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**Department of Defense
Fiscal Year (FY) 2022 Budget Estimates**

May 2021



Chemical and Biological Defense Program

Defense-Wide Justification Book Volume 4 of 5

Research, Development, Test & Evaluation, Defense-Wide

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Chemical and Biological Defense Program • Budget Estimates FY 2022 • RDT&E Program

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Chemical and Biological Defense Program Fiscal Year 2022 Budget Overview

The Chemical and Biological Defense Program (CBDP) is vital to our Nation's ability to counter current and future threats posed by chemical and biological (CB) weapons. CB threats remain significant and are expanding at an exponentially accelerated pace due to the convergence of multiple sciences and rapid technological developments, the last year has demonstrated the critical need for responsive biodefense capabilities to address these rapid changes. In recognition of this strategic context, the 2020 CBDP Enterprise Strategy established four strategic goals to improve Warfighter readiness and lethality and to align with other Departmental reforms. These are: ***plan for the future fight, deliver at speed, drive innovation, and optimize the enterprise.*** The strategy synchronizes CBDP processes and actions to ensure the Enterprise keeps pace with departmental reforms and stays ahead of threats, while delivering timely and effective CB defense capabilities to the Joint Force. The office of the Deputy Assistant Secretary of Defense for Chemical and Biological Defense (ODASD(CBD)) continues to work across the Department to clarify roles and responsibilities, strengthen domestic and international partnerships, anticipate emerging CB threats, close today's gaps, and rapidly mitigate vulnerabilities, specifically challenges highlighted by the ongoing COVID-19 pandemic.

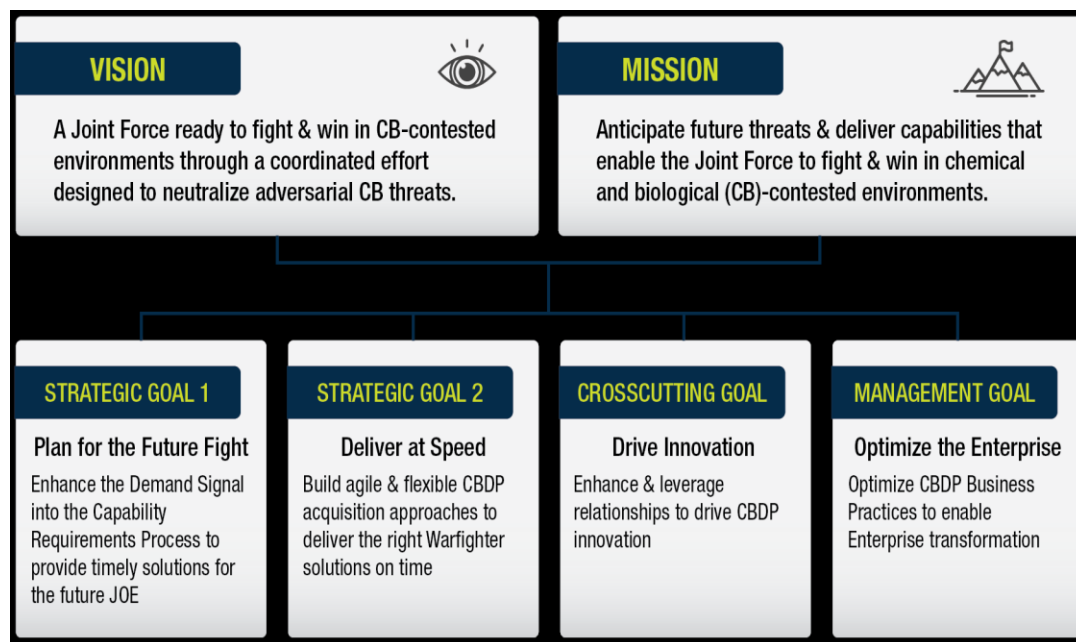
Strategic Overview

The *2021 Interim National Security Strategic Guidance (INSSG)*, *2018 National Defense Strategy (NDS)*, and *2018 National Biodefense Strategy (NBS)* acknowledge an increasingly complex global security environment, characterized by the re-emergence of long-term, strategic competition between nations, and the growing potential for strategic surprise stemming from advances and convergences in science and technology. The INSSG acknowledges that nuclear weapons and other weapons of mass destruction (WMD) all pose profound and, in some cases, existential dangers. Furthermore, the NDS prioritizes efforts to prevent WMD proliferation, defend the homeland from WMD, and manage the consequences of WMD attacks. The INSSG also highlights a renewed emphasis on the risks that biological threats, whether natural, accidental, or manmade, pose to our national security. The growing complexity of the threat space in biotechnology, engineering, and computational science create challenges for the Joint Force and may threaten the US' enduring advantages. The increased willingness of threat actors to use CB weapons to coerce, compel, or gain a tactical advantage is alarming and demonstrates the erosion of longstanding international norms against using these weapons. The proliferation of knowledge and technology, difficulty in detecting illicit activities, rise of advanced and emerging threats and improved delivery capabilities, and our limited ability to anticipate how adversaries could employ WMD, heighten the risk of attacks against the U.S. or its allies.



At the same time, science and technology advances increases the threat of an adversary biological weapons attack intended to appear as a naturally occurring disease outbreak. It is imperative that DoD prepare and is able to respond across the full spectrum of biological threats. The DoD's COVID-19 pandemic responses identified gaps in authorities and organizational structures to support necessary response efforts. The CBDP efforts are nested with Departmental partners as they continue to pursue opportunities to strengthen biodefense responsibilities and efforts across DoD stakeholders and the U.S. government.

As noted in the INSSG, however, the acceleration of science and technology “poses both peril and promise.” These changes create opportunities for the CB defense enterprise to leverage innovation and integrate the collective knowledge to rapidly field adaptive solutions to mitigate threats. Additionally, the technology to develop countermeasures for both naturally occurring and intentional CB incidents continues to merge, providing opportunities to gain efficiencies and reduce potential duplication of effort.



Considering the international security environment and national security objectives, the vision and mission of the CBDP is a Joint Force ready to fight and win in CB-contested environments through a coordinated effort designed to neutralize adversarial CB threats. The CBDP will achieve this through anticipation of future threats and delivery of capabilities that enable the Joint Force. These capabilities are part of an integrated and layered defense approach that addresses emerging threat conditions and leverages countering weapons of mass destruction (CWMD) missions that support operations ranging from major combat operations to domestic incident responses.

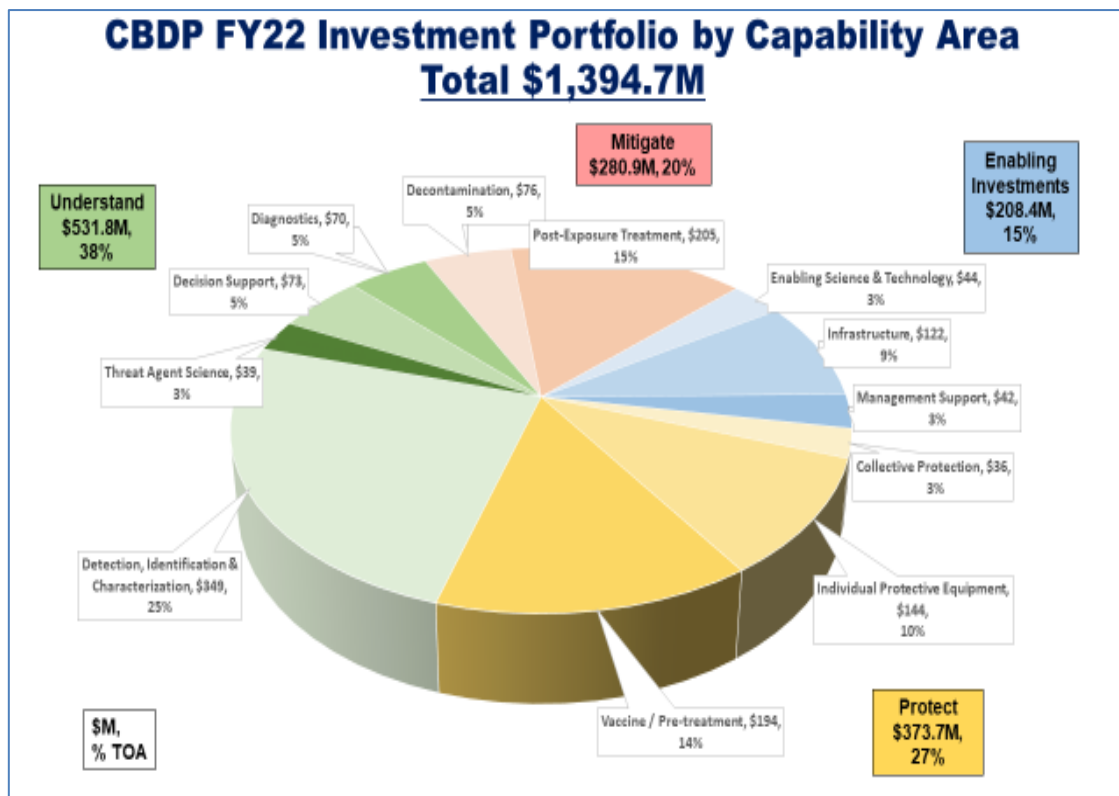


FY 2022 Portfolio Overview

The FY 2022 budget request of \$1.4 billion supports the INSSG, NDS and the DoD Strategy for CWMD, including the 2020 CBDP Enterprise Strategy, and will enable the continued development of capabilities to increase the resiliency of our warfighters and support efforts to understand, protect, and mitigate CB incidents and hazards. The CBDP investments are aligned to the following portfolios:

- Understand Portfolio (\$531.8M) -

Reduces the risk from emerging threats resulting from advances in technology and the increased proliferation of WMD to prevent surprise to the Department and the nation. Efforts focus on accelerating characterization and early assessment of possible CB hazards by leveraging advances in technology and artificial intelligence. Capabilities development seeks to improve tactical and operational commanders' decisions through improved detection, diagnosis and identification capabilities to support assigned missions. Developmental efforts focus on increasing detection accuracy, range and effectiveness, ensuring that data integrates seamlessly with other non-CB sensor systems and relevant information systems, and integration of sensors onto Service-fielded unmanned platforms.





- Protect Portfolio (\$373.7M) – Enhance mission performance and provide effective protection against current and emerging threats by rapidly developing and fielding modernized protection capabilities. Developmental efforts focus on advances in materials and systems engineering to enhance protective properties against a broader array of hazards, while reducing CWMD operational challenges and logistical burdens. Approaches focus on modular and customizable solutions that are effective against a broad range of challenges in varied environments. Improve delivery of medical countermeasures to the warfighter by enhancing development through a platform-based approach to enable cost effective and agile delivery of prophylactic capabilities for known and emerging threats. Developmental efforts focus on advanced medical countermeasures that provide safe and effective medical defenses against biological agents (bacteria, toxins, and viruses), emerging infectious diseases, and chemical agents.
- Mitigate Portfolio (\$280.9M) – Preserve combat power by developing and fielding systems that mitigate exposure to CB hazards and restore combat readiness of critical personnel and platforms. Developmental efforts address personnel decontamination, to include handling mass casualties and human remains, along with materiel decontamination, which includes sensitive equipment and aircraft. Novel decontamination approaches focus on broad decontaminant applicability to CB hazards, while minimizing harm to individuals, equipment, and platforms.
- Enabling Investments (\$208.4M) – Provides fundamental knowledge, dedicated infrastructure, technology demonstrations, and overarching RDT&E support functions as portfolio enablers key to responding to emerging threats. Dedicated funding in this portfolio supports National and Departmental incident response and preparedness to CB threats.



Countering Emerging Threats

The CBDP is reforming to address the current and future threat landscape while building an agile and adaptable program to ensure execution of Department priorities. Understanding and anticipating emerging threats is central to the CBDP's contribution to implement the NDS and address the threats posed by our adversaries.

The FY2022 budget request continues this pivot towards efforts focusing on countering emerging threats. This includes additional investments focused on countering emerging threats, to include;

- Initiation of a rapid response capability for repurposing FDA approved drug therapies for CB considerations and continues investments that build on COVID-19 response successes for added agility in our MCM development capabilities.
- Establishes an emerging threat innovation fund to expand S&T efforts focused on advancing novel technologies and research towards addressing gaps against current and future threats.
- Expands characterization and understanding for threat agent sciences.
- Increases investments on MCM platform and manufacturing technologies to streamline and accelerate product delivery and reduce developmental risk against known and unknown biological threats.
- Increased fielding of modernized capabilities to improve detection and identification against current and emerging threats, including fourth generation agents.

FY 2022 Budget Request Highlights

The FY 2022 Research, Development, Test and Evaluation (RDT&E) budget request of \$1,037.6 million supports key efforts including:

- \$219.0 million supporting RDT&E efforts advancing environmental detection and medical diagnostic capabilities providing enhanced situational awareness of traditional and non-traditional chemical hazards, as well as traditional and emerging biological hazards.
- \$205.8 million to continue support of research and development of Medical Countermeasures (MCMs), such as vaccines and therapeutics, addressing high-priority biological hazards.
- \$134.3 million supporting improved domestic incident preparedness and response to include dedicated efforts improving capabilities to address potential future pandemic and biological incidents. Includes focused investments



on MCM platform and manufacturing technologies to streamline and accelerate product delivery and reduce developmental risk. Additionally, these resources provide dedicated funding towards the DoD Medical Countermeasures Advanced Development and Manufacturing capability.

- \$105.0 million to continue support of research and development of MCMs focused on protecting against and treating exposure to traditional and non-traditional chemical agents.
- \$82.1 million supporting RDT&E for personnel protection, respiratory and ocular protection, collective protection, and hazard mitigation capabilities against traditional and non-traditional CB agents.
- \$74.0 million supporting basic research and threat agent sciences, advancing fundamental knowledge and experimental research in the life and physical sciences.
- \$71.1 million supporting integrated early warning, biosurveillance, warning & reporting, decision support, and modeling and simulation capabilities.
- \$70.8 million to support critical CB defense research, development, and test infrastructure and operations.
- \$35.8 million supporting concepts development, technology demonstrations, enhanced capability demonstrations, and Special Operations Forces Rapid Capability Development and Deployment to enhance military operational capabilities with technologies and equipment. Resources a dedicated innovation fund to rapidly address emerging threats.
- The FY 2022 Procurement budget request of \$357.2 million supports key efforts including:
 - \$64 million to procure the Common Analytical Laboratory System capability to integrate a common suite of commercial- and government-off-the-shelf components to provide a common, modular, and transportable/mobile analytical laboratory system to support DoD field analytic units. Systems provide rapid response capabilities to the Joint Force to analyze current and emerging chemical and biological threats.
 - \$60 million to procure improved air crew and ground forces protective ensembles to increase protection against advanced chemical and biological threats and decrease physiological burden.



- \$57 million to procure modernized respiratory and ocular protection for ground and air forces supporting increased protection against advanced chemical and biological threats and a decrease in the physiological burden.
- \$26 million to procure Joint Biological Aircraft Decontamination Systems providing large U.S. Air Force airframes the capability to decontaminate the interior and exterior of critical aircraft from biological threats.
- \$23 million to procure modernized collective protection capabilities (Joint Expeditionary Collective Protection, and CB Aircraft Survivability Barrier).
- \$22 million to procure CBRN Dismounted Reconnaissance Sets, Kits, and Outfits which allows warfighters to perform CBRN dismounted reconnaissance, surveillance, and site assessment of WMD suspect areas not accessible by traditional CBRN reconnaissance-mounted platforms.
- \$22 million to procure Enhanced Maritime Biological Detectors to provide the U.S. Navy improved detection and identification capabilities with decreased operational costs and increased reliability for detection of biological agents.

Summary

Because the proliferation of WMD is among the greatest challenges facing the United States of America, the Department must prioritize improving our ability to counter these new and emerging threats. Currently, the erosion of international norms regarding the use of CB weapons, acceleration and advances in science and technology, and the re-emergence of strategic competition all worsen the current CB threat environment. Amid this new technological revolution, the United States must continue modernizing our defensive capabilities and reinvest in the Department's scientific and technological edge. Accordingly, this budget enables the CBDP to increase the lethality of the Joint Force by ensuring they can fight and win in CB-contested environments and prevent any advantage against the United States and our allies and partners.

BEHIND THE WARFIGHTER. AHEAD OF THE THREAT.



Footnotes

FY 2020 Actuals

Includes Division A, Title IX and X of the Consolidated Appropriations Act, 2020 (P.L. 116-93), Division F, Title IV and V from the Further Consolidated Appropriations Act, 2020 (P.L. 116-94) and the Coronavirus Aid, Relief, and Economic Security Act (P.L. 116-136).

FY 2021 Enacted

Includes Division C, Title IX and Division J, Title IV of the Consolidated Appropriations Act, 2021 (P.L. 116-260).

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Department of Defense
FY 2022 President's Budget
Exhibit R-1 FY 2022 President's Budget
Total Obligational Authority
(Dollars in Thousands)

05 May 2021

Appropriation	FY 2020 Actual*	FY 2021 Enacted**	FY 2022 Request
Research, Development, Test & Eval, DW	1,163,287	1,043,228	1,037,545
Total Research, Development, Test & Evaluation	1,163,287	1,043,228	1,037,545

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Department of Defense
 FY 2022 President's Budget
 Exhibit R-1 FY 2022 President's Budget
 Total Obligational Authority
 (Dollars in Thousands)

05 May 2021

Summary Recap of Budget Activities	FY 2020 Actual*	FY 2021 Enacted**	FY 2022 Request
Basic Research	44,240	50,300	34,708
Applied Research	201,105	201,807	206,956
Advanced Technology Development	209,552	191,001	197,824
Advanced Component Development & Prototypes	104,580	76,167	129,445
System Development & Demonstration	417,723	356,472	299,848
Management Support	135,379	127,951	110,503
Operational Systems Development	50,708	39,530	58,261
Total Research, Development, Test & Evaluation	1,163,287	1,043,228	1,037,545
Summary Recap of FYDP Programs			
Research and Development	1,163,287	1,043,228	1,037,545
Total Research, Development, Test & Evaluation	1,163,287	1,043,228	1,037,545

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Defense-Wide
 FY 2022 President's Budget
 Exhibit R-1 FY 2022 President's Budget
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 (Dollars in Thousands)

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Defense-Wide
FY 2022 President's Budget
Exhibit R-1 FY 2022 President's Budget
Total Obligational Authority
(Dollars in Thousands)

05 May 2021

Appropriation	FY 2020 Actual*	FY 2021 Enacted**	FY 2022 Request
Chemical and Biological Defense Program	1,163,287	1,043,228	1,037,545
Total Research, Development, Test & Evaluation	1,163,287	1,043,228	1,037,545

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 (Dollars in Thousands)

05 May 2021

Appropriation: 0400D Research, Development, Test & Eval, DW

Line No	Program Element Number	Item	Act	FY 2020 Actual*	FY 2021 Enacted**	FY 2022 Request	Se c
8	0601384BP	Chemical and Biological Defense Program	01	44,240	50,300	34,708	U
		Basic Research		44,240	50,300	34,708	
17	0602384BP	Chemical and Biological Defense Program	02	201,105	201,807	206,956	U
		Applied Research		201,105	201,807	206,956	
45	0603384BP	Chemical and Biological Defense Program - Advanced Development	03	209,552	191,001	197,824	U
		Advanced Technology Development		209,552	191,001	197,824	
80	0603884BP	Chemical and Biological Defense Program - Dem/Val	04	104,580	76,167	129,445	U
		Advanced Component Development & Prototypes		104,580	76,167	129,445	
129	0604384BP	Chemical and Biological Defense Program - EMD	05	417,723	356,472	299,848	U
		System Development & Demonstration		417,723	356,472	299,848	
164	0605384BP	Chemical and Biological Defense Program	06	113,307	127,951	110,503	U
165	0605502BP	Small Business Innovative Research - Chemical Biological Def	06	22,072			U
		Management Support		135,379	127,951	110,503	
207	0607384BP	Chemical and Biological Defense (Operational Systems Development)	07	50,708	39,530	58,261	U
		Operational Systems Development		50,708	39,530	58,261	
Total Research, Development, Test & Eval, DW				1,163,287	1,043,228	1,037,545	

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 Total Obligational Authority
 (Dollars in Thousands)

05 May 2021

Appropriation: 0400D Research, Development, Test & Eval, DW

Line No	Program Element Number	Item	Act	FY 2020 Actual*	FY 2021 Enacted**	FY 2022 Request	Se
8	0601384BP	Chemical and Biological Defense Program	01	44,240	50,300	34,708	U
	Basic Research			44,240	50,300	34,708	
17	0602384BP	Chemical and Biological Defense Program	02	201,105	201,807	206,956	U
	Applied Research			201,105	201,807	206,956	
45	0603384BP	Chemical and Biological Defense Program - Advanced Development	03	209,552	191,001	197,824	U
	Advanced Technology Development			209,552	191,001	197,824	
80	0603884BP	Chemical and Biological Defense Program - Dem/Val	04	104,580	76,167	129,445	U
	Advanced Component Development & Prototypes			104,580	76,167	129,445	
129	0604384BP	Chemical and Biological Defense Program - EMD	05	417,723	356,472	299,848	U
	System Development & Demonstration			417,723	356,472	299,848	
164	0605384BP	Chemical and Biological Defense Program	06	113,307	127,951	110,503	U
165	0605502BP	Small Business Innovative Research - Chemical Biological Def	06	22,072			U
	Management Support			135,379	127,951	110,503	
207	0607384BP	Chemical and Biological Defense (Operational Systems Development)	07	50,708	39,530	58,261	U
	Operational Systems Development			50,708	39,530	58,261	
Total Chemical and Biological Defense Program				1,163,287	1,043,228	1,037,545	

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Appropriation 0400: Research, Development, Test & Evaluation, Defense-Wide

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Appropriation 0400: Research, Development, Test & Evaluation, Defense-Wide

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165	06	0605502BP	SMALL BUSINESS INNOVATIVE RESEARCH (SBIR).....	Volume 4 - 355

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CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	0602384BP	17	02.....	Volume 4 - 9
CHEMICAL/BIOLOGICAL DEFENSE (ATD)	0603384BP	45	03.....	Volume 4 - 47
CHEMICAL/BIOLOGICAL DEFENSE (BASIC RESEARCH)	0601384BP	8	01.....	Volume 4 - 1
CHEMICAL/BIOLOGICAL DEFENSE (EMD)	0604384BP	129	05.....	Volume 4 - 183
CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	0607384BP	207	07.....	Volume 4 - 359
CHEMICAL/BIOLOGICAL DEFENSE (RDT&E MGT SUPPORT)	0605384BP	164	06.....	Volume 4 - 335
SMALL BUSINESS INNOVATIVE RESEARCH (SBIR)	0605502BP	165	06.....	Volume 4 - 355

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 (Listing by Budget Activity, then Program Element Number)

BA# 01: Basic Research

Line#	BA#	PE#	PE Title	Cost (\$ in Millions)					
				Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
8	01	0601384BP	CHEMICAL/BIOLOGICAL DEFENSE (BASIC RESEARCH)	-	44.240	50.300	34.708	-	34.708
Total: Basic Research				-	44.240	50.300	34.708	-	34.708

BA# 02: Applied Research

Line#	BA#	PE#	PE Title	Cost (\$ in Millions)					
				Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
17	02	0602384BP	CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	-	201.105	201.807	206.956	-	206.956
Total: Applied Research				-	201.105	201.807	206.956	-	206.956

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 (Listing by Budget Activity, then Program Element Number)

BA# 03: Advanced Technology Development (ATD)

Cost (\$ in Millions)

