maturation, demonstration, and optimization of bio-products for defense applications by exploiting the use of robotics for semi-autonomous capabilities to develop new biomanufacturing platform strains. Rapidly assess the ability of new strains to provide a biotechnology solutions and biotechnologically derived materials.</p> <p>* Scale-up the production of biomolecules for use as energetic materials in hypersonic systems at volumes suitable for advanced prototyping and testing. Validate the performance of these materials to support enhanced weapon systems range, increased speeds, potential reusability, and supply security on relevant platforms.</p> <p>* Mature and demonstrate the bio-manufacturing process development for domestic production of high temperature resistant bio-manufactured materials necessary for new hypersonic defense systems, unmanned aerial vehicles (UAVs) and fire-resistant casings for batteries.</p> <p>* Improve the performance of biotechnology product production and downstream processing activities in high hazard operations. Optimize the biotechnology production data management, and process control software.</p> <p>* Demonstrate the production of bio-manufactured aviation and ground vehicle critical materials from in-theater waste streams. Optimize the organic solution to provide fuel in theater to maintain a capable fighting force and persist inside actively contested spaces from a sustainable and secure production system.</p> <p>* Demonstrate reduced logistics through biocementation technology for expeditionary basing needs.</p> <p>* Mature and demonstrate a biomanufactured non-hazardous solvents for use in stripping and cleaning applications for ground, air, and marine applications.</p> <p>* Demonstrate optical materials for agile laser protection of goggles, vision blocks, and sensor systems.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: Funding increase reflects planned lifecycle of the effort.</p>				
Title: SBIR/STTR		-	2.075	-

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2022	FY 2023	FY 2024
Description: Funding transferred in accordance with Title 15 USC §638				
FY 2023 Plans: Funding transferred in accordance with Title 15 USC §638				
FY 2023 to FY 2024 Increase/Decrease Statement: Funding transferred in accordance with Title 15 USC §638				
Accomplishments/Planned Programs Subtotals		51.774	56.853	59.871
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy				
N/A				