Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Defense Advanced Research Projects Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 0602383E / *BIOLOGICAL WARFARE DEFENSE*

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	-	31.951	34.588	26.950	-	26.950	25.071	30.536	38.536	41.035	-	-
BW-01: *BIOLOGICAL WARFARE DEFENSE*	-	31.951	34.588	26.950	-	26.950	25.071	30.536	38.536	41.035	-	-

A. Mission Description and Budget Item Justification

The Biological Warfare Defense project is budgeted in the Applied Research Budget Activity because its focus is on the underlying technologies associated with the detection, prevention, treatment and remediation of biological, chemical, and radionuclide threats.

Efforts to counter existing and emerging biological, chemical and radiological threats included: countermeasures to stop the pathophysiologic processes that occur as a consequence of an attack; collection of environmental trace constituents to support chemical mapping, tactical and strategic biological, chemical, and radiological sensors; and integrated defense systems. This project also includes development of a unique set of platform technologies and medical countermeasures synthesis that will dramatically decrease the timeline from military threat detection to countermeasure availability.

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	33.640	34.588	29.836	-	29.836
Current President's Budget	31.951	34.588	26.950	-	26.950
Total Adjustments	-1.689	0.000	-2.886	-	-2.886
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-0.558	0.000			
• SBIR/STTR Transfer	-1.131	0.000			
• TotalOtherAdjustments	-	-	-2.886	-	-2.886

Change Summary Explanation

FY 2019: Decrease reflects reprogrammings and the SBIR/STTR transfer.
FY 2020: N/A
FY 2021: Decrease reflects repricing of the Defense Against Mass Terror Threats program.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
Title: Defense Against Mass Terror Threats	31.951	34.588	26.950

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021

Description: The objective of the Defense Against Mass Terror Threats program is to identify and develop technologies that have the potential to significantly improve the United States' ability to reduce the risk of mass casualties in the wake of a Weapons of Mass Terror (WMT) attack. Challenges in reducing U.S. vulnerability to these attacks include developing new sensors and systems that afford early warning and opportunities to interdict these threats before they can be employed in urban areas and other population centers. A major goal of this program is to develop new sensors and sensing networks that can economically and reliably provide these wide-area monitoring capabilities for WMT threat signatures.

FY 2020 Plans:

- Initiate development of a continuous, wide-area sensing, full spectrum WMT sensing platform that integrates developments in physical sensors, automated intelligence and network algorithms, open source IT platforms, and adversary models.
- Test and further develop initial chemical and biological sensor suite based on sensor specificity, sensitivity, and time to detection performance to enable scalable and robust wide-area sensing.
- Continue development of an open source, continuous, wide-area sensing IT platform capable of simultaneous ingress and fused analysis of thousands of real-time, multi-modal physical sensor and information feeds.
- Continue development of algorithms capable of multi-modal sensor and information fusion, informed by potential adversary behaviors learned from scaled social science models, for threat detection that maximizes sensitivity while minimizing false alarms.
- Mature collaborations with law enforcement, Federal and international partners to support testing of sensor and network systems, support access to relevant data sets, and enable future transition activities.
- Conduct demonstrations and data collects of chemical and biological sensor systems.

FY 2021 Plans:

- Continue spiral development of chemical and biological sensors to include initial independent government testing of performance and suitability.
- Conduct initial operational demonstrations of new chemical and biological sensor systems with local, state and Federal stakeholders.
- Assess utility of worn physiological sensors to augment a biological sensor network.
- Continue spiral development of a network backbone and operating system supporting sensor and transactional data ingestion, including structured and unstructured data via natural language processing and assemblage of world graphs.
- Develop initial end-to-end alpha build of the network, including data model, pipeline and analytics engine capable of ingestion and automated analytics of heterogeneous transactional data sets and sensor data.
- Develop initial test strategies for sensor and network technologies that support eventual transition strategies, including into a possible Joint Concept Technology Demonstration or Program of Record.

FY 2020 to FY 2021 Increase/Decrease Statement:

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
FY 2021 decrease reflects shift from design and development to evaluation and demonstration.			
Accomplishments/Planned Programs Subtotals	31.951	34.588	26.950

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

N/A