Line#	BA#	PE#	PE Title	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
45	03	0603384BP	CHEMICAL/BIOLOGICAL DEFENSE (A TD)	-	209.552	191.001	197.824	-	197.824
Total: Advanced Technology Development (ATD)				-	209.552	191.001	197.824	-	197.824

BA# 04: Advanced Component Development & Prototypes (ACD&P)

Cost (\$ in Millions)

Line#	BA#	PE#	PE Title	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
80	04	0603884BP	CHEMICAL/BIOLOGICAL DEFENSE (A CD&P)	-	104.580	76.167	129.445	-	129.445
Total: Advanced Component Development & Prototypes (ACD&P)				-	104.580	76.167	129.445	-	129.445

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 (Listing by Budget Activity, then Program Element Number)

BA# 05: System Development & Demonstration (SDD)

Line#	BA#	PE#	PE Title	Cost (\$ in Millions)					
				Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
129	05	0604384BP	CHEMICAL/BIOLOGICAL DEFENSE (E MD)	-	417.723	356.472	299.848	-	299.848
Total: System Development & Demonstration (SDD)				-	417.723	356.472	299.848	-	299.848

BA# 06: RDT&E Management Support

Line#	BA#	PE#	PE Title	Cost (\$ in Millions)					
				Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
164	06	0605384BP	CHEMICAL/BIOLOGICAL DEFENSE (R DT&E MGT SUPPORT)	-	113.307	127.951	110.503	-	110.503
165	06	0605502BP	SMALL BUSINESS INNOVATIVE RESE ARCH (SBIR)	-	22.072	0.000	0.000	-	0.000
Total: RDT&E Management Support				-	135.379	127.951	110.503	-	110.503

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Chemical and Biological Defense Program • Budget Estimates FY 2022 • RDT&E Program
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 (Listing by Budget Activity, then Program Element Number)

BA# 07: Operational Systems Development

Cost (\$ in Millions)

Line#	BA#	PE#	PE Title	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
207	07	0607384BP	CHEMICAL/BIOLOGICAL DEFENSE (O P SYS DEV)	-	50.708	39.530	58.261	-	58.261
Total: Operational Systems Development				-	50.708	39.530	58.261	-	58.261

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Chemical and Biological Defense Program • Budget Estimates FY 2022 • RDT&E Program

Exhibit R-1

(Listing by Budget Activity, then Program Element Number)

BA# 01: Basic Research

Cost (\$ in Millions)

Line#	BA#	PE#	PE Title	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
8	01	0601384BP	CHEMICAL/BIOLOGICAL DEFENSE (BASIC RESEARCH)	-	44.240	50.300	34.708	-	34.708
Total: Basic Research				-	44.240	50.300	34.708	-	34.708

BA# 02: Applied Research

Cost (\$ in Millions)

Line#	BA#	PE#	PE Title	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
17	02	0602384BP	CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	-	201.105	201.807	206.956	-	206.956
Total: Applied Research				-	201.105	201.807	206.956	-	206.956

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Chemical and Biological Defense Program • Budget Estimates FY 2022 • RDT&E Program

Exhibit R-1

(Listing by Budget Activity, then Program Element Number)

BA# 03: Advanced Technology Development (ATD)

Cost (\$ in Millions)

Line#	BA#	PE#	PE Title	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
45	03	0603384BP	CHEMICAL/BIOLOGICAL DEFENSE (A TD)	-	209.552	191.001	197.824	-	197.824
Total: Advanced Technology Development (ATD)				-	209.552	191.001	197.824	-	197.824

BA# 04: Advanced Component Development & Prototypes (ACD&P)

Cost (\$ in Millions)

Line#	BA#	PE#	PE Title	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
80	04	0603884BP	CHEMICAL/BIOLOGICAL DEFENSE (A CD&P)	-	104.580	76.167	129.445	-	129.445
Total: Advanced Component Development & Prototypes (ACD&P)				-	104.580	76.167	129.445	-	129.445

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Chemical and Biological Defense Program • Budget Estimates FY 2022 • RDT&E Program

Exhibit R-1

(Listing by Budget Activity, then Program Element Number)

BA# 05: System Development & Demonstration (SDD)

Cost (\$ in Millions)

Line#	BA#	PE#	PE Title	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
129	05	0604384BP	CHEMICAL/BIOLOGICAL DEFENSE (E MD)	-	417.723	356.472	299.848	-	299.848
Total: System Development & Demonstration (SDD)				-	417.723	356.472	299.848	-	299.848

BA# 06: RDT&E Management Support

Cost (\$ in Millions)

Line#	BA#	PE#	PE Title	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
164	06	0605384BP	CHEMICAL/BIOLOGICAL DEFENSE (R DT&E MGT SUPPORT)	-	113.307	127.951	110.503	-	110.503
165	06	0605502BP	SMALL BUSINESS INNOVATIVE RESE ARCH (SBIR)	-	22.072	0.000	0.000	-	0.000
Total: RDT&E Management Support				-	135.379	127.951	110.503	-	110.503

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Chemical and Biological Defense Program • Budget Estimates FY 2022 • RDT&E Program

Exhibit R-1

(Listing by Budget Activity, then Program Element Number)

BA# 07: Operational Systems Development

Cost (\$ in Millions)

Line#	BA#	PE#	PE Title	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
207	07	0607384BP	CHEMICAL/BIOLOGICAL DEFENSE (O P SYS DEV)	-	50.708	39.530	58.261	-	58.261
Total: Operational Systems Development				-	50.708	39.530	58.261	-	58.261

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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide</i> / BA 1: <i>Basic Research</i>	R-1 Program Element (Number/Name) PE 0601384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (BASIC RESEARCH)</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	44.240	50.300	34.708	-	34.708	-	-	-	-	-	-
LF1: <i>Life Sciences (Basic Research)</i>	-	27.925	29.764	19.172	-	19.172	-	-	-	-	-	-
PS1: <i>Physical Sciences (Basic Research)</i>	-	16.315	20.536	15.536	-	15.536	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

The projects in this program element (PE) advance fundamental knowledge in life and physical sciences. These are basic research efforts directed at promoting theoretical and experimental research in Life and Physical Sciences.

Individual projects include:

- Life Sciences (LF1): fundamental efforts to understand living systems' response to biological or chemical agents, to support detection, diagnostics, protection, and medical treatment (e.g. microbiology, biochemistry, pathogenic mechanisms, cell and molecular biology, immunology, nanoscale science, and information science).

- Physical Sciences (PS1): fundamental scientific phenomena to support investigation of physical and chemical properties and interactions for enhanced functionalities important to detection, diagnostics, protection, and decontamination (e.g. chemistry, physics, materials science, nanotechnologies, nanoscale science, and environmental science).

B. Program Change Summary (\$ in Millions)

	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>
Previous President's Budget	48.238	45.300	45.314	-	45.314
Current President's Budget	44.240	50.300	34.708	-	34.708
Total Adjustments	-3.998	5.000	-10.606	-	-10.606
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	0.000	5.000			
• Congressional Directed Transfers	0.000	-			
• Reprogrammings	-1.365	-			
• SBIR/STTR Transfer	-2.633	-			
• Other Adjustments	0.000	-	-10.606	-	-10.606

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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 1: Basic Research</i>	R-1 Program Element (Number/Name) PE 0601384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (BASIC RESEARCH)</i>
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Congressional Add Details (\$ in Millions, and Includes General Reductions)

Project: PS1: *Physical Sciences (Basic Research)*

Congressional Add: *Water Jet Technology*

Congressional Add Subtotals for Project: PS1

Congressional Add Totals for all Projects

FY 2020	FY 2021
-	5.000
-	5.000
-	5.000

Change Summary Explanation

Funding: FY20 (-\$1.364 Million): Reprogramming to Applied Research to support developing a predictive analytic in the emerging environment to enable earlier warning of pathogen exposure.

FY20 (-\$2.633 Million): Transfer of funding to support Small Business Innovative Research/Small Business Technology Transfer efforts.

FY21 (+\$5.000 Million): Congressional Add for Water Jet Technology.

FY22 (-\$10.606 Million): Program adjustments to higher priority science & technology efforts.

Schedule: N/A

Technical: N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 1	R-1 Program Element (Number/Name) PE 0601384BP / CHEMICAL/BIOLOGICAL DEFENSE (BASIC RESEARCH)	Project (Number/Name) LF1 / Life Sciences (Basic Research)
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
LF1: Life Sciences (Basic Research)	-	27.925	29.764	19.172	-	19.172	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

This project (LF1) focuses on fundamental efforts to understand living systems' responses to biological or chemical agents, to support detection, protection, diagnostics, and medical treatment. Research focuses on studying factors which influence the behavior of chemicals, toxins, and pathogens in relation to the host or target. Understanding of host/agent interactions can drive exploration of novel approaches to detect, diagnose or protect against threats. Research also focuses on medical countermeasures for improved efficacy against a wide array of current and future threat agents.

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

	FY 2020	FY 2021	FY 2022
Title: 1) Life Sciences	27.925	29.764	19.172
<p>Description: Focuses on fundamental efforts to understand living systems' responses to biological agents, providing knowledge and capabilities that support medical countermeasure development for prophylaxis and therapeutic interventions.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Microbial pathogenesis - Complete the identification of host pathogen interactions utilizing model organisms, such as Burkholderia, Q Fever Filovirus and Alphavirus, to advance knowledge about biological targets in both the pathogen and host. - Animal model development - Continue to enhance animal model knowledge so as to predictively model human disease caused by biological infectious agents and toxins, and enable identification of common targets that facilitate broad-spectrum protection against classes of biological threat agents. - Animal Models Selection and Validation - Continue selection of animal models and threat/therapeutic classes for data validation. Continue to characterize tissue models against known targets to assess comparability to human organ response. Continue validation of organ and animal models against clinical data. - Enabling Technologies - Continue to develop platform technologies, such as artificial intelligence, machine learning, organ-on-a-chip technologies, and nanoparticles to advance broad-spectrum protection strategies engineered to target multiple biological agents, which will provide knowledge useful for development of medical countermeasures capable of defeating broad classes of biological toxins, viruses and bacteria. - Platform Technology - Begin to validate genomic targets for broad anti-alphavirus treatment and establish a screening database of preclinical countermeasures. - Artificial Intelligence (AI) for Early Drug Discovery - Explore the application of machine learning, AI, and other computational tools to inform rational drug discovery, design, optimization, decision support, and medical modeling. Develop a machine learning algorithm to aid in identifying optimal candidates for advanced development of monoclonal antibody biologics. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 1	R-1 Program Element (Number/Name) PE 0601384BP / CHEMICAL/BIOLOGICAL DEFENSE (BASIC RESEARCH)	Project (Number/Name) LF1 / Life Sciences (Basic Research)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>- STEM - Supporting Science, Technology, Engineering and Math (STEM) strategic efforts to develop talent across the education continuum to enrich our current and future DoD workforce to meet defense technological challenges.</p> <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Animal Models - Transition animal models to applied program for validation. - Enabling Technologies - Continue biotechnologies investments into organs-on-a-chip to address mechanisms of actions as well as drug model development as well as high throughput screen purification and screening. - Platform Technology - Continue to validate genomic targets for broad anti-alphavirus treatment and establish a screening database of preclinical countermeasures. - Artificial Intelligence (AI) for Early Drug Discovery - Continue to explore the application of machine learning, AI, and other computational tools to inform rational drug discovery, design, optimization, decision support, and medical modeling. Develop a machine learning algorithm to aid in identifying optimal candidates for advanced development of monoclonal antibody biologics. - Viral Pathogenesis - Continue pathogenesis in mouse models as well as antimicrobial peptide development. - Biomarkers - Begin assessing gene expression in various tissues after alphavirus exposure. Begin integration of machine learning (ML), to predict cellular binding site targets. - Inflammation Mapping - Initiate comparison of genomic models of expression to inflammatory response data. Assess how RNA regulation changes after exposure to chemical agents. Begin integration of machine learning (ML) to screen small molecule library for potential therapeutics. <p>Program ending in FY22:</p> <ul style="list-style-type: none"> - STEM - Complete STEM strategic efforts to develop talent across the education continuum to enrich our current and future DoD workforce to meet defense technological challenges. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Decrease due to change in program/project technical parameters.</p>			
Accomplishments/Planned Programs Subtotals	27.925	29.764	19.172

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• CB2: Chemical Biological Defense (Applied Research)	82.539	103.497	104.362	-	104.362	-	-	-	-	-	-
• NT2: Non-Traditional Agents Defense (Applied Research)	49.222	0.000	0.000	-	0.000	-	-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 1	R-1 Program Element (Number/Name) PE 0601384BP / CHEMICAL/BIOLOGICAL DEFENSE (BASIC RESEARCH)	Project (Number/Name) LF1 / Life Sciences (Basic Research)
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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• TM2: <i>Techbase Medical Defense (Applied Research)</i>	69.344	98.310	102.594	-	102.594	-	-	-	-	-	-
• CB3: <i>Chemical Biological Defense (ATD)</i>	26.426	27.448	27.146	-	27.146	-	-	-	-	-	-
• NT3: <i>Non-Traditional Agents Defense (ATD)</i>	28.344	15.308	18.396	-	18.396	-	-	-	-	-	-
• TM3: <i>Techbase Medical Defense (ATD)</i>	142.123	137.829	137.495	-	137.495	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program										Date: May 2021		
Appropriation/Budget Activity 0400 / 1					R-1 Program Element (Number/Name) PE 0601384BP / CHEMICAL/BIOLOGICAL DEFENSE (BASIC RESEARCH)				Project (Number/Name) PS1 / Physical Sciences (Basic Research)			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
PS1: <i>Physical Sciences (Basic Research)</i>	-	16.315	20.536	15.536	-	15.536	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

This project (PS1) advances fundamental scientific knowledge in physical science areas that include chemistry, physics, materials science, environmental science, and nanotechnology that could potentially lead to transformational chemical biological (CB) defensive capabilities enhancing Warfighter performance and safety.

Individual efforts in this project include:

- Research results in physics, chemistry, and materials science that have potential application in point and remote detection, diagnostics, protection and decontamination.
- Surface and environmental science focus on the study of physical and chemical properties and phenomena of interactions, especially with regard to Non-Traditional Agents (NTAs), in order to improve capabilities such as detection, protection, and decontamination.
- Research in nanotechnology and nanoscale sciences, such as nanoelectromechanical systems, molecular motors, nano-mechanical resonance sensing, and nano-meter imaging. Potential applications across CB capability areas include decreasing detection response times, increasing medical countermeasure effectiveness against a wider array of threat agents, and providing currently unavailable modalities like detection imbedded in fabrics.

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

	FY 2020	FY 2021	FY 2022
Title: 1) Physical Sciences	16.315	15.536	15.536
Description: Focuses on fundamental scientific phenomena including chemistry, physics, materials science, environmental science, and nanotechnology.			
FY 2021 Plans:			
- Bio Characterization - Determine drivers of genetic change and behavior of pathogens in a nonculturable state. Continue to determine conditions that resuscitate bacteria and assess virulence after resuscitation			
- Photonics - Begin to characterize photonic component sensitivity and integration of multi-agent chemical sensing. Begin assessment of selectivity needs and testing against mixture vapors.			
- Chemical Reactivators - Continue mechanistic and structural studies of the aged reactivator complexes.			
- Multifunctional Materials - Continue to synthesize polymer compositions and modify structures based on mechanical analysis. Begin understanding requirements for scale-up of synthesis and integration into woven fibers.			
- Design Rules for Materials - Investigate the effects of topology and pore size of metal organic frameworks, and test against simulant molecules. Revise computational models to predict material reaction rates.			
- Biomimetic - Understand design rules for catalytic hydrolysis of target molecules. Begin characterization of polymers through simulation and comparison to experimental data.			

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 1	R-1 Program Element (Number/Name) PE 0601384BP / CHEMICAL/BIOLOGICAL DEFENSE (BASIC RESEARCH)	Project (Number/Name) PS1 / Physical Sciences (Basic Research)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>- Novel Destruction - Develop a kinetic rates model for organic compounds and chemical warfare agents (CWA) surrogates. Investigate new nano-catalyst synthesis method to reduce material costs and improve catalytic activity.</p> <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Multifunctional Materials - Continue to synthesize polymer compositions and modify structures based on mechanical analysis. Begin understanding requirements for scale-up of synthesis and integration into woven fibers. - Design Rules for Materials - Continue investigating the effects of topology and pore size of metal organic frameworks, and test against simulant molecules. Revise computational models to predict material reaction rates. - Biomimetic - Continue understanding design rules for catalytic hydrolysis of target molecules. Continue characterization of polymers through simulation and comparison to experimental data. - Novel Destruction - Continue developing a kinetic rates model for organic compounds and CWA surrogates. Continue investigating new nano-catalyst synthesis method to reduce material costs and improve catalytic activity. - Photocatalysis - Begin to evaluate thermal chemistry of various materials for baseline metrics. Model performance metrics of material characteristics and kinetics with and without chemical simulants. <p>Programs ending in FY22:</p> <ul style="list-style-type: none"> - Bio Characterization - Complete determination for drivers of genetic change and behavior of pathogens in a nonculturable state. Complete conditions that determine that resuscitate bacteria and assess virulence after resuscitation. - Photonics - Complete characterization of photonic component sensitivity and integration of multi-agent chemical sensing. Complete assessment of selectivity needs and testing against mixture vapors. - Chemical Reactivators - Complete mechanistic and structural studies of the aged reactivator complexes. 			
Accomplishments/Planned Programs Subtotals	16.315	15.536	15.536

	FY 2020	FY 2021
Congressional Add: Water Jet Technology	-	5.000
FY 2021 Plans: - Develop and test Water Jet Technology for the destruction of chemical agent munitions using a stream of high pressure water.		
Congressional Adds Subtotals	-	5.000

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 1	R-1 Program Element (Number/Name) PE 0601384BP / CHEMICAL/BIOLOGICAL DEFENSE (BASIC RESEARCH)	Project (Number/Name) PS1 / Physical Sciences (Basic Research)
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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• CB2: <i>Chemical Biological Defense (Applied Research)</i>	82.539	103.497	104.362	-	104.362	-	-	-	-	-	-
• NT2: <i>Non-Traditional Agents Defense (Applied Research)</i>	49.222	0.000	0.000	-	0.000	-	-	-	-	-	-
• TM2: <i>Techbase Medical Defense (Applied Research)</i>	69.344	98.310	102.594	-	102.594	-	-	-	-	-	-
• CB3: <i>Chemical Biological Defense (ATD)</i>	26.426	27.448	27.146	-	27.146	-	-	-	-	-	-
• NT3: <i>Non-Traditional Agents Defense (ATD)</i>	28.344	15.308	18.396	-	18.396	-	-	-	-	-	-
• TM3: <i>Techbase Medical Defense (ATD)</i>	142.123	137.829	137.495	-	137.495	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

N/A

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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 2: Applied Research</i>	R-1 Program Element (Number/Name) PE 0602384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	201.105	201.807	206.956	-	206.956	-	-	-	-	-	-
CB2: <i>Chemical Biological Defense (Applied Research)</i>	-	82.539	103.497	104.362	-	104.362	-	-	-	-	-	-
NT2: <i>Non-Traditional Agents Defense (Applied Research)</i>	-	49.222	0.000	0.000	-	0.000	-	-	-	-	-	-
TM2: <i>Techbase Medical Defense (Applied Research)</i>	-	69.344	98.310	102.594	-	102.594	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

The projects in this program element (PE) support applied research in the areas of physical technologies, Non-Traditional Agent (NTA) medical and physical defense technologies, and medical technologies. Major efforts support development of vaccines, therapeutics, next generation diagnostics systems, next generation chemical detectors, nerve agent pretreatments, and individual protection advances.

Individual projects include:

- Chemical Biological Defense (CB2): continual improvements in CB physical sciences defense materiel, including contamination avoidance, decontamination, detection and protection technologies, as well as biological weapon/agent surveillance (e.g. CB protective materials, textiles, and filtration, sensors and sensing algorithms, effects modeling, chemical formulations, processes, and methods for hazard mitigation).
- NTA Defense (NT2): supports all NTA efforts (both medical and non-medical) including pretreatments, therapeutics, detection, threat agent science, modeling, protection and hazard mitigation and characterization of emerging threats. Starting in FY21, a portion of the NTA lines have been merged into RDT&E Projects CB3, Chemical Biological Defense, and TM3, Techbase Medical Defense. The administrative change is intended to improve S&T budget agility and transition efficiency.
- Techbase Medical Defense (TM2): development of antidotes, drug treatments, disease surveillance and point-of-need diagnostic devices, patient decontamination and medical technologies management (e.g. drug discovery and platform technology development, biomarkers and assay development useful in drug development and diagnostics, human mimicking devices and regulatory science).

CBDP S&T Applied Research Stakeholders: U.S. Army Combat Capabilities Development Command Chemical Biological Center (DEVCOM CBC), United States Army Medical Research Institute of Infectious Diseases (USAMRIID), United States Army Medical Research Institute of Chemical Defense (USAMRICD), United States Army Natick Soldier Systems Center, Naval Research Lab (NRL), Air Force Research Lab (AFRL), among others. The intent is to maintain strategic partnerships with the Department of Defense (DoD) Service communities for mission success across the enterprise through collaborative planning and programming maintaining budget assurance.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Chemical and Biological Defense Program	Date: May 2021
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 2: Applied Research</i>	R-1 Program Element (Number/Name) PE 0602384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)</i>
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Efforts under this PE will transition to or will provide risk reduction for Advanced Technology Development (PE 0603384BP), Advanced Component Development and Prototypes (PE 0603884BP), and System Development and Demonstration (PE 0604384BP) activities.

B. Program Change Summary (\$ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	215.057	201.807	208.635	-	208.635
Current President's Budget	201.105	201.807	206.956	-	206.956
Total Adjustments	-13.952	0.000	-1.679	-	-1.679
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	0.000	-			
• Congressional Directed Transfers	0.000	-			
• Reprogrammings	-8.499	-			
• SBIR/STTR Transfer	-5.453	-			
• Other Adjustments	0.000	-	-1.679	-	-1.679

Change Summary Explanation

Funding: FY20 (-\$8.501 Million): Internal Reprogramming (FY20-31 IR) for the Coronavirus Aid, Relief, and Economic Security (CARES) Act to conduct rapid assessments and characterizations of emerging pathogens (+\$1.500 Million); below threshold reprogramming to Advanced Technology Development for COVID-19 SARS-CoV-2 vaccine development project (-\$5.404 Million) and medical defense pretreatments efforts (-\$3.909 Million); below threshold reprogramming to RDT&E Management Support for support to laboratory infrastructure for laboratory operations, facilities sustainment, and regulatory compliance for critical chemical biological defense activities at USAMRIID and USAMRICD (-\$0.688 Million).

FY20 (-\$5.453 Million): Transfer of funding to support Small Business Innovative Research/Small Business Technology Transfer efforts.

FY22: (-\$1.679 Million): Program adjustments for Emerging Threat Rapid Response Capabilities (+\$2.300 Million); Departmental reduction to account for the availability of prior year execution balances (-\$1.931 Million); and Departmental inflation/travel adjustments (-\$2.048 Million).

Schedule: N/A

Technical: N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	Project (Number/Name) CB2 / Chemical Biological Defense (Applied Research)
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
CB2: Chemical Biological Defense (Applied Research)	-	82.539	103.497	104.362	-	104.362	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

Project CB2 provides physical science applied research to develop future, multi-disciplinary, and multi-functional capabilities in life sciences, physical sciences, environmental sciences, mathematics, cognitive sciences, and engineering. Efforts in this project support the seamless integration of state-of-the-art-technologies into a collection of systems across the spectrum of capabilities required to support chemical and biological defense missions.

Individual efforts in this project include:

- Protection and hazard mitigation focuses on providing technologies that protect from and reduce the impact of chemical/biological threat or hazard to the Warfighter, weapons platforms, and structures.
- Detection focuses on developing technologies for remote and point detection and identification of chemical and biological agents.
- Decision analysis and management focuses on advanced hazard prediction, medical and epidemiological modeling of biological agents, operational effects and risk assessment, and systems performance modeling.
- Warning and reporting focuses on methods of alerting to chemical or biological threat agent releases and exposures.
- Threat agent science is devoted to characterizing threat agents and the hazards they present in terms of agent fate in the environment, toxicology, and pathogenicity, and focuses on the horizontal integration of CB defensive technologies in support of the Joint Services.
- Non-Traditional Agent (NTA) Defense including pretreatments, therapeutics, detection, threat agent science, modeling, protection and hazard mitigation and characterization of emerging threats.

Project NT2, Techbase Non-Traditional Agents Defense, will merge into this Project starting in FY21.

FY21-22 reorganizes, renames legacy Bullet titles and introduces new Bullets (Thrust Areas). These new "Thrust" titles are in line with the CBDP Core Capability Areas and intended to provide more detail and traceability from the S&T program to advanced development.

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

	FY 2020	FY 2021	FY 2022
Title: 1) CARES Act: - ProBE: Proteomic/Multi-omic Biothreat Evaluation	1.000	-	-
Description: Provides the ability to conduct comprehensive assessments and characterizations of emerging pathogens using interdisciplinary approaches.			
Title: 2) CARES Act: Reusable N95 Masks to DEVCOM CBC	0.500	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	Project (Number/Name) CB2 / Chemical Biological Defense (Applied Research)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
Description: Provides reusable N95 Masks to the Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC).				
Title: 3) Internal COVID: Virus decon to DEVCOM CBC Description: Virus decontamination to DEVCOM CBC.		0.054	-	-
Title: 4) Internal COVID: Portable bio containment module testing at DEVCOM SC. Description: Portable bio containment module testing at DEVCOM SC.		0.034	-	-
Title: 5) Detection Sensor Technologies Description: Focus of this effort is to develop capabilities to detect and identify chemical and biological threats. This activity includes development of point, remote, or standoff sensors as appropriate, to address both conventional and non-traditional chemical and biological threats. These efforts are being developed to further the detection capability for early warning of contamination exposure to the warfighter. This effort is being separated into five thrust areas starting in FY21: Distributed CB Reconnaissance, Enhanced/Emerging Biothreat Sensing, Expeditionary Analytical Toolkit (ExAnT), Unattended Perimeter Monitoring, and Unconventional Detection Modality.		22.541	-	-
Title: 6) Distributed CB Reconnaissance Description: Develop distributed chemical and biological reconnaissance tools to enhance early warning and situation awareness of chemical and biological threats to include low cost point sensor and sensing/collection systems for manned and unmanned platforms. FY 2021 Plans: - Identify strategic points of placement for sensor integration by conducting modeling research on agent dispersal patterns; demonstrate in-flight collection and detection for sensors integrated onto unmanned aerial platforms. - Evaluate enhanced technologies on manned and unmanned platforms for early warning and integrated threat awareness. FY 2022 Plans: - Evaluate low size, weight, power, and cost technologies for near-real time detection capabilities for deployable or distributed biological and chemical sensing for hazard awareness and assessment of operational environments. - Identify innovative solutions to increase situational awareness using manned and unmanned platforms and provide operational advantages to the Warfighter. FY 2021 to FY 2022 Increase/Decrease Statement:		-	4.031	3.328

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	Project (Number/Name) CB2 / Chemical Biological Defense (Applied Research)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
Decrease due to change in program/project schedule.				
<p>Title: 7) Enhanced/Emerging Biothreat Sensing</p> <p>Description: Establish capability to rapidly develop sensors to detect enhanced or emerging biological threats via quickly adaptable or analyte-agnostic laboratory and field-forward detection capabilities. This will provide improved detection capabilities for unknown or novel threats across the spectrum of detection and validation assets. This thrust area leverages multi-omics data science to inform rational and rapid development of synthetic biological sensing platforms as well as improved laboratory methods.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue development of algorithms and laboratory workflows to identify threats in unknown samples. - Continue development of far-forward pathogen agnostic sensing toolkit. - Continue development of ruggedized, scalable sensor with adaptable design. - Continue development of sample stabilization methods. - Begin automated in-silico design to expedite assay development. - Examine potential solutions for augmenting or replacing current lateral flow assays. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Continue development of algorithms and laboratory workflows to identify threats in unknown samples. - Continue development of far-forward pathogen agnostic sensing toolkit. - Continue automated in-silico design to expedite assay development. - Accelerate transitions of multi-omic data tools from interagency partners, leveraging increasing understanding of the fundamental biology of emerging and engineered threats to inform development of agile sensors with optimized detection targets and capabilities. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to accelerated development effort.</p>		-	7.055	9.825
<p>Title: 8) Expeditionary Analytical Toolkit (ExAnT)</p> <p>Description: Keeping the warfighter ahead of traditional and emerging chemical threats in complex environments by developing a suite of expeditionary chemical sensors with modernized detection technologies for traditional threats while enhancing detection capabilities for non-traditional, emerging, and mixed chemical hazards.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue development of detection technologies to provide unattended monitoring for early indication of airborne chemical threats. 		-	2.861	3.333

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	Project (Number/Name) CB2 / Chemical Biological Defense (Applied Research)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
<ul style="list-style-type: none"> - Provide a comprehensive characterization of common pre-cursor chemicals, intermediates, and yielded synthetic opioids to support optical detection enhancement. - Develop low SWaP proximate sensors to detect deposited chemical hazards to support tactical and dismounted site assessment missions. - Provide advanced sensing capability for low volatility chemicals and emerging threats to protect the Warfighter. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Support expeditionary forces in leveraging reach-back capabilities for identification purposes. - Continue to develop advance detection capabilities to detect chemical warfare agents in complex and obscurant-heavy environments. - Evaluate detectors ability to measure hazards in complex environments and samples. - Advance detection capabilities by developing sensor platforms for integration into a portable device. - Anticipate future detection capability needs to support the warfighter in CB-contested operational environments. - Evaluate and transition compact vapor detectors for the Warfighter. - Continue to develop novel data processing and data analysis algorithms based on machine learning techniques. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.</p>				
<p>Title: 9) Unattended Perimeter Monitoring</p> <p>Description: Develop automated technologies to improve detection of aerosolized hazards while minimizing or removing user intervention to enable a reliable detect-to-warn capability, providing a capability for unattended monitoring of perimeters for temporary defense positioning, including base camps, to enable early indication of threats. This thrust area will evaluate current and novel technologies to provide improved chemical threat detection and automated biological detection capabilities.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Modernize unattended perimeter monitoring technologies to reduce false alarms and increase confidence in reporting. - Refine trigger, collector, and detector/identifier technologies. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Evaluate the use of machine learning into detector/identifier technologies to further reduce false reporting due to environmental factors. - Continue development of fully-automated biosurveillance system capable of air sample collection, sample preparation, and analysis. <p>FY 2021 to FY 2022 Increase/Decrease Statement:</p>		-	2.436	4.114

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	Project (Number/Name) CB2 / Chemical Biological Defense (Applied Research)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
Increase due to change in program/project technical parameters.				
<p>Title: 10) Unconventional Detection Modalities</p> <p>Description: Targeted set of programs pushing the boundaries of sensor development by pulling technologies developed from academia and basic research to be integrated into early detection prototypes. These technologies focus on keeping the warfighter ahead of the chemical and biological threats with portable, low SWaP detectors that will protect the general forces and enhance operations on the battlefield by providing warning and field analytics.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue design and integration of monolithic interferometer. - Continue to synthesize and further assess SIC materials by coating various surface coupons. - Continue and validate chemical detection modalities utilizing Waveguide Enhanced Raman Spectroscopy (WERS) and Refractive Index sensing. - Conduct field testing of detection prototypes using nanoparticles and voltammetry electrochemistry. - Continue model development for machine learning algorithms. - Continue development of detection of BWA using cell-free platforms onto an integrated prototype. - Conduct a low SWAP-C demonstration using cell-based platforms - Develop prototype using optical light scattering for biological detection. - Validate gene deletion in bacterial pathogens. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Conduct detection sensing validation for detection by utilizing nanoparticles and voltammetry electrochemistry. - Conduct model testing and validation of machine learning algorithms for chemical detection sensors. - Miniaturize and refine optical light scattering prototype. - Conduct live-agent testing using cell-free platforms. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Decrease due to change in program/project technical parameters.</p>		-	7.183	4.997
<p>Title: 11) Material Contamination Mitigation</p> <p>Description: Develop highly effective non-traditional or novel decontamination technologies that integrate with current procedures and support non-material improvements of the overall decontamination effort. This effort is being separated into three thrust areas starting in FY21: Enhanced Survivability Coatings, Equipment Decontamination, and Wide Area Decontamination.</p>		9.738	-	-
<p>Title: 12) Enhanced Survivability Coatings</p>		-	3.202	2.436

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	Project (Number/Name) CB2 / Chemical Biological Defense (Applied Research)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Description: This effort supports the Materiel Contamination Mitigation Core Capability Area. Military equipment coatings are challenging and logistically intensive to decontaminate. Efforts within this thrust seek to produce enhanced coatings that increase chemical warfare agent survivability and decontaminability of military equipment to levels comparable to that of stainless steel. Improved coatings will resist chemical agent absorption and be quickly decontaminated in field, to rapidly return equipment to mission operations level.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue evaluating polymer coatings as potential temporary or permanent military equipment coatings to decrease logistical burden of decontamination in support of CBRN Coatings, Coverings, and Protective Overlays Program of Record. - Increase chemical agent resistance of current military coatings through development and testing of novel temporary coatings to reduce the spread of contamination and enable more facile decontamination of military assets. - Continue to improve equipment coatings through bio-inspired surface treatments to repel agents of interest from current military equipment coatings. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Improve success of decontamination through the evaluation and incorporation of appliques (to include chemical transport studies in current military coatings, novel coatings characterization, thin film overcoats, strippable coat, reactive coat, and lock-down coats) in support of CBRN Coatings, Coverings, and Protective Overlays Program of Record. - Incorporate bio-inspired surface treatments for equipment coatings to repel agents of interest from current military equipment coatings. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Decrease due to change in program/project technical parameters.</p>			
<p>Title: 13) Equipment Decontamination</p> <p>Description: This effort supports the Materiel Contamination Mitigation Core Capability Area. The Warfighter has a limited capability to decontaminate personal equipment, weapons, vehicles, ships, and facilities; Sensitive equipment (weapon system optics, electronic equipment, interior spaces, and aircraft); and hazardous waste. Efforts within this thrust seek to develop decontaminant formulations and procedures that reduce or eliminate residual contamination hazards; enable unit-level decontamination with rapid unmasking; reduce logistic needs (need for water); enable rapid sorting of clean from dirty to rapidly return high-value equipment to normal use; and develop improved realistic test methods.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Transition disclosure/decontamination assurance technologies low light formulation to enhance agent disclosure/ decontamination assurance technologies to the Contamination Indicator Decontamination Assurance System program. 	-	2.079	3.150

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	Project (Number/Name) CB2 / Chemical Biological Defense (Applied Research)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>- Complete and transition biological hot air decontamination technology for aircraft and sensitive equipment to the Joint Biological Agent Decontamination System (JBADS) Program of Record.</p> <p>- Complete operational user assessment for Sprayable Decontaminant Slurry technology for tactical level equipment decontamination.</p> <p>- Complete optimization of chemical hot air decontamination process and transition to the Service Equipment Decontamination System (SEDS) Program of Record.</p> <p>FY 2022 Plans:</p> <p>- Begin integrating contamination mitigation technologies by advancing the proof of concept for hot-air CWA decontamination by validating the operational performance envelope. Successful efforts will result in improved efficacy, materials compatibility, flexibility, and reduced logistical burden compared to existing and emerging decontamination program requirements.</p> <p>- Transition Sprayable Decontaminant Slurry technology for immediate chemical warfare agent decontamination of equipment to the Service Equipment Decontamination System (SEDS).</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to change in program/project technical parameters.</p>			
<p>Title: 14) Wide Area Decontamination</p> <p>Description: This effort supports the Materiel Contamination Mitigation Core Capability Area. Warfighters lack capability to rapidly restore critical DoD infrastructure (e.g., sea port or air base) that will mitigate contamination spread and enable normal, unprotected operations. Efforts within this thrust seek to improve contamination mitigation logistics/cost reduction, effectiveness, compatibility/safety, and environmental compatibility. Wide Area Decontamination efforts will not be conducted during FY22-FY25 due to funding reductions. Efforts are scheduled to resume in FY26.</p> <p>FY 2021 Plans:</p> <p>- Continue Wide Area Decontamination efforts (funded as BA3 in FY 2020) to examine analytical methods, test procedures, and candidate packaged commercial chemicals as decontaminants for decontamination of chemical agents on concrete, asphalt and soil.</p> <p>- Assess packaged commercial chemicals as decontaminants and barrier polymers on concrete, asphalt, and soil substrates for effectiveness, availability, and sprayability/scalability.</p> <p>- Complete and publish Wide Area Decontamination decontaminant assessment report for chemical agents.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement:</p>	-	0.867	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	Project (Number/Name) CB2 / Chemical Biological Defense (Applied Research)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
Minor change due to routine program adjustments.			
<p>Title: 15) Warning and Reporting</p> <p>Description: Integrate and fuse disparate sensor data, leverage non-invasive physiological data for detection of threat exposure prior to symptom onset, and provide timely data-driven predictions and warnings. This effort is transitioning to the CBRN Battlespace Surveillance, Alerting & Response thrust area starting in FY21.</p>	11.159	-	-
<p>Title: 16) CBRN Battlespace Surveillance, Alerting & Response</p> <p>Description: To improve upon the Department of Defense's capability to detect, identify, alert, and responds to deliberate releases and naturally occurring outbreaks of chemical and biological threat agents. Current predictive algorithms in development by JSTO are based on large in-hospital datasets from patients with comorbidities. Improving on the applicability and efficacy of these algorithms will focus on large, real-time human data collects of chemical and biological agent / agent proxy exposures. Additionally, studies will focus on examining the feasibility of specifically isolating indicators of respiratory infection, determining severity of infection, and predicting return to mission readiness after exposure. This capability will enable early implementation of countermeasures such as isolation, quarantine, and removal from an area, thus potentially reducing transmission, morbidity, and mortality rates. The maturation of algorithms will incorporate Machine Learning (ML) approaches for refining sensitivity and specificity.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue to expand on wearable device-based non-invasive biomarker analysis for pre-symptomatic indication of chemical or biological exposure. - Enhance early warning algorithm development for predicting altered health severity and duration to inform on warfighter time-to mission-readiness. - Continue to develop ML algorithms to detect signatures of genetically engineered pathogens. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Continue to expand wearable device-based non-invasive biomarker analysis for pre-symptomatic indication of chemical or biological exposure. - Complete early warning algorithm development for predicting altered health severity and duration to inform warfighter time-to mission-readiness. - Continue to develop ML algorithms to detect signatures of genetically engineered pathogens - Continue to develop predictive algorithms and analytic tools utilizing Artificial Intelligence (AI) and ML techniques to allow for rapid response to Emerging Threats. 	-	8.625	9.459

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	Project (Number/Name) CB2 / Chemical Biological Defense (Applied Research)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
- Initiate the development of AI based drug discovery algorithms for Emerging Threats.				
FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to change in program/project technical parameters.				
Title: 17) Decision Analysis and Management		19.181	-	-
Description: Improve battlespace awareness and support decision-making by predicting hazardous material releases and resulting human effects. Provide tools to enable the assessment and mitigation of impacts at personnel, system, tactical, operational, and strategic levels. Develop CBRN data sharing capabilities and information resources. This effort is being separated into two thrust areas starting in FY21: CBRN Decision Aids and CBRN Situational Awareness.				
Title: 18) CBRN Decision Aids		-	4.903	3.100
Description: In order to unencumber the warfighter at the tactical edge, JSTO will continue to develop and field CBRN Decision Aids on End User Devices (EUDs) in both connected and disconnected operations. Capabilities will focus on utilizing automation, reducing the burden experienced by the warfighter, while providing accurate, actionable information. During this time period, a focus will be put on developing a Contamination Avoidance Decision Aid to inform the warfighter on how to avoid, respond to and plan routes around CB hazards.				
Another area of focus will be the development of Autonomous Asset Guidance. This capability will be used in conjunction with other capabilities developed under the CBRN Decision Aids portfolio to optimize the use of Autonomous Assets and reduce the burden incurred by the warfighter in order to operate them. This capability will also aim to incorporate, fuse and utilize data from Autonomous Assets to improve and refine other CBRN Decision Aids.				
FY 2021 Plans:				
- Develop a sensor model toolbox application for rapid development of new sensor models				
- Continue development of algorithms to optimize the path of moving sensors for detection and source term estimation and develop the capability to react to events.				
- Continue development of warning and decision aids for tactical users leveraging the compute resources resident on EUDs. Explore the use of augmented reality to provide chemical and biological threat situational awareness in head-mounted visual displays.				
FY 2022 Plans:				
FY22:				
- Continue development of warning and decision aids for tactical users leveraging the compute resources resident on EUDs.				

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	Project (Number/Name) CB2 / Chemical Biological Defense (Applied Research)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
- Initiate the use of augmented reality to provide chemical and biological threat situational awareness in head-mounted visual displays.			
FY 2021 to FY 2022 Increase/Decrease Statement: Decrease due to change in program/project technical parameters.			
Title: 19) CBRN Situational Awareness Description: To enhance CB Situational Awareness, JSTO will expand the types of threats that can be modeled with hazard assessment capabilities to include fixed-wing and rotary-wing drones of interests. These capabilities will allow for single drones and swarms to be modeled. Virtual Reality (VR) and Augmented Reality (AR) technologies will be leveraged to develop CB focused training and mission rehearsal capabilities that will be integrated into systems widely used by the Joint Force. Virtual training environments will be developed to implement, visualize and account for hazard source terms and plumes generated by transport and dispersion (T&D) models Augmented Reality applications will also be explored for tactical use to maximize warfighter CB situational awareness on the battlefield. JSTO will modernize hazard modeling capabilities by adopting a modular framework and integrating across Service command and control systems to operationalize Reachback support. JSTO will further enhance hazard modeling by creating a seamless indoor-to-outdoor T&D modeling capability and improve urban T&D modeling to support operations in urban and mixed environments. New state-of-the-art computational fluid dynamics modeling techniques and their exploitation of the latest computing resources will be leveraged to increase both speed and accuracy. JSTO will develop CB health effect modeling software and analytic tools to support force readiness and facilitate medical planning against chemical and biological agents. Epidemiological models will be developed that quantify and visualize mission operational impacts from exposure to, and spread of, infectious biological threat agents to DoD relevant populations. Additionally, JSTO will leverage Threat Agent Science (TAS) data to enhance capabilities for modeling health effects and host pathogen interactions from exposures to traditional and non-traditional CB agents. This will provide the warfighter with more accurate casualty estimates accounting for human health effects. FY 2021 Plans: - Continue development of coupled indoor and outdoor dispersion models for enhanced hazard prediction in urban environments. - Conduct field trial to collect validation data for coupled indoor and outdoor dispersion models. - Complete development of microscale transport and dispersion software for improved hazard prediction in urban environments. - Continue development of next generation littoral and liminal waterborne modeling system.	-	12.891	10.894

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	Project (Number/Name) CB2 / Chemical Biological Defense (Applied Research)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
<ul style="list-style-type: none"> - Continue to develop models to provide operationally relevant outputs to support medical decision making. Integrate outputs into existing comprehensive epidemiological modeling tool. - Continue to develop ML algorithms for disease prediction and forecasting for mobile platforms. - Initiate efforts to develop VR/AR synthetic training environment. - Initiate biological agent modeling into the NHRC's JMPT. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Complete development of coupled indoor and outdoor dispersion models for enhanced hazard prediction in urban environments. - Complete field trial to collect validation data for coupled indoor and outdoor dispersion models. - Complete development of next generation littoral and liminal waterborne modeling system. - Continue to enhance CB situational awareness capabilities for integration into Heads up Display (HUD) technologies. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Decrease due to change in program/project technical parameters.</p>				
<p>Title: 20) Threat Agent Sciences</p> <p>Description: Supports defensive countermeasure development against CB threats by delivering the scientific data, understanding, and relevant human estimates of the hazards posed to humans by exposure to CB agents. Toxicological and/or infectious-dose information and environmental response supports development and/or enhancement of both operational risk and exposure guidelines; identifies gaps in detection and protection; informs decontamination procedures; and supports the development of medical countermeasures. Knowledge generated from this program is used to inform understanding of hazards, hazard prediction models, and materiel and countermeasure development. This effort is being separated into five thrust areas starting in FY21: Employment Characterization, Environmental Response, First Look (Chemical and Biological), Host Response, and Technical Surprise.</p>		11.711	-	-
<p>Title: 21) Employment Characterization</p> <p>Description: Employment Characterization studies help refine threat assessments and potential impacts of indoor and/or outdoor releases of threat agents on CBDP operations, strategy, and capabilities.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Review state of knowledge on agent employment (laboratory and outdoors) to identify gaps and threat agent science assessment opportunities. - Continue with evaluation of potential munitions for applicability to future threat based on performance characteristics. - Continue studying scale employment methods and feasibility for emerging threat agents. <p>FY 2022 Plans:</p>		-	4.943	4.159

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	Project (Number/Name) CB2 / Chemical Biological Defense (Applied Research)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
<ul style="list-style-type: none"> - Continue to review state of knowledge on agent employment (laboratory and outdoors) to identify gaps and threat agent science assessment opportunities. - Provide munitions evaluation to modelers and stakeholders, and follow with a gap analysis to determine knowledge gaps for future analysis. - Continue studying scale employment methods and feasibility for emerging threat agents. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Decrease due to change in program/project technical parameters.</p>				
<p>Title: 22) Environmental Response</p> <p>Description: Environmental Response evaluates behavior of chemical and biological threat agents in the environment (including soil, water, and plants), on clothing, on and in structures, and on equipment supports model development and decision-making tools.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue delivering data on fate, persistence, viability and response of priority agents in various environments to inform hazard assessment. - Continue assessing the impact of environmental factors on threat agent activity (persistence, viability, transport, degradation, resuspension, and decontamination) for both chemical and biological threats. - Continue exploratory studies that analyze the state of the art for encapsulation technologies and methodologies. - Assess the properties of anti-materiel agents and evaluate the efficacy of these agents including environmental stability and factors associated with performance against materials of interest. - Identify and close knowledge gaps associated with the aerosol biology and its implications with the outdoor release of biological threats. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Continue delivering data on fate, persistence, viability and response of priority agents in various environments to inform hazard assessment (for chemical and biological threats). - Continue assessing the impact of environmental factors on threat agent activity (persistence, transport, degradation, resuspension, and decontamination). - Continue to identify and close knowledge gaps associated with the aerosol biology and its implications with the outdoor release of biological threats. - Continue assessing anti-materiel agents, evaluate the efficacy of these agents, and measure their environmental stability and performance against materials of interest. 		-	5.491	5.548

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	Project (Number/Name) CB2 / Chemical Biological Defense (Applied Research)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
<p>- Continue environmental stability efforts for toxin and viral threats, including the fundamental characteristics that influence viral stability.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.</p>				
<p>Title: 23) First Look (Chemical and Biological)</p> <p>Description: First Look provides the initial characterization of potential CB threats, and provides a fundamental assessment of the potential risks they pose (including synthesis, growth, production, virulence, feasibility for weaponization and initial toxicology screening).</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Finish priority Pharmaceutical based agent (PBA) assessments. - Continue NTA evaluations - Expand Biological First Look to assess additional emerging pathogens and novel toxins. - Continue developing innovative laboratory tools and approaches to enable expedient characterization of emerging, or novel biological threats, including the understanding enabling technologies impact to gene modification/expression to assess toxin activity. - Continue examining and developing advanced methods for threat agent characterization, including more complex agent mixtures or combinations. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Continue developing innovative laboratory tools and approaches to enable expedient characterization of emerging or novel biological threats (to include highly infectious and novel organisms), including understanding enabling technologies' impact to gene modification/expression and the ability to assess toxin activity. - Continue developing advanced methods for threat agent characterization, including more complex agent mixtures or combinations. - Begin evaluating findings of technological advancement implications to discounted threats study. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.</p>		-	9.300	9.850
<p>Title: 24) Host Response</p> <p>Description: Host Response characterizes adverse effects (acute vs. chronic) from exposure to toxic chemical and/or infectious biological threat agents using operationally relevant exposure scenarios and exposure routes (e.g., .inhalation, dermal, ingestion, etc.) and appropriate assessment methods and models.</p>		-	11.800	15.200

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	Project (Number/Name) CB2 / Chemical Biological Defense (Applied Research)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Execute a knowledge gap study focused on traditional biological agents to inform future threat agent science investments. - Continue developing in silico predictive capabilities and models, linking the different properties to provide initial toxicological hazard assessment information on emerging threat compounds. - Finalize validation of rapid threat assessment and microphysiological systems methods. - Continue development of in vitro tools to provide acute toxicity and mechanisms of emerging threat agents using developed analytical processes rapid threat assessment and microphysiological systems methods. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Build on predictive methods and technologies for both chemical and biological agent characterizations. - Deliver initial operational capacity for predictive toxicological analytical tools linking in silico analysis, in vitro assessments (activity, metabolism, etc), and refining quick turn estimates for emerging chemical threats, and informing follow on toxicological evaluations. - Initiate studies to address host response areas identified by the FY21 gap analysis study for traditional biological agents. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to change in program/project technical parameters.</p>			
<p>Title: 25) Technical Surprise</p> <p>Description: Technical Surprise assesses technological advancements for potential implications to the threat space. Technical Surprise will include horizon scanning to identify potential areas of concern as well as conduct technical assessments of emerging technological advancements (e.g. artificial intelligence, machine learning, quantum computing) of concern enabled by scientific advances which can be used for nefarious purposes.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Evaluate technologies that make threats more likely to survive employment/use. - Complete retrosynthetic chemical analyses, and refer results to First look for further evaluation. - Continue to maintain a watch on technology advancements and potential impacts to threat space or warfighter. Identify and assess the implications of progress and acceleration to-date for former technical hurdles being lowered or overcome - Evaluate enabling areas of technological convergence that can potentially impact the ease and ability for nefarious actor use. - Identify and assess the implications of the limitations and barriers associated with synthetic biology. <p>FY 2022 Plans:</p>	-	4.000	4.500

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	Project (Number/Name) CB2 / Chemical Biological Defense (Applied Research)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
<ul style="list-style-type: none"> - Continue identifying and assessing technological advancements that will impact the chemical and biological threat space, including potential threats that are not specifically chemical or biological in nature, but have implications to chemical and biological defense capabilities. - Continue a horizon scanning capability to provide situational awareness in assessing technological growth and convergence that can affect the chemical and biological threat space, while keeping abreast to changes in the nature of future threats. - Continue the assessment of synthetic biological tools and other biotechnology developments that can enhance or alter the threat space. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.</p>				
<p>Title: 26) Percutaneous Protection</p> <p>Description: Develop advanced ensemble prototypes with state-of-the art materials that address the full spectrum of threats and provide a range of solutions optimized for protection, thermal comfort, and mission performance. This effort is transitioning to the Dynamic Multifunction Materials for Second Skin thrust area starting in FY21.</p>		2.851	-	-
<p>Title: 27) Dynamic Multifunction Materials for Second Skin</p> <p>Description: This effort supports the Percutaneous Protection Core Capability Area. Efforts will utilize responsive technologies to provide chemical biological protective suits that adapt to the environment by synthesizing scaled samples via roll-to-roll manufacture which exhibit materials properties that reduce thermal burden and integrate with current combat garments. These technologies include interpenetrating polymer networks that will change moisture permeability and molecular selectivity on demand, and membranes with higher moisture vapor transfer rates than existing fabrics.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue to down-selecting processes for mounting responsive interpenetrating polymer network onto fabrics and begin agent testing. - Continued efforts to scale and evaluate carbon nanotube membrane with for response to chemical and biological agents and begin agent testing. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Increase molecular selectivity of responsive interpenetrating polymers towards nerve and blister agents. - Demonstrate and scale carbon nanotube membrane responsive textiles into garments that increase protection levels in response to chemical weapons agents while preserving moisture vapor transport rate; advance to BA3. <p>FY 2021 to FY 2022 Increase/Decrease Statement:</p>		-	2.197	1.839

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	Project (Number/Name) CB2 / Chemical Biological Defense (Applied Research)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
Decrease due to change in program/project technical parameters.				
<p>Title: 28) Lightweight Protective Garments</p> <p>Description: This effort supports the Percutaneous Protection Core Capability Area. Efforts will advance garment material and ensemble technologies with new capabilities using integrated garment designs and fabrication for thermal burden reduction, state-of-the-art threat protection technologies, and supporting test methodologies and methods that provide operationally relevant, comparable data on test garments.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Modify and validate Photographic Aerosol System Test (AST) protocol to incorporate female test participant and continued to improve Porton Man testing in support of the Uniform Integrated Protection Ensemble Family of Systems Program of Record. - Transition improved protective garment test methodologies that provide greater validation of chemical biological protection, are repeatable and support testing under relevant conditions to the Uniform Integrated Protection Ensemble Family of Systems Program of Record. - Transfer antimicrobial fabrics to test base and advance to BA3 in support of the Uniform Integrated Protection Ensemble Family of Systems Program of Record. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program/project transitioned to Advanced Development.</p>		0.301	0.555	-
<p>Title: 29) Respiratory and Ocular Protection</p> <p>Description: Development and integration of novel filtration media into a lightweight, low-profile, and low-burden individual protective filter, which has enhanced performance against a broader range of challenges that include Chemical Warfare Agents (CWA), Biological Weapons Agents (BWA), and Toxic Industrial Chemicals (TICs). Development of respiratory protection and design for better interoperability to support longer range missions. This effort is being separated into two thrust areas starting in FY21: All Hazards & Respiratory Protection and Multifunction Materials for Protection.</p>		1.207	-	-
<p>Title: 30) All-Hazards & Respiratory Protection</p> <p>Description: This effort supports the Respiratory and Ocular Protection Core Capability Area. Efforts will improve chemical and biological agent protection while maintaining warfighter capability through integrated research on respirator, seams, closures, and new materials; perform early surveys for end-user jury input; frequent user operational evaluation; focus on closed circuit full spectrum respiratory protection.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue to explore trade space for next generation general purpose mask. 		-	3.324	1.380

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	Project (Number/Name) CB2 / Chemical Biological Defense (Applied Research)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>- Continue development of systems that provide chemical biological respiratory protection technologies in support of tactical all hazard, full spectrum respiratory protection system.</p> <p>- Complete system testing and transition cooling garment systems to Uniform Integrated Protection Ensemble Family of Systems Program of Record.</p> <p>FY 2022 Plans:</p> <p>- Transition lightweight protective garment for all hazards environments to Uniform Integrated Protection Ensemble Family of Systems Program of Record.</p> <p>- Complete development of systems that provide chemical biological respiratory protection technologies in support of tactical all hazard, full spectrum respiratory protection system.</p> <p>- Develop next generation respiratory protection technology in the form of a low-burden, non-contact powered respirator with novel filter designs that integrates with Warfighter technologies and reduces encumbrance.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Decrease due to change in program/project technical parameters. Decrease is due to transition of Tactical All Hazards Technologies (cooling garments and full spectrum respiratory protection).</p>			
<p>Title: 31) Multifunction Materials for Protection</p> <p>Description: This effort supports the Respiratory and Ocular Protection, Percutaneous Protection, Expeditionary Collective Protection, Materiel Contamination Mitigation, and Personnel Contamination Mitigation Core Capability Areas. Efforts will discover, develop and integrate novel, reactive/catalytic materials and scale material manufacturing with maximum sorption and reactivity, and characterize materials using state-of-the-art in operando and ambient pressure spectroscopies, for eventual integration into next generation decontaminants, coatings, filters, and protective garments that reactively decontaminate chemical warfare agents.</p> <p>FY 2021 Plans:</p> <p>- Continue to engineer reactive/catalytic nano-structure materials from basic research efforts for chemical agent destruction, to facilitate air purification enhancement.</p> <p>- Continue to integrate engineered reactive/catalytic nano-structure materials into filters, decontaminants, and textiles to assess materials in an operationally-relevant environment for personnel decontamination.</p> <p>FY 2022 Plans:</p> <p>- Continue to engineer reactive/catalytic nano-structure materials from basic research efforts for chemical agent destruction, to facilitate air purification enhancement.</p> <p>- Continue to integrate engineered reactive/catalytic nano-structure materials into filters, decontaminants, and textiles to assess materials in an operationally-relevant environment for personnel decontamination.</p>	-	3.461	5.677

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	Project (Number/Name) CB2 / Chemical Biological Defense (Applied Research)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
<p>- Develop self-decontaminating, reusable protective garments of composite textiles with a reactive barrier, improved protection, and reduced thermal burden/life-cycle costs for advancement to the BA3 level.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to change in program/project technical parameters.</p>				
<p>Title: 32) Personnel Contamination Mitigation</p> <p>Description: Develop new technologies to mitigate the risk associated with contaminated human remains and personal effects (materials) exposed to and contaminated by chemical agents by neutralizing and/or physically removing the residual chemical agents. This effort is transitioning to the Personnel Decontamination thrust area starting in FY21.</p>		1.365	-	-
<p>Title: 33) Personnel Decontamination</p> <p>Description: This effort supports the Personnel Contamination Mitigation Core Capability Area. Efforts will develop decontaminants for decontamination of unbroken skin with lower lifecycle costs and storage constraints and determination of time, efficacy and logistics burdens to warfighters for mass casualty decontamination. Decrease Warfighter burden in the event of a CWA exposure by identifying science and technology gaps in the mass personnel decontamination process as well as possible substitutions for current approved personnel decontamination formulations.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue evaluating polymer coatings as potential temporary or permanent military equipment coatings to decrease logistical burden of decontamination in support of CBRN Coatings, Coverings, and Protective Overlays Program of Record. - Increase chemical agent resistance of current military coatings through development and testing of novel temporary coatings to reduce the spread of contamination and enable more facile decontamination of military assets. - Continue to improve equipment coatings through bio-inspired surface treatments to repel agents of interest from current military equipment coatings. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Continue to develop and assess physical removal technologies for potential replacement of Reactive Skin Decontamination Lotion in support of the Next Generation Personnel Decontamination Program of Record. - Continue to integrate new dry decontamination into a mitt form-factor and determine science and technology challenges within process and procedure improvements. - Develop methodologies and procedures to for military working dog decontamination. <p>FY 2021 to FY 2022 Increase/Decrease Statement:</p>		-	1.311	1.180

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	Project (Number/Name) CB2 / Chemical Biological Defense (Applied Research)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
Minor change due to routine program adjustments.			
Title: 34) Expeditionary Collective Protection Description: Develop new technologies for soldiers to determine the remaining chemical vapor service life of their Chemical Warfare Agents (CWA) filters. This effort is transitioning to the Air Purification Enhancements thrust area starting in FY21.	0.897	-	-
Title: 35) Air Purification Enhancements Description: This effort supports the Expeditionary Collective Protection (CP) Core Capability Area. Existing CP systems have high life cycle costs driven by maintenance and limited service life. JSTO efforts will focus on optimizing and extending filter life to reduce lifecycle costs while maintaining or improving protection. FY 2021 Plans: - Identify new filter bed materials that are capable of reacting, sorbing, and neutralizing chemical and biological agents. - Continue efforts for novel filtration against nontraditional agents and other emerging threats in ColPro and other large-scale filter systems and testing under relevant environmentally-relevant conditions in support of the Collective Protection Modernization Program of Record. FY 2022 Plans: - Continue integration of the full range of nontraditional agents, including other emerging threats into the air purification enhancement portfolio and testing under relevant environmentally-relevant conditions. - Continue efforts for novel filtration against nontraditional agents and other emerging threats in ColPro and other large-scale filter systems in support of the Collective Protection Modernization Program of Record. FY 2021 to FY 2022 Increase/Decrease Statement: Decrease due to change in program/project technical parameters.	-	0.982	0.393
Accomplishments/Planned Programs Subtotals	82.539	103.497	104.362

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• CB3: Chemical Biological Defense (ATD)	26.426	27.448	27.146	-	27.146	-	-	-	-	-	-
• ET3: Emerging Threats (ATD)	0.000	0.000	6.000	-	6.000	-	-	-	-	-	-

Remarks

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)</i>	Project (Number/Name) CB2 / <i>Chemical Biological Defense (Applied Research)</i>

D. Acquisition Strategy

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 2					R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)				Project (Number/Name) NT2 / Non-Traditional Agents Defense (Applied Research)			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
NT2: Non-Traditional Agents Defense (Applied Research)	-	49.222	0.000	0.000	-	0.000	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

Project NT2 provides early applied research to enhance and develop defensive capabilities against Non-Traditional Agents (NTAs). This project focuses on expanding scientific knowledge required to develop defensive capabilities and to demonstrate fast and agile scientific responses to enhance or develop capabilities that address emerging threats. Efforts and studies conducted under this project address direction from the FDA to conduct specific post-New Drug Application (NDA)-approval efforts and studies (e.g. required studies, Post Marketing Commitments), and requirements from the joint service users. This project is a comprehensive and focused effort for developing NTA defense capabilities, coordinated with specific interagency partners for doctrine, equipment, and training for the Warfighter and civilian population for defense against NTAs.

Individual efforts in this project include:

- Support an integrated approach to counter emerging threats through innovative science and technology (S&T) solutions for detection, protection, decontamination, information systems and modeling and simulation, and medical countermeasures.
- Provides for the upgrade and modernization of Medical Chemical Defense countermeasures which include U.S. Food and Drug Administration (FDA) approved prophylactics, pre-treatments, and therapeutics and intend to protect and/or sustain the Joint Service Member in a toxic chemical threat environment.

Starting in FY21, a portion of the NTA lines have been merged into RDT&E Projects CB2, Chemical Biological Defense, and TM2, Techbase Medical Defense. The administrative change is intended to improve S&T budget agility and transition efficiency.

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

	FY 2020	FY 2021	FY 2022
<p>Title: 1) Chemical Pretreatments and Prophylactics - Medical</p> <p>Description: Develops pretreatments and prophylactics that provide protection against NTAs and emerging chemical threats. Prophylactic MCMs include catalytic and stoichiometric bioscavengers that rapidly bind and detoxify a broad spectrum of NTAs.</p> <p>Transferred FY19 NT2 funds to NT3 in FY20/21 to support more advanced efforts such as the opioid MCMs and 2-PAM BBB delivery efforts.</p>	5.012	-	-
<p>Title: 2) Chemical Therapeutics - Medical</p> <p>Description: Investigates common mechanisms of agent injury. Physiological parameters and pathological assessments will be used to establish the general mode and mechanism(s) of toxicity to inform countermeasure development. Develops, assesses, evaluates, and validates therapeutics for treatment resulting from exposure to NTAs and emerging chemical threats.</p>	15.700	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	Project (Number/Name) NT2 / Non-Traditional Agents Defense (Applied Research)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
Title: 3) Expeditionary Collective Protection Description: Develop new technologies for soldiers to determine the remaining chemical vapor service life of their chemical warfare agent (CWA) filters.		0.690	-	-
Title: 4) Material Contamination Mitigation Description: Develop highly effective non-traditional or novel decontamination technologies that integrate with current procedures and support non-material improvements of the overall decontamination effort.		0.692	-	-
Title: 5) Modeling & Simulation Description: Provide modeling of NTA materials for hazard prediction. Develop NTA source term algorithms for predicting chemical hazards from intentionally functioning weapons, counter-proliferation scenarios (bomb on target), and missile intercept. Investigate NTA agent fate for secondary effects, environmental/atmospheric chemistry, atmospheric and waterborne transport and dispersion, human effects, model Validation and Verification (V&V), scaled testing, casualty estimation, and supporting data management.		1.491	-	-
Title: 6) Percutaneous Protection Description: Study and assessment of percutaneous protective technologies to include membrane and composite material ("novel materials"/"multifunctional materials").		0.973	-	-
Title: 7) Personnel Contamination Mitigation Description: Develop new technologies to mitigate the risk associated with contaminated human remains and personal effects (materials) exposed to and contaminated by chemical agents by neutralizing and/or physically removing the residual chemical agents.		0.444	-	-
Title: 8) Respiratory and Ocular Protection Description: Development and analysis of design alternatives for chemical and biological air-purifying respirators that provide enhanced protection with lower physiological burden and improved interface with mission equipment.		0.691	-	-
Title: 9) Threat Agent Sciences Description: Provide critical agent characterization (chemical, physical and physiological/toxicological) data on current and emerging threat agents to prepare for surprise, enabling and informing development and testing of NTA defense technology (e.g., detection, decontamination, protection, and hazard assessment). This characterization of new threats informs decision makers		23.529	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program	Date: May 2021
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Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	Project (Number/Name) NT2 / Non-Traditional Agents Defense (Applied Research)
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
and development of Concept of Operations (CONOPs) and Tactics, Techniques and Procedures (TTP); it also provides the basis for countermeasure development and assessment.			
Accomplishments/Planned Programs Subtotals	49.222	-	-

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• CB3: Chemical Biological Defense (ATD)	26.426	27.448	27.146	-	27.146	-	-	-	-	-	-
• ET3: Emerging Threats (ATD)	0.000	0.000	6.000	-	6.000	-	-	-	-	-	-
• NT3: Non-Traditional Agents Defense (ATD)	28.344	15.308	18.396	-	18.396	-	-	-	-	-	-
• TM3: Techbase Medical Defense (ATD)	142.123	137.829	137.495	-	137.495	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 2					R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)				Project (Number/Name) TM2 / Techbase Medical Defense (Applied Research)			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
TM2: Techbase Medical Defense (Applied Research)	-	69.344	98.310	102.594	-	102.594	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

Project TM2 provides for applied research for innovative technology approaches to advance medical systems designed to rapidly identify, diagnose, prevent, and treat disease due to exposure to chemical and biological threat agents. Project NT2, Techbase Non-Traditional Agents Defense, will merge into this Project starting in FY21.

Individual efforts in this project include:

- Core science efforts in Medical Chemical, Medical Biological, Diagnostics, and Medical Countermeasures.
- Supports applied research for the investigation of new medical countermeasures to include prophylaxes, pretreatments, antidotes, skin decontaminants, and therapeutic drugs against identified and emerging biological and chemical warfare agents.
- Medical Science and Technology (S&T) efforts in this Budget Activity refine promising medical initiatives identified in Budget Activity 1, resulting in the development of countermeasures to protect against and treat the effects of exposure to chemical and biological (CB) agents.
- Diagnostic research focuses on providing high quality data closer to the point-of-need comprising device innovation, panels of biomarkers driven by bioinformatics, and epidemiological modeling tools.

FY21-22 reorganizes, renames legacy Bullet titles and introduces new Bullets (Thrust Areas). These new "Thrust" titles are in line with the CBDP Core Capability Areas and intended to provide more detail and traceability from the S&T program to advanced development.

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

	FY 2020	FY 2021	FY 2022
Title: 1) Medical Diagnostics Description: Investigate medical diagnostics ubiquitous and comprehensive against chemical and biological threats (including NTAs, pharmaceutical-based agents, and toxins) by advancing diagnostic innovations; investigating emerging technologies; ensuring medical diagnostics rapid adaptation to emerging threats; harvesting and synergizing the immense volume of diagnostic data; and aligning medical diagnostics capabilities with the FDA pipeline and larger commercial supply chain. This effort is being separated into three thrust areas starting in FY21: Chemical Diagnostics, Diagnostic Building Blocks, and Emerging Threats.	12.843	-	-
Title: 2) Chemical Diagnostics Description: Develop diagnostics for exposure to traditional and nontraditional chemical warfare agents (CWAs) and pharmaceutical based agents (PBAs). Early identification and diagnosis is key to appropriate medical countermeasure (MCM) treatment and enhances force protection and lethality.	-	1.770	1.554
FY 2021 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	Project (Number/Name) TM2 / Techbase Medical Defense (Applied Research)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
<ul style="list-style-type: none"> - Complete the development of the Chemical Diagnostics (CHEMDX) system and transition the device to the Joint Product Executive Office (JPEO) Program of Record (POR) for advanced development and FDA clearance. - Continue the development of new and optimized lab-based assays, field forward sampling, and in vitro diagnostic (IVD) technologies to verify human exposures to organophosphates (OP) and mustard (HD). - Continue the development of strategies to address portable ultra-low detection of opioids. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Initiate the development to adapt the CHEMDX platform to simultaneously measure organophosphate nerve agent and fentanyl exposure to rapidly inform whether an individual has been exposed to a high probability incapacitant. - Complete the development of new and optimized lab-based assays, field forward sampling, and IVD technologies to verify human exposures to OP and HD. - Continue the development of strategies to address portable ultra-low detection of opioids. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.</p>				
<p>Title: 3) Diagnostic Building Blocks</p> <p>Description: The Diagnostic Building Blocks thrust area lays a foundation for the entire diagnostics portfolio by exploiting areas such as machine learning (ML), synthetic biology and chemistry to develop novel and rapid diagnostic tests for utilization in the event of an outbreak of an unknown threat.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue the development of protocols for generating synthetic molecular binding agents (SYMBAs) that are sensitive and specific, and can be applied to various diagnostic platforms, supporting open-architecture capabilities. - Continue the research and development of clustered regularly interspaced short palindromic repeat (CRISPR) based solutions for field diagnostics that will provide an ultra-sensitive, cost-effective, and accurate medical diagnostic solution for the Warfighter against unknown biological threats. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Complete the development of protocols for generating SYMBAs that are sensitive and specific and can be applied to various diagnostic platforms, supporting open-architecture capabilities <p>FY 2021 to FY 2022 Increase/Decrease Statement: Decrease due to change in program/project technical parameters.</p>		-	5.644	4.446
<p>Title: 4) Emerging Threats</p>		-	7.439	4.110

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	Project (Number/Name) TM2 / Techbase Medical Defense (Applied Research)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Description: The Emerging Threats thrust area pushes beyond the boundaries of the traditional threat list in the field of diagnostics to better prepare for surprise by leveraging novel approaches to classify a threat from an unknown sample.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue research characterizing antimicrobial resistant (AMR) and antimicrobial susceptibility testing (AST) mechanisms in Burkholderia pseudomallei. - Continue research into an improved diagnostic development pipeline for hard to detect pathogens. - Continue the development of a comprehensive reference guide that will enable evidence based decision processes that drive the development of current and future diagnostic technologies. - Continue evaluation efforts for adapting an FDA approved biomarker platform for diagnosis of human TBI to a platform for diagnosis of brain injury resulting from the encephalitic alphaviruses. - Initiate efforts on several complementary approaches to address challenges in toxin diagnosis at the point of care (POC). - Initiate the development of a universal blood sample preparation platform to be compatible with several diagnostic systems. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Complete research characterizing AMR and AST mechanisms in Burkholderia pseudomallei. - Complete and validate an improved diagnostic development pipeline for hard to detect pathogens and transition to JPEO. - Complete the development of a comprehensive reference guide that will enable evidence based decision processes that drive the development of current and future diagnostic technologies and transition to JPEO. - Complete evaluation efforts for adapting an FDA approved biomarker platform for diagnosis of human TBI to a platform for diagnosis of brain injury resulting from the encephalitic alphaviruses. - Continue efforts on several complementary approaches to address challenges in toxin diagnosis at the POC. - Continue the development of a universal blood sample preparation platform to be compatible with several diagnostic systems. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Decrease due to change in program/project technical parameters.</p>			
<p>Title: 5) Bacterial/Viral/Toxins/ Broad Spectrum Prophylaxis</p> <p>Description: Provide the warfighter protection against biothreat agents through the administration of prophylaxis against known bacterial, viral and toxin threats of interest and emerging infectious threats. Use novel technology and methods to support development of vaccine candidates. Conduct studies to determine potential immune interference between lead vaccine candidates, the effect of alternative vaccine delivery methods, and thermo-stabilization technologies on the efficacy of lead vaccine candidates. Identify correlates of protection in humans, and predict the success of lead vaccine candidates in humans.</p> <p>FY 2021 Plans:</p>	21.071	26.029	29.560

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program	Date: May 2021
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Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	Project (Number/Name) TM2 / Techbase Medical Defense (Applied Research)
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Bacterial:</p> <ul style="list-style-type: none"> - Continue evaluation of Q fever vaccines based on selected T and B cell antigens. - Continue development of nanoparticle tularemia vaccine. - Continue nonclinical development of Burkholderia vaccines. - Evaluate protective efficacy of Anthrax vaccines against novel Bacillus anthracis strains. - Initiate development of Burkholderia monoclonal antibodies. - Continue evaluation of Burkholderia and Q Fever vaccines in the biomimetic Modular Immune In-vitro Construct (MIMIC) system. - Continue to sustain the Human Specimen Archive at United States Army Medical Research Institute of Infectious Diseases (USAMRIID). <p>Viral:</p> <ul style="list-style-type: none"> - Continue development of inactivated alphavirus vaccine. - Continue establishment of humoral correlates of protection against Ebola virus. - Continue biomarker discovery and host pathway/pathogen interactions important for protection against hemorrhagic fever viruses. - Continue improvements to immunogenicity, efficacy and manufacturing of Venezuelan Equine Encephalitis Virus (VEEV) DNA vaccine. - Continue development of multiplexed VEEV infection biomarker assay and qualification/validation of VEEV immune assays for clinical and pivotal animal studies. - Continue development of DNA vaccine against Marburg Virus. - Continue to evaluate alternative delivery devices for DNA vaccines in large animal studies. <p>Toxins:</p> <ul style="list-style-type: none"> - Continue development of well-defined animal models for medical countermeasure development against aerosolized biological toxins including marine toxins. - Continue evaluation of toxins and antitoxin prophylaxis in animal models. - Continue development of prototype mAb based drugs. - Initiate development of functional assays to determine biological activity for various toxins. <p>Broad Spectrum:</p> <ul style="list-style-type: none"> - Continue nonclinical evaluation of hybrid Staphylococcus enterotoxin and arenavirus antigen vaccines in in vitro assays and small animal models. - Continue to qualify/validate MIMIC for use in evaluation of pulmonary responses to biodefense vaccines. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program	Date: May 2021
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Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	Project (Number/Name) TM2 / Techbase Medical Defense (Applied Research)
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>- Initiate development of broad spectrum, novel antitoxin technologies including exploring the use of cell membrane coated nanosponges.</p> <p>- Initiate novel pan virus nanosponge platform development, explore additional applications of nanosponge technology to include toxins and bacteria.</p> <p>FY 2022 Plans:</p> <p>Bacterial:</p> <ul style="list-style-type: none"> - Complete the non-clinical animal studies for two back-up Burkholderia vaccine candidates. Candidates will proceed in development under BA3 funding if results indicated candidates are efficacious, otherwise, efforts will be terminated. - Continue development of Burkholderia monoclonal antibodies. - Continue non-clinical animal immunogenicity and efficacy studies for a Tularemia subunit. - Continue efforts in enabling science and NHP efficacy model development for Q fever. - Continue Q Fever vaccine prototype testing and candidate down selection. - Continue to evaluate protective efficacy of Anthrax vaccines against novel Bacillus anthracis strains. <p>Viral:</p> <ul style="list-style-type: none"> - Initiate non-clinical animal studies for the Inactivated Western, Eastern, and Venezuelan Equine Encephalitis (WEVEE) vaccine candidate. - Initiate non-clinical animal studies for the Trivalent Western Equine Encephalitis and Venezuelan Equine Encephalitis (WEEVEE) DNA vaccine. - Complete initial development of alphavirus mAbs against VEEV, EEEV, and WEEV, epitope identification and mAb generation. Project will continue utilizing BA3 funding. - Conduct nonclinical safety and efficacy studies for the Marburg Virus (MARV) DNA vaccine. - Down-select between alternative delivery devices for DNA vaccine delivery. <p>Toxins:</p> <ul style="list-style-type: none"> - Conduct epitope identification and mAbs generation against several marine toxins. - Continue to develop novel antitoxin technologies including exploring the use of cell membrane coated nanosponges. - Continue evaluation of toxins and antitoxin prophylaxis in animal models. - Continue to develop functional assays to determine biological activity for various toxins. <p>Broad Spectrum:</p> <ul style="list-style-type: none"> - Continue novel pan virus nanosponge platform development to address emerging threats, explore additional applications of nanosponge technology to include emerging toxins and bacterial threats. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	Project (Number/Name) TM2 / Techbase Medical Defense (Applied Research)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
<ul style="list-style-type: none"> - Explore additional strategies and platforms for broad spectrum protection to address protection against emerging threats. - Evaluation of next generation adjuvants for use in biodefense vaccines. - Initiate nonclinical evaluation of multivalent vaccine against arenaviruses. - Continue to qualify/validate MIMIC for use in evaluation of pulmonary responses to biodefense vaccines. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to change in program/project technical parameters.</p>				
<p>Title: 6) Chemical Therapeutics</p> <p>Description: Focuses on therapeutic strategies to effectively minimize injuries resulting from exposure to CWAs. This effort involves the development of neuroprotectants, anticonvulsants, improved therapies for enzyme reactivation, and investigation of alternate pathways leading to treatment. This effort also includes discovery and development of therapeutic strategies to treat dermal, ocular and respiratory injuries of CWAs. Efforts in this area are designed to develop potential candidates that will ultimately be submitted for Food and Drug Administration (FDA) licensure or to identify previously licensed products for new uses in the treatment of chemical warfare casualties. This effort is being separated into four thrust areas starting in FY21: Chemical Reactive Ocular Wound and Dermal Therapeutics (CROWD), Enabling Science, Pharmaceutical Based Agents (PBA), and Reactivators of AChE as Therapeutics (ReACT).</p>		10.138	-	-
<p>Title: 7) Chemical Reactive Ocular Wound and Dermal Therapeutics (CROWD)</p> <p>Description: Focuses on therapeutic strategies to effectively treat CWA contamination on wounds, eyes, and large areas of intact skin. This effort involves the development of products capable of removing or neutralizing CWAs from those routes of exposure, to decrease the toxic load of agent and allow optimal effectiveness of other systemic therapeutics.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Proof of concept test of candidate decontamination products for capability to decontaminate CWAs from wounds. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Determination of dosing strategies for use of candidate products in traumatic wounds. - Perform advanced preclinical studies to validate safety and efficacy in support of clinical trials. - Assessment of candidate product readiness for advanced development. - Continue refinement of manufacturing and stability. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to change in program/project technical parameters.</p>		-	3.126	6.679
<p>Title: 8) Enabling Science</p>		-	10.002	11.148

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021	
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	Project (Number/Name) TM2 / Techbase Medical Defense (Applied Research)	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021
<p>Description: Enables the accelerated development and deployment of therapeutics and prophylactics to the warfighter for protection against CWAs by leveraging technological advances to more efficiently assess the safety and efficacy of new candidates for IND submission. Efforts in this area include the development of anticholinergics, anticonvulsants, neuroprotectants, and delivery technologies to deliver therapeutics across the blood brain barrier (BBB). Efforts in this area establish therapeutic candidate libraries and pipelines using high throughput screening, artificial intelligence based drug design, and predictive toxicology.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue development of therapeutic candidate pipelines to treat CWAs using high throughput screening and AI-based predictive ADME/T - Continue to maintain databases of both screening and ADME/T data for drug candidates. - Complete in vitro ultra high throughput screening of library compounds for use as anticholinergics. - Down select generated chemical libraries to the most promising therapeutic candidates for follow on safety and efficacy assessments - Integrate Chemoinformatics System's ADME/T prediction tools with high throughput screening data into a high throughput screening database to support hit prioritization and identification of lead therapeutic candidates. - Incorporate and further develop AI/machine learning methods to optimize drug design. - Continue development of technologies for 2-PAM delivery across the BBB. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Employ AI-based computational toxicology and drug design system incorporating machine learning algorithms to streamline drug design. - Continue to maintain databases of both high throughput screening and ADME/T data for drug candidates. - Continue to perform select animal and safety studies for lead therapeutic candidates, including anticholinergics, for treatment of CWAs. - Continue to develop encapsulation and shuttle technologies that will deliver the 2-PAM payload across the BBB. - Continue to support the therapeutic candidate pipeline. - Perform follow on in vitro and in vivo safety and efficacy studies to support the down selection of high throughput screening hits to leads. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to change in program/project technical parameters.</p>			
Title: 9) Pharmaceutical Based Agents (PBAs)		-	6.564
			7.390

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	Project (Number/Name) TM2 / Techbase Medical Defense (Applied Research)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Description: Focuses on therapeutic strategies to effectively minimize injuries resulting from exposure to Pharmaceutical Based Agents (PBAs). This effort involves the evaluation FDA approved therapeutics for operational use, as well as generation of novel drug products to enhance level of protection and/or operational utility for the Warfighter. Efforts in this area are designed to develop drug candidates that will ultimately be submitted for Food and Drug Administration (FDA) licensure or to identify previously licensed products for new uses in the treatment of chemical warfare casualties.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue development of novel opioid therapeutics which will allow current pain management doctrine. - Continue operational assessment of FDA approved drug products to inform MCM timing and sequence in the event of a known or unknown chemical exposure. - Assess drug products for use against other priority PBA emerging threats (e.g., non-opioids). <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Continue development of novel opioid therapeutics which will allow current pain management doctrine. - Continue operational assessment of FDA approved drug products to inform MCM timing and sequence in the event of a known or unknown chemical exposure. - Continue to assess drug products for use against other priority PBA emerging threats (e.g., non-opioids) <p>FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to change in program/project technical parameters.</p>			
<p>Title: 10) Reactivators of AChE as Therapeutics (ReACT)</p> <p>Description: Focuses on therapeutic strategies to effectively minimize injuries resulting from exposure to CWAs. This effort involves the development of improved therapies for enzyme reactivation. Efforts in this area are designed to develop potential candidates that will ultimately be submitted for Food and Drug Administration (FDA) licensure or to identify previously licensed products for new uses in the treatment of chemical warfare casualties.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Test the efficacy of candidate resurrectors of inhibited acetylcholinesterase in vivo in animal models. - Continue to develop the most promising broad spectrum therapeutic candidates by using in vitro efficacy data from generated chemical libraries to inform iterative QSAR studies. - Continue animal studies to support regulatory submission of candidate therapeutics for treatment of the toxic effects of selected, priority NTAs. - Continue drug formulation efforts for MCMs with a longer shelf-life and with feasibility of an auto-injector containing material and chemical composition. 	-	7.501	5.262

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	Project (Number/Name) TM2 / Techbase Medical Defense (Applied Research)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<ul style="list-style-type: none"> - Continue validation and characterization of therapeutics for an improved broad spectrum reactivator - Continue development of current and screening for novel broad spectrum cholinesterase reactivators that are effective in the brain. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Test the safety and efficacy of candidate resurrectors of inhibited acetylcholinesterase in vivo in animal models. - Down select generated chemical libraries to the most promising broad spectrum therapeutic candidates for follow on safety and efficacy assessments. - Continue drug formulation efforts for MCMs with a longer shelf-life and with feasibility of an auto-injector containing material and chemical composition. - Continue development of current and screening for novel broad spectrum cholinesterase reactivators that are effective in the brain. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Decrease due to change in program/project technical parameters.</p>			
<p>Title: 11) Pretreatments and Prophylactics, Nerve Agents</p> <p>Description: Develop pretreatments and prophylactics that provide protection against chemical warfare agents, including organophosphorus nerve agents (OPNA), such as stoichiometric and catalytic scavengers and other entities that rapidly bind and detoxify a broad spectrum of agents.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue efforts to develop catalytic enzymes for use against selected, priority NTAs. - Continue expanded pre-clinical studies of lead catalytic scavengers to support future investigative new drug (IND) filing. - Continue efforts to develop capability for rapid development of medical countermeasures. - Continue efforts to explore and further develop novel non-enzyme nerve agent prophylaxis. - Continue new approaches to identify pretreatment and prophylaxis against multiple classes of NTAs and emerging chemical threats. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Continue efforts to develop catalytic enzymes for use against selected, priority NTAs. - Continue expanded pre-clinical studies of lead catalytic scavengers to support future investigative new drug (IND) filing. - Continue efforts to develop capability for rapid development of medical countermeasures. - Continue efforts to explore and further develop novel non-enzyme nerve agent prophylaxis. 	0.537	4.063	3.282

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	Project (Number/Name) TM2 / Techbase Medical Defense (Applied Research)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
<p>- Continue new approaches to identify pretreatment and prophylaxis against multiple classes of NTAs and emerging chemical threats.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Decrease due to change in program/project technical parameters.</p>				
<p>Title: 12) Bacterial Therapeutics</p> <p>Description: Discover and develop therapeutic countermeasures to mitigate the effects of known and emerging bacterial threats to the warfighter.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue the discovery and advancement of novel, non-traditional (antimicrobial peptides, immunomodulators, host-directed therapies), as well as traditional, strategies to identify lead therapeutic candidates to treat bacterial infections. - Continue discovery of antibody and derivatives to treat intracellular bacterial infection. - Develop novel formulations of existing antibiotics to overcome antimicrobial resistance, improve pharmacokinetic parameters, dose-sparing and to enhance antimicrobial killing. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Continue efforts to discover and develop traditional (small molecule inhibitors) and non-traditional (phage therapies, antimicrobial peptides, immunomodulators, and host-directed therapies) therapeutic candidates to existing and emerging bacterial threats. - Complete the development of formulations for existing antibiotic therapies that increase efficacy against bacterial pathogens and initiate proof of concept animal studies. - Continue small animal proof of concept testing to identify novel/nontraditional therapies against all pathogens. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to change in program/project technical parameters.</p>		12.966	10.915	14.456
<p>Title: 13) Viral Therapeutics</p> <p>Description: Discover and develop therapeutic countermeasures to mitigate the effects of known and emerging viral threats to the warfighter.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue screening, evaluation and development of novel and repurposed, broad-spectrum small molecule inhibitors and biologics effective against viral infections in vitro and in vivo. - Invest in identification of new pathways as antiviral drug targets. - Continue development of animal models for evaluation of therapeutic countermeasures. 		11.465	15.006	14.457

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	Project (Number/Name) TM2 / Techbase Medical Defense (Applied Research)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
- Explore target pathway analysis in mice and NHP to interrogate new potential targets for drug intervention. FY 2022 Plans: - Continuation of testing and development of biologics and small molecules targeting viral threats. - Continuation of the discovery and down-selection of additional broad-spectrum, direct-acting and host-directed antivirals - Initiate new investments in the discovery and down-selection of additional broad-spectrum, direct-acting and host-directed antiviral candidates for existing and emerging threats. FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.			
Title: 14) Toxin Therapeutics Description: Discover and develop therapeutic countermeasures to protect the warfighter against biotoxin threats. FY 2021 Plans: - Evaluate broad-spectrum, small molecule compounds and biologics for efficacy in the treatment and recovery from intoxication by BoNT. - Evaluate swine as a large animal model for BoNT. FY 2022 Plans: - Continue evaluation of broad-spectrum, small molecule compounds and biologics for efficacy in the treatment and recovery from intoxication by BoNT. FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.	0.324	0.251	0.250
Accomplishments/Planned Programs Subtotals	69.344	98.310	102.594

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• ET3: <i>Emerging Threats (ATD)</i>	0.000	0.000	6.000	-	6.000	-	-	-	-	-	-
• TM3: <i>Techbase Medical Defense (ATD)</i>	142.123	137.829	137.495	-	137.495	-	-	-	-	-	-
• MB4: <i>Medical Biological Defense (ACD&P)</i>	41.997	47.727	47.351	-	47.351	-	-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602384BP / CHEMICAL/BIOLOGICAL DEFENSE (APPLIED RESEARCH)	Project (Number/Name) TM2 / Techbase Medical Defense (Applied Research)
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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• MB5: Medical Biological Defense (SDD)	170.345	117.956	137.348	-	137.348	-	-	-	-	-	-
• MC5: Medical Chemical Defense (SDD)	55.269	54.392	50.362	-	50.362	-	-	-	-	-	-
• MB7: Medical Biological Defense (Op Sys Dev)	2.663	2.308	3.833	-	3.833	-	-	-	-	-	-
• MC7: Medical Chemical Defense (Op Sys Dev)	1.222	1.817	1.336	-	1.336	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (ATD)</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	209.552	191.001	197.824	-	197.824	-	-	-	-	-	-
CB3: <i>Chemical Biological Defense (ATD)</i>	-	26.426	27.448	27.146	-	27.146	-	-	-	-	-	-
ET3: <i>Emerging Threats (ATD)</i>	-	0.000	0.000	6.000	-	6.000	-	-	-	-	-	-
NT3: <i>Non-Traditional Agents Defense (ATD)</i>	-	28.344	15.308	18.396	-	18.396	-	-	-	-	-	-
TM3: <i>Techbase Medical Defense (ATD)</i>	-	142.123	137.829	137.495	-	137.495	-	-	-	-	-	-
TT3: <i>Technology Transition (ATD)</i>	-	12.659	10.416	8.787	-	8.787	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

The projects in this program element (PE) demonstrate technologies supporting transition to advanced component development for physical capabilities which cover biological and chemical detection, situational awareness and effects modeling, and protection and hazard mitigation. Other major efforts support enhanced chemical detection capabilities for aerosols and non-traditional agents, expanded capabilities for early warning in pathogen detection and diagnosis, and pretreatments and therapeutics against a broader set of chemical and biological agents. Medical capabilities (pretreatments, therapeutics, diagnostics capabilities, and drug manufacturing and regulatory science technologies) include capabilities against non-traditional agents.

Individual projects include:

- Chemical Biological Defense (CB3): demonstrations of CB physical science defense technologies including biological detection, chemical detection, digital battlespace management, protection, and decontamination.

- Emerging Threats (ET3): identify and develop scientific solutions, or to modernize capabilities, that allow for a more rapid response to emerging threats.

- Non-Traditional Agents (NTA) Defense (NT3): supports all efforts (both medical and non-medical) including chemical diagnostics, medical pretreatments, therapeutics, detection, and protection and hazard mitigation. Starting in FY21, a portion of the NTA lines have been merged into RDT&E Projects CB3, Chemical Biological Defense, and TM3, Techbase Medical Defense. The administrative change is intended to improve S&T budget agility and transition efficiency.

- Techbase Medical Defense (TM3): aims to produce biological diagnostic assays and reagents, diagnostic device platforms, pretreatments and therapeutics for bacterial, viral, and toxin threats as well as for chemical threats, and medical devices, as countermeasures for CBR threat agents. Specific areas of medical investigation include: prophylaxis, pretreatment, antidotes and therapeutics, personnel and patient decontamination, and medical management of casualties.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Chemical and Biological Defense Program	Date: May 2021
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (ATD)</i>
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- Technology Transition (TT3): validates high-risk/high-payoff technologies, concepts-of-operations, and a Joint Combat Developer concept development and experimentation process to significantly improve Warfighter capabilities in preparation for transition of mature chemical and biological (CB) defense technologies to advanced development programs.

The CBDP S&T Advanced Technology Development stakeholders: The U.S. Army Combat Capabilities Development Command Chemical Biological Center (DEVCOM CBC), United States Army Medical Research Institute of Infectious Diseases (USAMRIID), United States Army Medical Research Institute of Chemical Defense (USAMRICD), United States Army Natick Soldier Systems Center, Naval Research Lab (NRL), Air Force Research Lab (AFRL), among others. The intent is to maintain strategic partnerships with the DoD Service communities for mission success across the enterprise through collaborative planning and programming maintaining budget assurance.

Work conducted under this PE will transition to and will provide risk reduction for Advanced Component Development and Prototypes (PE 0603884BP) and System Development and Demonstration (PE 0604384BP) activities.

B. Program Change Summary (\$ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	175.486	188.001	188.479	-	188.479
Current President's Budget	209.552	191.001	197.824	-	197.824
Total Adjustments	34.066	3.000	9.345	-	9.345
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	0.000	3.000			
• Congressional Directed Transfers	0.000	-			
• Reprogrammings	35.165	-			
• SBIR/STTR Transfer	-1.099	-			
• Other Adjustments	0.000	-	9.345	-	9.345

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

Project: CB3: *Chemical Biological Defense (ATD)*

Congressional Add: *High Air Flow ChemBio Filtration System Enhancement*

	FY 2020	FY 2021
	-	3.000
Congressional Add Subtotals for Project: CB3	-	3.000
Congressional Add Totals for all Projects	-	3.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Chemical and Biological Defense Program Date: May 2021

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (ATD)</i>
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Change Summary Explanation

Funding: FY20 (+\$35.163 Million): Internal Reprogramming (FY20-31 IR) for the Coronavirus Aid, Relief, and Economic Security (CARES) Act (+\$26.300 Million); below threshold reprogramming increase for COVID-19 SARS CoV-2 vaccine development project (+\$5.404 Million), and medical defense pretreatments efforts (+\$3.459 Million).

FY20 (-\$1.099 Million): Transfer of funding to support Small Business Innovative Research/Small Business Technology Transfer efforts.

FY21 (+\$3.000 Million): Congressional Add for High Air Flow Chemical Biological (CB) Filtration System Enhancement.

FY22 (+\$9.345 Million): Increase for 1) Emerging Threat Rapid Response Capabilities, 2) COVID-19 SARS-CoV-2 vaccine development, and 3) to accelerate efforts to develop and deliver nerve agent medical countermeasures (+\$12.111 Million). Departmental inflation/travel adjustments (-\$2.766 Million).

Schedule: N/A

Technical: N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program										Date: May 2021		
Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603384BP / CHEMICAL/BIOLOGICAL DEFENSE (ATD)				Project (Number/Name) CB3 / Chemical Biological Defense (ATD)			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
CB3: <i>Chemical Biological Defense (ATD)</i>	-	26.426	27.448	27.146	-	27.146	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project CB3 develops technology advancements for joint service application in the areas of digital battlespace management technologies, protection/ hazard mitigation and detection. These activities will speed maturing of advanced technologies to reduce risk in system-oriented integration/demonstration efforts. A portion of Project NT3, Techbase Non-Traditional Agents Defense, will merge into this Project starting in FY21.

Individual efforts in this project include:

- Digital battlespace management focuses on situational awareness and threat agent applications, analytic applications platform for operational situational awareness, non-traditional detection sciences, tactical decision aids, and advanced computational methods.
- Protection/hazard mitigation works to provide technologies that protect from and reduce the impact of both chemical and biological threats and hazards to the Warfighter, weapons platforms, and structures.
- Detection strives to develop technologies for point and standoff detection and identification of both chemical and biological agents.
- Non-Traditional Agent (NTA) Defense includes chemical diagnostics, medical pretreatments, therapeutics, detection, and protection and hazard mitigation.

FY20-22 reorganizes, renames legacy Bullet titles and introduces new Bullets (Thrust Areas). These new "Thrust" titles are in line with the CBDP Core Capability Areas and intended to provide more detail and traceability from the S&T program to advanced development.

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

	FY 2020	FY 2021	FY 2022
Title: 1) CARES Act - Dial A Threat	0.495	-	-
Description: This effort will add additional tasks to provide a COVID detection/diagnostic assay, optimize sample preparation methods for SARS CoV-2, and evaluate the performance of CRISPR based assays for SARS CoV-2.			
Title: 2) CARES Act - EpiGrid, Advanced Capabilities for Human Health Effects Modeling, Interior Modeling	1.000	-	-
Description: Expand and enhance epidemiological modeling capabilities to allow for modeling of COVID-19 in populations. Enhance hazard prediction capabilities for use in COVID-19 scenarios.			
Title: 3) CARES Act - Rapid Detection and Identification of Biological Events Testing	0.081	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Description: Further evaluate Zeteo Tech BioFlyte prototype which is a MALDI-TOF MS instrument and supplement the library build with SARS CoV-2 in order to benchmark the prototype instrument compared to other MS technologies for desired DoD and Defense applications.</p>			
<p>Title: 4) CARES Act - RATE Operationalization</p> <p>Description: Rapidly enhance non-invasive physiological detection algorithms for pre-symptomatic prediction of COVID-19 infection. Conduct multiple, large cohort studies to include warfighters across the Services and other DoD personnel to collect, analyze and interpret data to improve early detection algorithms.</p>	6.490	-	-
<p>Title: 5) Expeditionary Collective Protection</p> <p>Description: Develop new technologies for soldiers to determine the remaining chemical vapor service life of their chemical warfare agent (CWA) filters. This effort is transitioning to the Air Purification Enhancements thrust area starting in FY21.</p>	0.639	-	-
<p>Title: 6) Air Purification Enhancements</p> <p>Description: This effort supports the Expeditionary Collective Protection (CP) Core Capability Area. Existing CP systems have high life cycle costs driven by maintenance and limited service life. Science & Technology efforts will focus on optimizing and extending filter life to reduce lifecycle costs while maintaining or improving protection.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Complete field-testing and sampling Residual Life Indicator (RLI) filters at fixed sites and provide final report. - Transition Residual Life Indicator (RLI) filters to the Collective Protection Modernization Program of Record. - Continue to scale up manufacture of novel filter bed materials and integrate into filters for testing against threat agents of interest. Initiate materials testing for effectiveness against novel threats for Next Generation Filtration systems. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Continue materials testing for effectiveness against novel threats for Next Generation Filtration systems. - Incorporate novel materials into Collective Protection (ColPro) systems that increase the performance against agents delivered in all states of matter (vapor, aerosol, and liquid) in operationally relevant environments. - Engineer novel filter bed materials for chemical agent destruction, integrate them into next generation filters, and develop methods to assess filter performance in an operationally-relevant environment. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.</p>	-	0.237	0.287
<p>Title: 7) Respiratory and Ocular Protection</p>	3.683	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Description: Develop novel filtration media that are lighter weight and lower burden while capable of protecting against a broader range of challenges that includes toxic industrial chemicals (TICs). This effort is being separated into two thrust areas starting in FY21: All-Hazards & Respiratory Protection and Multifunction Materials for Protection.</p>			
<p>Title: 8) All-Hazards & Respiratory Protection</p> <p>Description: This effort supports the Respiratory and Ocular Protection Core Capability Area. Efforts will improve chemical and biological agent protection while maintaining warfighter capability through integrated research on respirator, seams, closures, and new materials; perform early surveys for end-user jury input; frequent user operational evaluation; focus on closed circuit Self-Contained Breathing Apparatus.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue to explore trade space for next generation general purpose mask. - Continue development of systems that provide chemical biological respiratory protection technologies in support of tactical all hazard, full spectrum respiratory protection system. - Complete system testing and transition cooling garment systems to Uniform Integrated Protection Ensemble Family of Systems Program of Record. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Transition lightweight protective garment for all hazards environments to Uniform Integrated Protection Ensemble Family of Systems Program of Record - Complete development of systems that provide chemical biological respiratory protection technologies in support of tactical all hazard, full spectrum respiratory protection system. - Develop next generation respiratory protection technology in the form of a low-burden, non-contact powered respirator with novel filter designs that integrates with Warfighter technologies and reduces encumbrance. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Decrease due to change in program/project technical parameters.</p>	-	1.718	0.814
<p>Title: 9) Multifunction Materials for Protection</p> <p>Description: This effort supports the Respiratory and Ocular Protection, Percutaneous Protection, Expeditionary Collective Protection, Materiel Contamination Mitigation, and Personnel Contamination Mitigation Core Capability Areas. Efforts will discover, develop and integrate novel, reactive/catalytic materials and scale material manufacturing with maximum sorption and reactivity, and characterize materials using state-of-the-art in operando and ambient pressure spectroscopies, for eventual</p>	-	1.260	1.105

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>integration into next generation decontaminants, coatings, filters, and protective garments that reactively decontaminate chemical warfare agents.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue to engineer reactive/catalytic nano-structure materials from basic research efforts for chemical agent destruction, to feed air purification enhancement. - Continue to integrate engineered reactive/catalytic nano-structure materials (derived from BA2 efforts) into filters, decontaminants, and textiles to assess materials in an operationally-relevant environment for personnel decontamination. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Continue to engineer reactive/catalytic nano-structure materials from basic research efforts for chemical agent destruction, to feed air purification enhancement. - Continue to integrate engineered reactive/catalytic nano-structure materials (derived from BA2 efforts) into filters, decontaminants, and textiles to assess materials in an operationally-relevant environment for personnel decontamination. - Test and transition self-decontaminating, reusable protective garments (derived from BA2 efforts) of composite textiles with a reactive barrier, improved protection, and reduced thermal burden/life-cycle costs for insertion into the Uniform Integrated Protection Ensemble Family of Systems Program of Record. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.</p>			
<p>Title: 10) Warning and Reporting</p> <p>Description: Develop a framework for integrating and correlating timely, relevant information sources. Investigate new approaches and methodologies such as machine learning, artificial intelligence, and advanced data analysis to accelerate analytical processes and provide early warning of chemical and biological threats. This effort is transitioning to the CBRN Battlespace Surveillance, Alerting & Response thrust area starting in FY21.</p>	1.021	-	-
<p>Title: 11) CBRN Battlespace Surveillance, Alerting & Response</p> <p>Description: To improve upon the Department of Defense's capability to detect, identify, alert, and responds to deliberate releases and naturally occurring outbreaks of chemical and biological threat agents. JSTO will expand on developing predictive CB exposure algorithms based on non-invasively collected human biomarkers. Current predictive algorithms in development by JSTO are based on large in-hospital datasets from patients with comorbidities. Improving on the applicability and efficacy of these algorithms will focus on large, real-time human data collects of chemical and biological agent / agent proxy exposures. Additionally, studies will focus on examining the feasibility of specifically isolating indicators of respiratory infection, determining severity of infection, and predicting return to mission readiness after exposure. This capability will enable early implementation</p>	-	2.160	4.848

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>of countermeasures such as isolation, quarantine, and removal from an area, thus potentially reducing transmission, morbidity, and mortality rates. The maturation of algorithms will incorporate Machine Learning (ML) approaches for refining sensitivity and specificity.</p> <p>FY 2021 Plans: - Improve algorithms development that leverage non-invasive physiological monitoring devices to provide earlier warning of chemical and biological agent exposure.</p> <p>FY 2022 Plans: - Continue the improvement of algorithms that leverage non-invasive physiological monitoring devices to provide earlier warning of chemical and biological threats and/or exposure. - Continue the advancement of standoff physiological monitoring capabilities. - Continue to develop predictive algorithms and analytic tools utilizing Artificial Intelligence (AI) and ML techniques to allow for rapid response to Emerging Threats.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to change in program/project technical parameters.</p>			
<p>Title: 12) Decision Analysis and Management</p> <p>Description: Enable the prediction of chemical and biological hazards, exposures, casualties, and infections along with providing timely and accurate warnings and recommended courses of action. Develop methods to utilize non-traditional detection methods to provide indications of Chemical and Biological exposure risk. This effort is being separated into two thrust areas starting in FY21: CBRN Decision Aids and CBRN Situational Awareness.</p>	5.424	-	-
<p>Title: 13) CBRN Decision Aids</p> <p>Description: In order to unencumber the warfighter at the tactical edge, continue to develop and field CBRN Decision Aids on End User Devices (EUDs) in both connected and disconnected operations. Capabilities will focus on utilizing automation, reducing the burden experienced by the warfighter, while providing accurate, actionable information. During this time period, a focus will be put on developing a Contamination Avoidance Decision Aid to inform the warfighter on how to avoid, respond to and plan routes around CB hazards.</p> <p>Another area of focus will be the development of Autonomous Asset Guidance. This capability will be used in conjunction with other capabilities developed under the CBRN Decision Aids portfolio to optimize the use of Autonomous Assets and reduce the burden incurred by the warfighter in order to operate them. This capability will also aim to incorporate, fuse and utilize data from Autonomous Assets to improve and refine other CBRN Decision Aids.</p>	-	1.150	1.400

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue the development and porting of decision support plug-ins for integration with Tactical Assault Kit (TAK), including the Android, web, Windows OS, and Virtual Reality (VR) and Augmented Reality (AR) versions to further leverage the TAK infrastructure and cross-community tools. - Initiate use of Graphics Processing Units (GPUs) for faster than real-time high resolution hazard prediction modeling capabilities and initiate user testing. - Continue development of approaches to translate raw sensor data and publish to a common standard. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Continue the improvement of decision support plug-ins for integration with TAK, including the Android, web, Windows OS, and virtual and augmented reality versions to further leverage the TAK infrastructure and cross-community tools. - Further develop the use of GPUs for faster than real-time high resolution hazard prediction modeling capabilities and initiate user testing. - Finalize the development of approaches to translate raw sensor data and publish to a common standard. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.</p>			
<p>Title: 14) CBRN Situational Awareness</p> <p>Description: To enhance CB Situational Awareness, JSTO will expand the types of threats that can be modeled with hazard assessment capabilities to include fixed-wing and rotary-wing drones of interests. These capabilities will allow for single drones and swarms to be modeled.</p> <p>Virtual Reality (VR) and Augmented Reality (AR) technologies will be leveraged to develop CB focused training and mission rehearsal capabilities that will be integrated into systems widely used by the Joint Force. Virtual training environments will be developed to implement, visualize and account for hazard source terms and plumes generated by transport and dispersion (T&D) models. Augmented Reality applications will also be explored for tactical use to maximize warfighter CB situational awareness on the battlefield.</p> <p>JSTO will modernize hazard modeling capabilities by adopting a modular framework and integrating across Service command and control systems to operationalize Reachback support. JSTO will further enhance hazard modeling by creating a seamless indoor-to-outdoor T&D modeling capability and improve urban T&D modeling to support operations in urban and mixed environments. New state-of-the-art computational fluid dynamics modeling techniques and their exploitation of the latest computing resources will be leveraged to increase both speed and accuracy.</p>	-	4.948	5.016

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>JSTO will develop CB health effect modeling software and analytic tools to support force readiness and facilitate medical planning against chemical and biological agents. Epidemiological models will be developed that quantify and visualize mission operational impacts from exposure to, and spread of, infectious biological threat agents to DoD relevant populations. Additionally, JSTO will leverage Threat Agent Science (TAS) data to enhance capabilities for modeling health effects and host pathogen interactions from exposures to traditional and non-traditional CB agents. This will provide the warfighter with more accurate casualty estimates accounting for human health effects.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue configuration management of science and technology prototype for transition of upgraded capabilities. - Continue performance enhancements for T&D models, particularly for urban environments. - Further develop a comprehensive infectious disease epidemiological modeling applications for disease prediction, forecasting, medical planning and treatment. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Continue configuration management of science and technology prototype for transition of upgraded capabilities. - Continue improvement of performance enhancements for T&D models, particularly for urban environments. - Continue the development of comprehensive infectious disease epidemiological modeling applications for disease prediction, forecasting, medical planning and treatment. - Continue to enhance CB situational awareness capabilities for integration into Head up Display (HUD) technologies for tactical use. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to change in program/project technical parameters.</p>			
<p>Title: 15) Detection</p> <p>Description: Advance and mature technologies and capabilities to detect and identify chemical and biological threats to the point of transitioning to customers for advanced development. This activity includes development of point, remote, or standoff sensors as appropriate, to address both chemical and biological threats. These efforts develop transitionable detection capabilities for early warning of contamination exposure to the warfighter. This effort is being separated into five thrust areas in FY21: Distributed CB Reconnaissance, Enhanced/Emerging Biothreat Sensing, Expeditionary Analytical Toolkit (ExAnT), Unattended Perimeter Monitoring, Unconventional Detection Modality.</p>	5.356	-	-
<p>Title: 16) Distributed CB Reconnaissance</p>	-	3.216	2.079

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Description: Develop distributed chemical and biological reconnaissance tools to enhance early warning and situation awareness of chemical and biological threats to include low cost point sensor and sensing/collection systems for manned and unmanned platforms.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue refinement and testing of sensors to achieve a more robust system that can decipher between threats and non-threats. - Examine potential solutions for augmenting and replacing current paper-based technologies. - Develop relevant capabilities to address current and emerging threats. - Development of Artificial Intelligence and Machine Learning capabilities to support integrated early warning, sensor networking, and autonomous sensing. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Incorporate sensors into maneuver autonomy to enhance biological threat reduction. - Develop innovative sensor solutions to increase situational awareness and provide operational advantage. - Sensor development will include integration of technologies such as photonics and Waveguide-Enhanced Raman Spectroscopy (WERS) into detectors as sensor arrays. - Develop low-cost, low-burden detection technologies to support tactical and dismounted site assessment missions. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program/project funding transferred from another funding line.</p>			
<p>Title: 17) Enhanced/Emerging Biothreat Sensing</p> <p>Description: Establish robust capability to assess emerging and enhanced biological threats to rapidly develop biosensors for detecting emerging or enhanced biological threats. Quickly develop adaptable, analyte-agnostic laboratory and field-forward detection capabilities to provide a spectrum of improved detection assets for novel threats. This thrust area leverages multi-omics data science or the combining multiple measurements to inform rational and rapid design and development of biodetection solutions. Synthetic biological concepts will be thoroughly evaluated and exploited for the development of biosensing solutions and refinement of laboratory methods.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue development of detection capabilities for identifying genomic editing events and rapid assessment and detection of emerging biological threats. - Continue development of algorithms and laboratory workflows to identify threats in unknown samples. - Continue development of far-forward pathogen agnostic sensing toolkit. - Continue development of ruggedized, scalable sensor with adaptable design. 	-	1.768	2.848

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
<p>- Continue development of sample stabilization methods.</p> <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Continue development of detection capabilities focused on addressing emerging biological threats. - Continue development of algorithms and laboratory workflows to identify threats in unknown samples. - Continue development of far-forward pathogen agnostic sensing toolkit. - Continue development of in-silico design to expedite assay development. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.</p>				
<p>Title: 18) Expeditionary Analytical Toolkit (ExAnT)</p> <p>Description: Develop a suite of expeditionary chemical sensors to provide the warfighter with modernized detection technologies for traditional threats while enhancing detection capabilities for non-traditional, emerging, and mixed chemical hazards.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue development of chemical vapor sensor utilizing dielectric excitation with focus on attaining sensitivity - Continue development of sensors based on semiconductor thin films coated with plasmonic metal and metal oxide nanoparticles <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Continue development of chemical vapor sensor utilizing dielectric excitation with focus prototype delivery and validation. - Continue development of sensors based on semiconductor thin films coated with plasmonic metal and metal oxide nanoparticles; focus on validation and testing systems. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.</p>		-	3.083	3.333
<p>Title: 19) Unattended Perimeter Monitoring</p> <p>Description: Automated technologies to improve detection of aerosolized hazards while minimizing or removing user intervention to enable a reliable detect-to-warn capability, providing a capability for unattended monitoring of perimeters for temporary defense positioning, including base camps, to enable early indication of threats. This thrust area will evaluate current and novel technologies to provide improved chemical threat detection and automated biological detection capabilities.</p> <p>FY 2021 Plans:</p>		-	0.931	1.094

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
<p>- Continue development of fully-automated biosurveillance system capable of air sample collection, sample preparation, and analysis for both chemical and biological threats.</p> <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Evaluate technology for next generation UAV-borne and wearable approaches - Integrate automated technologies to improve stand-off detection of vapor, aerosol, solid and liquid hazards for chemical detection. - Integrate refined trigger, collector, and detector/identifier technologies for bioaerosol detection. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.</p>				
<p>Title: 20) Unconventional Detection Modalities</p> <p>Description: Utilize a targeted set of programs pushing the boundaries of sensor development by pulling technologies developed from academia and basic research to be integrated into early detection prototypes. These technologies focus on keeping the warfighter ahead of the chemical and biological threats with portable, low SWaP detectors that will protect the general forces and enhance operations on the battlefield by providing warning and field analytics.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue and validate chemical detection modalities utilizing Waveguide Enhanced Raman Spectroscopy (WERS) and Refractive Index sensing. - Continue to synthesize and further assess SIC materials by coating various surface coupons. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Continue model development for machine learning algorithms. - Continue development of detection of emerging biothreats using cell-free platforms onto an integrated prototype. - Conduct detection sensing validation for detection by utilizing nanoparticles and voltammetry electrochemistry. - Conduct model testing and validation of machine learning algorithms for chemical detection sensors. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.</p>		-	1.142	0.781
<p>Title: 21) Percutaneous Protection</p> <p>Description: Develop advanced ensemble prototypes with state-of-the art materials that address the full spectrum of threats and provide a range of solutions optimized for protection, thermal comfort, and mission performance. This effort is being separated into two thrust areas in FY22: Lightweight Protective Garments and Dynamic Multifunction Materials for Second Skin.</p>		0.285	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021
<p>Title: 22) Lightweight Protective Garments</p> <p>Description: This effort supports the Percutaneous Protection Core Capability Area. Efforts will advance garment material and ensemble technologies with new capabilities using integrated garment designs and fabrication for thermal burden reduction, state-of-the-art threat protection technologies, and supporting test methodologies and methods that provide operationally relevant, comparable data on test garments.</p> <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - No BA3 efforts planned for FY20 and FY21. - Transition improved protective garment test methodologies (derived from BA2 efforts) that provide greater validation of CB protection, are repeatable and support testing under relevant conditions to the Uniform Integrated Protection Ensemble Family of Systems Program of Record. - Continue assessment for antimicrobial fabrics (derived from BA2 efforts) to be used as inner layer/liner in protective uniforms to prevent excessive growth of microbes associated with hygiene/extended wear and reduce the need for laundering. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments. This effort was funded under Percutaneous Protection.</p>		-	-
<p>Title: 23) Dynamic Multifunction Materials for Second Skin</p> <p>Description: This effort supports the Percutaneous Protection Core Capability Area. Efforts will utilize responsive technologies to provide CB protective suits that adapt to the environment by synthesizing scaled samples via roll-to-roll manufacture which exhibit materials properties that reduce thermal burden and integrate with current combat garments.</p> <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Increase molecular selectivity of responsive interpenetrating polymers (derived from BA2 efforts) towards nerve and blister agents. - Demonstrate and scale carbon nanotube membrane responsive textiles (derived from BA2 efforts) efforts into garments that increase protection levels in response to chemical weapons agents while preserving moisture vapor transport rate. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program/project transitioned to Advanced Technology Development</p>		-	-
Title: 24) Material Contamination Mitigation		1.952	-
			0.144
			1.379
			-

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Description: Develop highly effective non-traditional or novel decontamination technologies that integrate with current procedures and support non-material improvements of the overall decontamination effort. This effort is being separated into three thrust areas starting in FY21: Enhanced Survivability Coatings, Equipment Decontamination, and Personnel Decontamination.</p>			
<p>Title: 25) Enhanced Survivability Coatings</p> <p>Description: This effort supports the Materiel Contamination Mitigation Core Capability Area. Military equipment coatings are challenging and logistically intensive to decontaminate. Efforts within this thrust seek to produce enhanced coatings that increase chemical warfare agent survivability and decontaminability of military equipment to levels comparable to that of stainless steel. Improved coatings will resist chemical agent absorption and be quickly decontaminated in field, to rapidly return equipment to mission operations level.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Demonstrate temporary coatings (derived from BA2 efforts) to improve vehicle decontaminability in support of CBRN Coatings, Coverings, and Protective Overlays Program of Record. - Perform industry coating materials survey to identify candidate temporary chemical/biological agent resistant coatings. - Improve success of decontamination through the evaluation and incorporation of appliques (to include chemical transport studies current military coatings, novel coatings characterization, thin film overcoats, strippable coat, reactive coat, and lock-down coats). - Improve equipment coatings through bio-inspired surface treatments to repel agents of interest from current military coatings. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Increase chemical agent resistance of current military coatings through development and testing of novel temporary coatings to reduce the spread of contamination and enable more facile decontamination of military assets. Improve success of decontamination through the evaluation and incorporation of appliques. - Characterize chemical transport in current military coatings, thin film overcoats, and strippable, reactive, and lock-down coats in support of CBRN Coatings, Coverings, and Protective Overlays Program of Record. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.</p>	-	0.173	0.345
<p>Title: 26) Equipment Decontamination</p> <p>Description: This effort supports the Materiel Contamination Mitigation Core Capability Area. The Warfighter has a limited capability to decontaminate personal equipment, weapons, vehicles, ships, and facilities; Sensitive equipment (weapon system optics, electronic equipment, interior spaces, and aircraft); and hazardous waste. Efforts within this thrust seek to develop decontaminant formulations and procedures that reduce or eliminate residual contamination hazards; enable unit-level decontamination with rapid unmasking; reduce logistic needs (need for water); enable rapid sorting of clean from dirty to rapidly</p>	-	1.737	0.649

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>return high-value equipment to normal use; and develop improved realistic test methods. Successful efforts will result in improved efficacy, materials compatibility, flexibility, and reduced logistical burden compared to existing and emerging decontamination program requirements.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Complete biological hot air decontamination technology for bacterial spore decontamination of aircraft and sensitive equipment and transition process to the Joint Biological Agent Decontamination System (JBADS) Program of Record. - Publish laboratory test methods that measure impact of complex surfaces and real world factors on decontamination. - Complete Sprayable Decontaminant Slurry formulation and operational user assessment for tactical level equipment decontamination. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Begin integrating contamination mitigation technologies by advancing the proof of concept for hot-air CWA decontamination by validating the operational performance envelope. Successful efforts will result in improved efficacy, materials compatibility, flexibility, and reduced logistical burden compared to existing and emerging decontamination program requirements. - Transition Sprayable Decontaminant Slurry technology for immediate chemical warfare agent decontamination of equipment to the Service Equipment Decontamination System (SEDS) Program of Record. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Decrease due to change in program/project technical parameters.</p>			
<p>Title: 27) Personnel Decontamination</p> <p>Description: This effort supports the Personnel Contamination Mitigation Core Capability Area. Efforts will develop decontaminants for decontamination of unbroken skin with lower lifecycle costs and storage constraints and determination of time, efficacy and logistics burdens to warfighters for mass casualty decontamination. Decrease Warfighter burden in the event of a CWA exposure by identifying science and technology gaps in the mass personnel decontamination process as well as possible substitutions for current approved personnel decontamination formulations.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue to assess reactive sorbant assessment for individual and skin decontamination. - Begin investigations to optimize form factors for dry skin decontamination. - Continue personnel decontamination efforts to enhance current processes and support mass casualty personnel decontamination warfighter operations, including homeland defense mission, including efficacy data against representative nontraditional agents required to achieve FDA approval. <p>FY 2022 Plans:</p>	-	0.925	1.024

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603384BP / CHEMICAL/BIOLOGICAL DEFENSE (ATD)	Project (Number/Name) CB3 / Chemical Biological Defense (ATD)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
- Continue investigations to optimize form factors for dry skin decontamination. - Develop and assess physical removal technologies for potential replacement of RSDL. - Continue to integrate new dry decontamination into a mitt form factor and determine S&T challenges within process and procedure improvements. This includes development of methodologies and procedures for military working dog (MWG) decontamination.			
<i>FY 2021 to FY 2022 Increase/Decrease Statement:</i> Program/project funding transferred from another funding line.			
Accomplishments/Planned Programs Subtotals	26.426	24.448	27.146

	FY 2020	FY 2021
<i>Congressional Add:</i> High Air Flow ChemBio Filtration System Enhancement	-	3.000
<i>FY 2021 Plans:</i> Develop High Air Flow ChemBio Filtration System Enhancement for expeditionary and mobile collective protection systems through combination of filter elements, incorporation of new filter bed materials, and reduction of element size.		
Congressional Adds Subtotals	-	3.000

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

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• CA4: Contamination Avoidance (ACD&P)	18.806	10.326	32.923	-	32.923	-	-	-	-	-	-
• DE4: Decontamination (ACD&P)	7.009	6.286	18.385	-	18.385	-	-	-	-	-	-
• IS4: Information Systems (ACD&P)	0.517	4.661	0.000	-	0.000	-	-	-	-	-	-
• TE4: Test & Evaluation (ACD&P)	5.054	4.107	0.000	-	0.000	-	-	-	-	-	-
• TT4: Technology Transition (ACD&P)	0.000	0.577	0.866	-	0.866	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603384BP / CHEMICAL/BIOLOGICAL DEFENSE (ATD)	Project (Number/Name) ET3 / Emerging Threats (ATD)
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
ET3: <i>Emerging Threats (ATD)</i>	-	0.000	0.000	6.000	-	6.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

Project ET3 aims to identify and develop scientific solutions, or to modernize capabilities, that allow for a more rapid response to emerging threats. This project supports the development of defense capabilities, collaborating across the DoD and specific interagency partners for doctrine, equipment, and training for the Warfighter and civilian population for defense against emerging threats. Additionally, this project supports advanced development of defensive science and technology capabilities aimed at proactive characterization of threats and potentially disruptive technologies.

Individual efforts in this project include:

- Developing new science and technology capabilities that allow for the rapid characterization of emerging threats to support operational decision making and requirements setting. Support an integrated approach to developing new or enhanced countermeasures against emerging threats through innovative science and technology solutions for detection, protection, decontamination, and medical countermeasures (MCMs).
- Efforts supply test methodologies and supporting science to verify capabilities, develop protection and hazard mitigation options, expand hazard assessment tools, and develop MCMs against emerging threats.

The Chemical and Biological Defense Emerging Threat Innovation Fund challenges DoD Labs and innovation cells to deliver transformational technologies against emerging threats that enables the force to compete, deter, and win in strategic environments described in the National Defense Strategy.

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

	FY 2020	FY 2021	FY 2022
Title: 1) Emerging Threat Innovation	-	-	6.000
Description: The Chemical and Biological Defense Emerging Threat Innovation Fund challenges DoD Labs and innovation cells to deliver transformational technologies against emerging threats that enables the force to compete, deter, and win in strategic environments described in the National Defense Strategy.			
FY 2022 Plans: Initiate enhanced capability to more rapidly characterize, and the development of medical countermeasures against, emerging chemical and biological threats through investment in high throughput technologies.			
FY 2021 to FY 2022 Increase/Decrease Statement: Program/project is new start effort in FY 2022.			
Accomplishments/Planned Programs Subtotals	-	-	6.000

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603384BP / CHEMICAL/BIOLOGICAL DEFENSE (ATD)	Project (Number/Name) ET3 / Emerging Threats (ATD)
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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• CA4: Contamination Avoidance (ACD&P)	18.806	10.326	32.923	-	32.923	-	-	-	-	-	-
• DE4: Decontamination (ACD&P)	7.009	6.286	18.385	-	18.385	-	-	-	-	-	-
• IP4: Individual Protection (ACD&P)	1.997	2.483	3.968	-	3.968	-	-	-	-	-	-
• TE4: Test & Evaluation (ACD&P)	5.054	4.107	0.000	-	0.000	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program										Date: May 2021		
Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603384BP / CHEMICAL/BIOLOGICAL DEFENSE (ATD)				Project (Number/Name) NT3 / Non-Traditional Agents Defense (ATD)			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
NT3: Non-Traditional Agents Defense (ATD)	-	28.344	15.308	18.396	-	18.396	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project NT3 develops future capabilities against emerging and novel threats and verifies current capabilities against Non-Traditional Agents (NTAs). This project focuses on demonstrating fast and agile scientific responses to enhance or develop capabilities that address emerging threats. This project is a comprehensive and focused effort for developing NTA defense capabilities, coordinated with specific interagency partners for doctrine, equipment, and training for the Warfighter and civilian population for defense against NTAs. This project supports advanced technology development of NTA defense science and technology initiatives and transitioning to advance development.

Individual efforts in this project include:

- Support an integrated approach to develop new or enhanced countermeasures against novel and emerging threats through innovative science and technology (S&T) solutions for detection, protection, decontamination and medical countermeasures (MCMs).
- Efforts supply test methodologies and supporting science to verify capabilities, develop protection and hazard mitigation options, expand hazard assessment tools, and develop MCMs against NTAs.

Starting in FY21, a portion of the NTA lines have been merged into RDT&E Projects CB3, Chemical Biological Defense, and TM3, Techbase Medical Defense. The administrative change is intended to improve S&T budget agility and transition efficiency.

FY20-22 reorganizes, renames legacy Bullet titles and introduces new Bullets (Thrust Areas). These new "Thrust" titles are in line with the CBDP Core Capability Areas and intended to provide more detail and traceability from the S&T program to advanced development.

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

	FY 2020	FY 2021	FY 2022
Title: 1) Material Contamination Mitigation	0.520	-	-
Description: Develop highly effective non-traditional or novel decontamination technologies that integrate with current procedures and support non-material improvements of the overall decontamination effort.			
Title: 2) Modeling & Simulation	0.236	-	-
Description: This effort develops NTA technology advancements for joint service application in the area of information systems and modeling and simulation technologies. These activities will speed maturation of advanced technologies to reduce risk in			

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603384BP / CHEMICAL/BIOLOGICAL DEFENSE (ATD)	Project (Number/Name) NT3 / Non-Traditional Agents Defense (ATD)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
system-oriented integration/demonstration efforts. Information systems advanced technology focuses on areas of advanced warning and reporting, hazard prediction and assessment, simulation analysis and planning, and systems performance modeling.			
Title: 3) Percutaneous Protection Description: Develop advanced ensemble prototypes with state-of-the art materials that address the full spectrum of threats and provide a range of solutions optimized for protection, thermal comfort, and mission performance.	0.488	-	-
Title: 4) Personnel Contamination Mitigation Description: Develop new technologies to mitigate the risk associated with contaminated human remains and personnel effects (materials) exposed to and contaminated by chemical agents by neutralizing and/or physically removing the residual chemical agents.	0.408	-	-
Title: 5) Respiratory and Ocular Protection Description: Development and analysis of design alternatives for chemical and biological air-purifying respirators that provide enhanced protection with lower physiological burden and improved interface with mission equipment.	0.501	-	-
Title: 6) Test & Evaluation Description: Develop test and evaluation technologies and processes in support of NTA activities.	0.785	-	-
Title: 7) Therapeutics - Medical Description: Efforts in this area advance the understanding of mechanisms of action for NTAs and emerging chemical threats by probable routes of field exposure and seek to refine effectiveness of therapeutics to advance therapeutic development. Physiological parameters and pathological assessments will be used to establish the general mode and mechanisms of toxicity required for therapeutic development.	3.008	-	-
Title: 8) Pretreatments and Prophylactics - Medical Description: Develop pretreatments and prophylactics that provide protection against NTAs and emerging chemical threats. Prophylactic scavengers should rapidly detoxify a broad spectrum of compounds of interest (COIs).	11.184	-	-
Title: 9) Detection Description: Focuses on technologies to provide NTA detection capabilities. This effort is being separated into three thrust areas in FY21: Distributed CB Reconnaissance, Expeditionary Analytical Toolkit (ExAnT), and Unconventional Detection Modalities.	11.214	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Title: 10) Distributed CB Reconnaissance</p> <p>Description: Develop distributed chemical reconnaissance tools to enhance early warning and situation awareness of non-traditional chemical and biological threats to include low cost point sensor and sensing/collection systems for manned and unmanned platforms.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue to develop low size, weight, power, and cost sensors capable of real-time classification or detection of low volatility chemical threats - Continue to evaluate passive biomimetic sensor capability to discriminate between targets and background and integrate sensor on unmanned platforms. - Refine and continue more rigid testing of miniature aerosol sensors that selectively detect presence of airborne particles. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Validate testing of miniature aerosol sensors that selectively detect presence of airborne particles. - Model the response of passive biomimetic sensor capability to detect chemical threat simulants and interferents for identification. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.</p>	-	1.500	2.407
<p>Title: 11) Expeditionary Analytical Toolkit (ExAnT)</p> <p>Description: Focuses on technologies to provide non-traditional threat detection capabilities.</p> <p>Project NT3, Techbase Non-Traditional Agents Defense (Test & Evaluation), will merge into this program starting in FY21.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue the development of sensor technologies against non-traditional threats of concern. - Initiate the development of non-traditional chemical sensor platforms for ground and aerial systems for hazard awareness and assessment. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Continue the development of sensor technologies against non-traditional threats of concern to develop class-based detection and reduce reliance on known threat libraries. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.</p>	-	12.410	14.166
<p>Title: 12) Unconventional Detection Modalities</p>	-	1.398	1.823

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Description: Utilize a targeted set of programs pushing the boundaries of sensor development by pulling technologies developed from academia and basic research to be integrated into early detection prototypes. These technologies focus on keeping the warfighter ahead of nontraditional chemical threats with portable, low SWaP detectors that will protect the general forces and enhance operations on the battlefield by providing warning and field analytics.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue development of integrated photonics sensors. - Initiate application of miniaturized Raman spectrometers. - Initiate application of machine learning to disparate sensor feeds. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Continue development and refinement of integrated photonics. - Continue development and refinement of miniaturized Raman spectrometers. - Continue development and refinement of machine learning algorithms for integrating disparate sensor feeds. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.</p>			
Accomplishments/Planned Programs Subtotals	28.344	15.308	18.396

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• CA4: Contamination Avoidance (ACD&P)	18.806	10.326	32.923	-	32.923	-	-	-	-	-	-
• DE4: Decontamination (ACD&P)	7.009	6.286	18.385	-	18.385	-	-	-	-	-	-
• IP4: Individual Protection (ACD&P)	1.997	2.483	3.968	-	3.968	-	-	-	-	-	-
• TE4: Test & Evaluation (ACD&P)	5.054	4.107	0.000	-	0.000	-	-	-	-	-	-

Remarks

D. Acquisition Strategy
N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603384BP / CHEMICAL/BIOLOGICAL DEFENSE (ATD)				Project (Number/Name) TM3 / Techbase Medical Defense (ATD)			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
TM3: <i>Techbase Medical Defense (ATD)</i>	-	142.123	137.829	137.495	-	137.495	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project TM3 supports preclinical and early phase clinical development of vaccines, therapeutic drugs, and diagnostic capabilities to provide safe and effective medical defense against validated biological threat agents or emerging infectious disease biothreats including bacteria, toxins, and viruses. A portion of Project NT3, Techbase Non-Traditional Agents Defense, will merge into this Project starting in FY21.

Individual efforts in this project include:

- Evaluating innovative biotechnology approaches to advance medical systems designed to rapidly identify, diagnose, prevent, and treat disease due to exposure to biological threat agents.
- In addition this project supports the advanced development of medical countermeasures to include prophylaxes, pretreatments, antidotes, skin decontaminants and therapeutic drugs against identified and emerging chemical warfare threat agents. Entry of candidate vaccines, therapeutics, and diagnostic technologies into advanced development is facilitated by the development of technical data packages that support the Food and Drug Administration (FDA) Investigational New Drug (IND) processes, DoD acquisition regulations, and the oversight of early phase clinical trials in accordance with FDA guidelines.
- Non-Traditional Agent (NTA) Defense includes chemical diagnostics, medical pretreatments, therapeutics, detection, and protection and hazard mitigation.

FY20-22 reorganizes, renames legacy Bullet titles and introduces new Bullets (Thrust Areas). These new "Thrust" titles are in line with the CBDP Core Capability Areas and intended to provide more detail and traceability from the S&T program to advanced development.

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

	FY 2020	FY 2021	FY 2022
Title: 1) CARES Act - A Highly Multiplexed Point-of-Care Digital Protein Assay Platform with Digital Molecular Capability Description: Potential COVID-19 Related Options to Expand Effort. Tests will independently verify and validate results.	1.934	-	-
Title: 2) CARES Act - Host Response (Organs-on-chips) Description: Initiated characterization of the pathogenesis of the SARS CoV-2 virus in vitro through the use of various organs-on-chips systems	4.000	-	-
Title: 3) CARES Act - SARS COV-2 VSV vaccine Description: Initiate non-clinical development to determine efficacy of a SARS CoV-2 Vesicular Stomatitis (VSV) vaccine.	12.300	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
Title: 4) Internal COVID - New Horizons Diagnostics Corporation - Serology Description: Create COVID-19 peptide array to monitor antigen drift in subsequent waves.		1.473	-	-
Title: 5) Internal COVID - Serology Development and IV&V Testing Description: National Strategic Research Institute (NSRI) - Spiral Development of Prototypes to Support the COVID-19 Pandemic Response. Independent evaluation of tests developed by New Horizons Diagnostics.		3.300	-	-
Title: 6) Internal COVID - Systems Approach to Medical Countermeasures Development Description: Assess and integrate emerging technologies to inform screening and down selection of potential MCM candidates.		0.250	-	-
Title: 7) Internal COVID - Systems Approach to Medical Countermeasures Development Description: Prototype a systems approach for rapid MCM development via screening and design of adaptive platform, assess efficacy of candidate compounds, and architect a future integrated systems-of-systems for rapid MCM development platform.		4.700	-	-
Title: 8) Internal COVID - VSV SARS CoV-2 vaccine Description: Provide the Warfighter with protection against COVID-19 through the development of a SARS CoV-2 VSV vaccine. FY 2022 Plans: Complete pre-clinical development of the Vesicular Stomatitis Virus - delta G (VSVdeltaG) SARS CoV-2 vaccine. FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to accelerated development effort. Supports COVID-19/pandemic response efforts.		5.404	-	5.100
Title: 9) Medical Diagnostics Description: Investigate medical diagnostics that are agnostic against chemical and biological threats (including NTAs, pharmaceutical-based agents, and toxins) by advancing diagnostic innovations; investigating emerging technologies; ensuring medical diagnostics rapid adaptation to emerging threats; develop prototypes and tools that advance medical diagnostics towards FDA approval. This effort is being separated into four thrust areas starting in FY21: Battlefield Readiness, Chemical Diagnostics, Clinical Evaluation, and Emerging Threats.		19.583	-	-
Title: 10) Battlefield Readiness Description: Develop field forward medical diagnostics that provide multiplexed detection of biological and toxin threats to facilitate triage and diagnosis at lower roles of care.		-	9.386	7.774

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Complete and transition to advanced developer data the development of rapid, low cost, consumable tests that can detect biological threats that cause Plague and Melioidosis, reducing discovery-to-decision times. - Continue to develop a portable, ultrasensitive immunological diagnostic platform that enables rapid identification and diagnosis of a broader range of threats across the continuum of care, post symptom onset. - Continue the development and evaluation of a customizable, lightweight, comfortable, in ear wearable device (EWD) and algorithms to detect disease onset by monitoring a Warfighter's health state. - Complete and transition the generation of POC diagnostics assays and devices that detect a panoply of different species and variants of Old World Hantavirus across the Korean peninsula. - Continue the development of vertical flow assay technologies that are rapid, capable of multiplexing, portable, and may result in a faster sample to answer and more sensitive detection level than traditional lateral flow diagnostics. - Initiate a program to identify biological indicators that predict disease severity, which will lead to the development of a diagnostic that alerts medical personnel that a patient's condition may worsen or require immediate intensive care. - Initiate the development of a POC diagnostic platform that can provide the Warfighter pre-symptomatic diagnosis of infection, irrespective of whether the underlying pathogens are viral, bacterial, or parasitic. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Complete the development a portable, ultrasensitive immunological diagnostic platform that enables rapid identification and diagnosis of a broader range of threats across the continuum of care, post symptom onset. - Complete the development and evaluation of a customizable, lightweight, comfortable, in EWD and algorithms to detect disease onset by monitoring a Warfighter's health state. - Continue the development of vertical flow assay technologies that are rapid, capable of multiplexing, portable, and may result in a faster sample to answer and more sensitive detection level than traditional lateral flow diagnostics. - Continue program to identify biological indicators that predict disease severity, which will lead to the development of a diagnostic that alerts medical personnel that a patient's condition may worsen or require immediate intensive care. - Continue the development of a POC diagnostic platform that can provide the Warfighter pre-symptomatic diagnosis of infection, irrespective of whether the underlying pathogens are viral, bacterial, or parasitic - Initiate the development of a non-invasive prototype platform capable of diagnosing infectious diseases through collection and analysis of an individual's breath. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.</p>			
Title: 11) Battlefield Readiness	-	3.784	4.400

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Description: Provide capabilities to the Warfighter that increase the speed of relevancy, enhance troop preparedness, aid with triage support, and provide diagnosis at lower roles of care through development of field forward medical diagnostics that provide multiplexed detection of biological and toxin threats.</p> <p>FY 2021 Plans: - Initiate development of a portable, ultrasensitive immunological diagnostic platform that enables rapid identification and diagnosis of a broader range of threats across the continuum of care, post symptom onset.</p> <p>FY 2022 Plans: - Complete the development a portable, ultrasensitive immunological diagnostic platform that enables rapid identification and diagnosis of a broader range of threats across the continuum of care, post symptom onset. - Initiate the development of additional panels for infectious disease diagnostic tests on the immunological diagnostic platform.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.</p>			
<p>Title: 12) Chemical Diagnostics</p> <p>Description: Develop diagnostics for exposure to traditional and nontraditional chemical warfare agents (CWAs) and pharmaceutical based agents (PBAs). Early identification and diagnosis is key to appropriate medical countermeasure (MCM) treatment and enhances force protection and lethality.</p> <p>FY 2021 Plans: - Continue the research and development of a wearable device that is a continuous sensing platform for detecting indicators of chemical exposure (DICE), capable of alerting the Warfighter to potential exposure to traditional and nontraditional CWAs.</p> <p>FY 2022 Plans: - Complete the research and development of a wearable device that is a continuous sensing platform for DICE, capable of alerting the Warfighter to potential exposure to traditional and nontraditional CWAs. - Initiate efforts that expand the capability of wearable devices from an alert to an FDA-approved diagnostic platform that can detect a chemical threat and allow a physician to diagnose and determine a treatment strategy for exposure to traditional/ nontraditional chemical agents.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.</p>	-	3.429	3.710
<p>Title: 13) Chemical Diagnostics</p>	-	1.973	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Description: Develop diagnostics for exposure to traditional and nontraditional CWAs and PBAs. Early identification and diagnosis is key to appropriate MCM treatment and enhances force protection and lethality.</p> <p>FY 2021 Plans: - Initiate and complete an effort to build a dedicated, sustainable, and robust diagnostic capability at the United States Army Medical Research Institute for Chemical Defense (USAMRICD) to serve as an integral component of force protection that provides timely responses to global CWA threats.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program/project is entering completion and all activities will be closed.</p>			
<p>Title: 14) Clinical Evaluation</p> <p>Description: This thrust area optimizes the diagnostic development pathway by incorporating independent testing and evaluation for more informed prototype transition to advanced development. This area maintains access to research sites that offer native populations exposed to diseases of interest that would affect the Warfighter in battlefield settings and provides the ability to acquire novel technologies and provide analytical testing, evaluation, and reach back support for technologies already fielded.</p> <p>FY 2021 Plans: - Continue to maintain the capability to access clinical samples for infectious diseases of interest, and collaborate with sites around the world where diseases of concern are circulating. - Initiate test plans for bacterial versus viral prototypes to include the Cepheid Omni instrument for Next Generation Diagnostics System (NGDS) 2 Man Portable Diagnostic System (MPDS) and the MeMed Diagnostics Immuno POC protein-based platform.</p> <p>FY 2022 Plans: - Continue to maintain the capability to access clinical samples for infectious diseases of interest, and collaborate with sites around the world where diseases of concern are circulating. - Complete third party testing for bacterial versus viral prototypes. - Initiate test plans for a prototype capable of single molecule-based pathogen identification and assessment of pathogen susceptibility to antimicrobial agents. - Initiate test plans for a wearable sensor capable of detecting exposure to chemical warfare agents.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.</p>	-	5.040	3.210
<p>Title: 15) Emerging Threats</p>	-	3.227	6.324

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Description: The Emerging Threats thrust area pushes beyond the boundaries of the traditional threat list in the field of diagnostics to better prepare for surprise by leveraging novel approaches to classify a threat from an unknown sample.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Initiate work on POC diagnostics to identify antimicrobial resistant (AMR) microorganisms and perform antimicrobial susceptibility testing (AST) in less than one hour. - Complete the development of the Cepheid Bacterial vs. Viral Host Response Biomarker Cartridge and transition to the Joint Product Executive Office (JPEO) Program of Record (POR) for inclusion in the Next Generation Diagnostics System (NGDS) 2 Man Portable Diagnostic System (MPDS). - Complete data report for diagnostic meta-analysis on existing viral and bacterial biomarker infection data to elucidate a host biomarker panel for viral/bacterial differentiation. - Continue work on POC diagnostics to identify antibiotic resistant microorganisms and perform AST in less than one hour. - Initiate the development of a universal blood sample preparation platform to be compatible with several diagnostic systems. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Complete work on POC diagnostics to identify AMR microorganisms and perform AST in less than one hour. - Initiate efforts that explore the proteomic expression profiles of bacterial pathogens when they are challenged with antibiotics to characterize regulatory mechanisms of antibiotic resistance. - Complete work on POC diagnostics to identify Antimicrobial Resistance (AMR) microorganisms and perform AST in less than one hour. - Continue the development of a universal blood sample preparation platform to be compatible with several diagnostic systems. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program/project funding transferred from another funding line.</p>			
<p>Title: 16) Diagnostic Building Blocks</p> <p>Description: The Diagnostic Building Blocks thrust area lays a foundation for the entire diagnostics portfolio by exploiting areas such as machine learning (ML), synthetic biology and chemistry to develop novel and rapid diagnostic tests for utilization in the event of an outbreak of an unknown threat.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Initiate efforts that support the advancement of genomics capabilities at the United States Army Medical Research Institute for Infectious Disease (USAMRIID). - Complete data transitions of S&T efforts that monitor and incorporate new genomics data on pathogens to continuously validate and revise our collection of molecular diagnostic assays, which will allow rapid response to current and emerging infectious diseases by predicting accurate PCR assays designs. - Complete data transitions for the development of complementary diagnostic assays that can be used to support vaccine and countermeasure development efforts. 	11.461	10.179	7.701

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>- Continue the development of protocols for generating SYMBAs that are sensitive and specific and can be applied to various diagnostic platforms, supporting open-architecture capabilities.</p> <p>- Initiate the research and development of Clustered Regularly Interspaced Short Palindromic Repeat (CRISPR) based solutions for field diagnostics that will provide an ultra-sensitive, cost-effective, and accurate medical diagnostic solution for the Warfighter against unknown biological threats.</p> <p>FY 2022 Plans:</p> <p>- Continue efforts that support the advancement of genomics capabilities at USAMRIID.</p> <p>- Initiate novel efforts in artificial intelligence (AI) and ML for designing broader and more specialized assay panels for Chemical and Biological (CB) threats. - Complete the development of protocols for generating SYMBAs that are sensitive and specific and can be applied to various diagnostic platforms, supporting open-architecture capabilities.</p> <p>- Continue the research and development of CRISPR based solutions for field diagnostics that will provide an ultra-sensitive, cost-effective, and accurate medical diagnostic solution for the Warfighter against unknown biological threats.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Decrease due to change in program/project technical parameters.</p>			
<p>Title: 17) Vaccine Platforms and Research Tools</p> <p>Description: Use novel technology and methods to support development of vaccine candidates. Conduct studies to determine potential immune interference between lead vaccine candidates, the effect of alternative vaccine delivery methods, and thermo-stabilization technologies on the efficacy of lead vaccine candidates. Identify correlates of protection in humans, and predict the success of lead vaccine candidates in humans.</p>	1.498	-	-
<p>Title: 18) Viral Vaccines</p> <p>Description: Evaluate the best vaccine candidates for Alphaviruses and Filoviruses for effectiveness and duration of protective immune response against aerosol challenge in large animal models. Animal models will be developed to support FDA licensure of mature vaccine candidates. This effort is transitioning to the Bacterial, Viral and Toxin Prophylaxis thrust area starting in FY21.</p>	4.541	-	-
<p>Title: 19) Bacterial/Toxin Vaccines</p> <p>Description: Evaluate the best single agent bacterial and toxin vaccines and pretreatments for effectiveness against aerosol challenge in large animal models. This effort is transitioning to the Bacterial, Viral and Toxin Prophylaxis thrust area starting in FY21.</p>	14.518	-	-
<p>Title: 20) Bacterial, Viral and Toxin Prophylaxis</p>	-	36.229	34.160

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

Description: Provide the warfighter protection against biothreat agents through the pre-exposure administration of prophylaxis against known bacterial, viral and toxin threats of interest as well as emerging infectious threats.

FY 2021 Plans:
 Bacterial:
 - Complete preclinical studies of Burkholderia outer membrane vesicle (OMV) vaccine and subunit vaccine for initiation of a Phase 1 clinical trial.
 - Continue IND enabling development of live-attenuated tularemia vaccine.
 - Initiate manufacturing of capsule conjugate manufacturing process development and formulation for next generation anthrax vaccine in combination with Protective-antigen (PA) based vaccine.
 - Complete correlates of immunity and down selection of next generation capsular polysaccharides (CPS) conjugate anthrax vaccine.
 - Complete assay qualification for OMV vaccine studies for use in upcoming Phase 1 clinical trial.
 - Continue manufacturing and nonclinical development of next generation plague and tularemia monoclonal antibody cocktail.
 - Continue manufacturing development of OMV and nanoparticle vaccine platforms targeting Francisella, Yersinia and Q Fever.
 - Continue seroprevalence studies in support of potential clinical trials, reagent generation and biomarker discovery.

Viral:
 - Continue assay qualification and validation for Ebola virus, Marburg virus, and alphavirus vaccines.
 - Continued development of alphavirus animal models to support animal rule licensure of alphavirus vaccines
 - Continue evaluation of rVSV Ebola vaccine duration of protection assessment.
 - Continue evaluation and mitigation studies of Filovirus aerosol pathology.

Toxins:
 - Complete IND enabling efforts and filings in support of human clinical trials for animal-rule licensure of the multivalent monoclonal antibody cocktail for protection against A and B serotypes of botulinum neurotoxin.
 - Complete Phase 1 clinical trial for multivalent monoclonal antibody cocktail for transition to advanced development BoNT mAb program.

FY 2022 Plans:
 Bacterial:
 - Complete non-clinical safety and efficacy studies for Tularemia prophylaxis with the ClpB vaccine for advancement to clinical Phase 1.
 - Complete non-clinical safety and efficacy studies with the Tularemia Fn-IgID vaccine for advancement to clinical Phase 1.

FY 2020	FY 2021	FY 2022

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
<ul style="list-style-type: none"> - Continue manufacturing and nonclinical development of next generation plague and tularemia monoclonal antibody cocktail. - Complete non-clinical safety and efficacy studies on a live attenuated plague vaccine candidate for advancement to clinical Phase 1. - Complete the proof of efficacy animal testing for the anthrax CPS conjugate vaccine candidate for advancement to clinical Phase 1. - Complete Q Fever human seroprevalence study to determine what percentage of Warfighter would be eligible to receive QVax vaccine. Results will be transitioned to advanced development to support their evaluation of QVax for further advanced development. <p>Viral:</p> <ul style="list-style-type: none"> - Continue assay qualification and validation for Ebola virus, Marburg virus, and alphavirus vaccines. - Continued development of alphavirus animal models to support animal rule licensure of alphavirus vaccines - Complete evaluation of rVSV Ebola vaccine duration of protection assessment to support CONOPs development for Ebola Vaccine use by the Services. - Continue evaluation and mitigation studies of Filovirus aerosol pathology. - Initiate animal efficacy testing against panel of respiratory viruses of broad spectrum epithelial nanosponge technology. <p>Toxins:</p> <ul style="list-style-type: none"> - Complete transition of the multivalent monoclonal antibody cocktail for protection against A and B serotypes of botulinum neurotoxin to advanced development BoNT mAb program at JPEO-CBRND following the completion of the Phase 1 clinical trial. - Initiate large animal efficacy testing of mAb cocktail for protection against Palytoxin. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.</p>				
<p>Title: 21) Chemical Therapeutics</p> <p>Description: Focuses on pretreatment and post treatment strategies to effectively minimize injuries resulting from exposure to CWAs. This effort involves the development of neuroprotectants, anticonvulsants, and improved therapies for brain enzyme reactivation. Supports eventual FDA licensure of new compounds or to identify licensed products for use in the treatment of chemical warfare casualties. This effort is being separated into four thrust areas starting in FY21: Nerve Agent Prophylaxis/Pretreatments, Pharmaceutical Based Agents (PBAs), and Reactivators of AChE as Therapeutics (ReACT).</p>		1.883	-	-
<p>Title: 22) Nerve Agent Prophylaxis/Pretreatments</p>		-	9.918	6.857

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Description: Develop pretreatments and prophylactics that provide protection against NTAs and emerging chemical threats. Prophylactic scavengers should rapidly detoxify a broad spectrum of compounds of interest (COIs).</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue efforts to develop organophosphorus nerve agents (OPNA) catalytic scavenger enzymes in support of investigational new drug (IND) submission to the FDA. - Complete non-Good Laboratory Practices (GLP) pharmacokinetics, immunogenicity and efficacy of catalytic scavenger enzyme candidates in small animals and choose two lead candidate enzymes for development. - Continue formulation efforts. - Initiate enzyme non-current Good Manufacturing Practice (cGMP) manufacturing scale-up. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Continue efforts to develop OPNA catalytic scavenger enzymes in support of investigational new drug (IND) submission to the FDA. - Initiate GLP pharmacokinetics, immunogenicity and efficacy of catalytic scavenger enzyme lead candidates in small animals. - Initiate enzyme cGMP manufacturing scale-up. - Hold pre-IND Meeting with FDA to obtain guidance on the regulatory path. - Continue formulation efforts. - Continue enzyme non-cGMP manufacturing scale-up. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Decrease due to change in program/project technical parameters.</p>			
<p>Title: 23) Pharmaceutical Based Agents (PBAs)</p> <p>Description: Focuses on therapeutic and proactive strategies to effectively minimize injuries resulting from exposure to Pharmaceutical Based Agents (PBAs). This effort involves the evaluation FDA approved therapeutics for operational use, as well as generation of novel drug products to enhance level of protection and/or operational utility for the Warfighter. Efforts in this area are designed to develop drug candidates that will ultimately be submitted for Food and Drug Administration (FDA) licensure or to identify previously licensed products for new uses in the treatment and pretreatment against chemical warfare injury.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue development of ROCS higher concentration Naloxone formulation for use in a multiuse vial format through New Drug Approval (NDA) by FDA. - Continue operational assessment of FDA approved drug products to inform MCM timing and sequence in the event of a known or unknown chemical exposure. 	-	2.019	4.065

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<ul style="list-style-type: none"> - Assess operational feasibility of employing FDA approved opioid antagonist MCM to provide extended duration of protection. - Develop novel therapeutic products to mitigate Opioid Induced Respiratory Depression (OIRD) to reduce lethality in CWA exposed Warfighters. - Continue studies to assess safety, efficacy, and tolerance of COTS products and dosages for opioid based PBA exposure. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Continue development of Rapid Opioid Countermeasure System (ROCS) higher concentration Naloxone formulation for use in a multiuse vial format through NDA by FDA. - Continue operational assessment of FDA approved drug products to inform MCM timing and sequence in the event of a known or unknown chemical exposure. - Assess operational feasibility of employing FDA approved opioid antagonist MCM to provide extended duration of protection. - Continue development of novel therapeutic products to mitigate OIRD to reduce lethality in CWA exposed Warfighters. - Continue studies to assess safety, efficacy, and tolerance of COTS products and dosages for opioid based PBA exposure. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to change in program/project technical parameters.</p>			
<p>Title: 24) Reactivators of AChE as Therapeutics (ReACT)</p> <p>Description: Focuses on therapeutic strategies to effectively minimize injuries resulting from exposure to CWAs. This effort involves the development of improved therapies for enzyme reactivation. Efforts in this area are designed to develop potential candidates that will ultimately be submitted for Food and Drug Administration (FDA) licensure or to identify previously licensed products for new uses in the treatment of chemical warfare casualties.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue to advance pre-clinical development of lead therapeutic candidates - Continue investigating technologies for delivering therapeutics to the brain. - Continue formulation efforts for lead therapeutic candidates. - Continue in vivo screening for lead therapeutic candidates. - Continue pre-clinical studies of lead reactivators to support future investigational new drug (IND) filing. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Continue to advance pre-clinical development of lead therapeutic candidates. - Continue investigating technologies for delivering therapeutics to the brain. - Continue formulation efforts for lead therapeutic candidates. - Continue in vivo screening for lead therapeutic candidates. 	-	3.904	6.649

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
- Continue pre-clinical studies of lead reactivators to support future IND filing.			
<i>FY 2021 to FY 2022 Increase/Decrease Statement:</i> Increase due to change in program/project technical parameters.			
<i>Title:</i> 25) Bacterial Therapeutics <i>Description:</i> Identify, optimize and evaluate potential therapeutic compounds effective against bacterial threat agents. <i>FY 2021 Plans:</i> - Continue multiple efforts to identify and advance candidate therapeutics, with a focus on non-traditional candidates, through preclinical evaluation toward investigational new drug (IND) and Phase 1 clinical studies. Preclinical candidate selection for small molecule broad-spectrum antibacterial targeting <i>B. pseudomallei</i> and initiate IND enabling toxicology studies. - Expand layered defense against bacterial threats that evaluates the combination of vaccination with antibiotic therapy, as well as promising monoclonal antibodies and nontraditional therapeutics. - Utilizing flexible and agile acquisition vehicles, continue to partner with interagency, international and industry partners to develop nonclinical biodefense efficacy packages for therapeutic assets in advanced development. - Complete small animal proof of concept efficacy studies on two (nontraditional) immunomodulatory drugs. - Deliver non-human primate pharmacokinetic study package to interagency joint development programs. <i>FY 2022 Plans:</i> - Continue multiple efforts to identify and advance candidate therapeutics, with a focus on non-traditional candidates, through preclinical evaluation toward IND and Phase 1 clinical studies. - Utilizing flexible and agile acquisition vehicles, continue to partner with interagency, international, and industry partners to develop nonclinical biodefense efficacy packages for therapeutic assets in advanced development. - Complete non-human primate studies to demonstrate efficacy at humanized doses against anthrax or melioidosis and transition to HHS BARDA. - Complete non-human primate pharmacokinetics studies for one immunomodulatory drug readying the candidate for transition to advanced development and transition to Health & Human Services (HHS) Biomedical Advance Research and Development Authority (BARDA). - Continue to deliver proof of concept and humanized nonhuman primate efficacy biodefense data packages to interagency joint development programs for transition to HHS BARDA. - File INDs for novel orally-delivered and IV therapeutic for treatment of <i>B. pseudomallei</i> infection. This will support planned Phase I clinical trial. <i>FY 2021 to FY 2022 Increase/Decrease Statement:</i>	12.058	17.800	12.846

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
Decrease due to change in program/project technical parameters.				
<p>Title: 26) Viral Therapeutics</p> <p>Description: Identify, optimize and evaluate potential therapeutic candidates effective against designated viral threat agents.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue broad-spectrum, small molecule and monoclonal antibody selection and evaluation in NHP models for multiple anti-viral therapeutic applications. - Continue joint development of pan-Marburg monoclonal antibody development with interagency partners. - Begin studies on adjunct therapies that decrease morbidity after viral exposure. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Continue broad-spectrum, small molecule and monoclonal antibody selection and evaluation in NHP models for multi therapeutic applications. - Transition lead Alphavirus Therapeutics small-molecule candidate to advanced development. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to change in program/project technical parameters.</p>		17.293	9.417	12.847
<p>Title: 27) Toxin Therapeutics</p> <p>Description: Discover and develop therapeutic countermeasures to protect the warfighter against biotoxin threats.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Initiate evaluation of the efficacy of repurposed drug for treatment of botulinum neurotoxin (BoNT) A intoxication in non-human primate animal model. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Continue evaluation of efficacy of repurposed drug for treatment of botulinum neurotoxin (BoNT) B, E or F intoxication in non-human primate animal model. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.</p>		-	0.243	0.250
<p>Title: 28) Medical Countermeasures Initiative</p> <p>Description: Platform development Chem Bio Incident Preparedness and Response-Medical Countermeasures Initiative (CBIPR-MCMI):</p>		15.900	21.281	21.602

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>The MCMI will integrate the regulatory science and manufacturing technologies and processes developed into the Advanced Development and Manufacturing Facility (MCM-ADM) to support establishment of platform capabilities as enablers of the advanced development of CBDP medical countermeasure products. These initiatives will lead to the development of multi-use platforms that have the potential to accelerate medical product development and/or regulatory approval as well as reduce overall development costs.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue to fund monoclonal antibodies technologies to counter threat agents both prophylactically and therapeutically. - Continue to fund novel expression systems, including rapid manufacturing systems. - Continue expansion of outer membrane vesicle based bacterial expression platforms for bacterial vaccine candidates. - Continue to fund novel platform technologies to support rapid medical countermeasure candidate development, including prospective candidate DNA banking, additional cell line development. - Continue the advancement of the conjugate polysaccharide based vaccine platform, live attenuated bacteria, subunit vaccines and the DNA vaccine platform. - Fund technologies that support regulatory science. - Continue to fund animal model development to support, test, and evaluate MCMs and the capability to respond to emerging threats. - Support manufacturing advancements for biologics. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Conduct Phase 1 clinical trial for Venezuelan Equine Encephalitis (VEE) DNA vaccine. - Continue to invest in novel expression systems and expand outer membrane vesicle based bacterial expression platforms for bacterial vaccine candidates. - Invest in novel platform technologies to support rapid medical countermeasure candidate development, including prospective candidate DNA banking, additional cell line development. - Invest in novel expression systems, including rapid manufacturing systems. - Continue to invest in technologies that support regulatory science. - Continue to invest in animal model development to support, test, and evaluate MCMs and the capability to respond to emerging threats. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.</p>			
Title: 29) Laboratory Operations & Support	10.027	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
Description: Support for laboratory operations, facilities sustainment, and regulatory compliance for critical chemical biological defense activities at USAMRIID and USAMRICD.			
Accomplishments/Planned Programs Subtotals	142.123	137.829	137.495

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

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• MB4: Medical Biological Defense (ACD&P)	41.997	47.727	47.351	-	47.351	-	-	-	-	-	-
• MB5: Medical Biological Defense (SDD)	170.345	117.956	137.348	-	137.348	-	-	-	-	-	-
• MC5: Medical Chemical Defense (SDD)	55.269	54.392	50.362	-	50.362	-	-	-	-	-	-
• MB7: Medical Biological Defense (Op Sys Dev)	2.663	2.308	3.833	-	3.833	-	-	-	-	-	-
• MC7: Medical Chemical Defense (Op Sys Dev)	1.222	1.817	1.336	-	1.336	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program										Date: May 2021		
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
TT3: <i>Technology Transition (ATD)</i>	-	12.659	10.416	8.787	-	8.787	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project TT3 validates high-risk/high-payoff technologies, concepts-of-operations, and a Joint Combat Developer concept development and experimentation process to significantly improve Warfighter capabilities in preparation for transition of mature chemical and biological (CB) defense technologies to advanced development programs. This project addresses the three primary chemical and biological defense thrust areas of Assess, Protect, and Mitigate with an emphasis on Integrated Early Warning (IEW) and Integrated Layered Defense (ILD). IEW is conducted through a coordinated program approach focused on layering chemical and biological detection technologies and integrating CB threat indicators, providing a combination of awareness and understanding that facilitates effective decision making so the force can continue military operations and achieve mission success in a CBRN environment. The ILD achieves solutions for capability gaps across medical and non-medical commodity areas to enable warfighter survival and rapid recovery in a CBRN environment.

Individual efforts in this project include:

- Programs that offer the opportunity to identify and efficiently mature emerging technologies, reduce risks, and finalize engineering and integration efforts.
- Programs that seek to demonstrate the potential for enhanced military operational capability and/or cost effectiveness. Upon conclusion of the technical and operational demonstrations, the user or sponsor provides a determination of the military utility and operational impact of the technology and capability demonstrated. Successfully demonstrated technologies with proven military utility can remain in place for future extended user evaluations, accepted into the advanced stages of the formal acquisition process, proceed directly into limited or full- scale production or be returned to the technical base for further development.

FY20-22 reorganizes, renames legacy Bullet titles and introduces new Bullets (Thrust Areas). These new "Thrust" titles are in line with the CBDP Core Capability Areas and intended to provide more detail and traceability from the S&T program to advanced development.

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

	FY 2020	FY 2021	FY 2022
Title: 1) Experiment & Technology Demonstrations	12.659	-	-
Description: Utilize Technology Concepts, Early User Assessments, and Advanced Technology Demonstrations (ATDs) to demonstrate the maturity and potential of advanced technologies across the Assess, Protect, and Mitigate spectrum for enhanced military operational capability and technology transition effectiveness. This effort is being separated into three thrust areas starting in FY21: Advanced Technology Demonstration, Technology Concept, and User Assessment.			
Title: 2) Advanced Technology Demonstration	-	5.724	5.640

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021	
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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021
<p>Description: ATDs enable the effective transition of cutting edge CBRN S&T Technologies to the Warfighter by providing them an opportunity to engage with these new technologies in a mission oriented demonstration. Feedback from the Warfighters ensures that these technologies are operationally relevant, value added, and can be matured and transitioned in a timely and effective manner to end users for employment.</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue CMWD Integrated Tactical Information Recon System (CITRIS): integrate a remote sensing capability into the tactical mobile application system. - Continue Integrated Threat Response Advanced Technology Demonstration (ITR ATD) Demonstrate whole of force (IEW and ILD) Warfighter operations in a CBRN Environment. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Continue CITRIS: heads up display CWMD Common Tactical Picture to support end user CWMD tactical situational awareness. - Continue Integrated Threat Response Advanced Technology Demonstration (ITR ATD) Demonstrate whole of force (IEW and ILD) Warfighter operations in a CBRN Environment. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.</p>			
<p>Title: 3) Technology Concept</p> <p>Description: Initiatives to validate technology requirements and scope future S&T programs with Warfighter stakeholders, including Combat Developers and Service representatives. Technology Concept efforts utilize Table Top Exercises (TTXs), Limited Objective Experiments (LOEs), and User workshops to inform emerging capabilities and concepts of employment (CONEMPs).</p> <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue seven concept studies: Layered and Integrated Medical Intervention Technologies (LMIT), Limited-use Medical Countermeasures Operational Capability (LMOC), Genedrive, CBRN Hazard Prediction, Leave and Forget Sensor, Temporary Coatings, Decon Slurry. - Initiate Throw-away CBRN Sensor Concept and Respiratory Concept Focus Groups. <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Conduct three to five concept studies including LMIT, LMOC, Leave and Forget Sensor Concept. <p>FY 2021 to FY 2022 Increase/Decrease Statement:</p>		-	2.292
			1.296

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
Decrease due to change in program/project technical parameters.			
Title: 4) User Assessment	-	2.400	1.851
Description: User Assessments examine maturing technologies and provide opportunities for early Warfighter input into the form, fit, and function of maturing S&T prototypes and technologies; and as appropriate, assess them within a simulated operational environment.			
FY 2021 Plans: - Continue three assessment events including the annual CB Operational Analysis (CBOA), Decon Slurry, and LMOC Field Assessment.			
FY 2022 Plans: - Continue the annual CBOA event.			
FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.			
Accomplishments/Planned Programs Subtotals	12.659	10.416	8.787

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• TT4: Technology Transition (ACD&P)	0.000	0.577	0.866	-	0.866	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

N/A

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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603884BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	104.580	76.167	129.445	-	129.445	-	-	-	-	-	-
CA4: <i>Contamination Avoidance (ACD&P)</i>	-	18.806	10.326	32.923	-	32.923	-	-	-	-	-	-
DE4: <i>Decontamination (ACD&P)</i>	-	7.009	6.286	18.385	-	18.385	-	-	-	-	-	-
IP4: <i>Individual Protection (ACD&P)</i>	-	1.997	2.483	3.968	-	3.968	-	-	-	-	-	-
IS4: <i>Information Systems (ACD&P)</i>	-	0.517	4.661	0.000	-	0.000	-	-	-	-	-	-
MB4: <i>Medical Biological Defense (ACD&P)</i>	-	41.997	47.727	47.351	-	47.351	-	-	-	-	-	-
TE4: <i>Test & Evaluation (ACD&P)</i>	-	5.054	4.107	0.000	-	0.000	-	-	-	-	-	-
TM4: <i>Techbase Medical Defense (ACD&P)</i>	-	29.200	0.000	25.952	-	25.952	-	-	-	-	-	-
TT4: <i>Technology Transition (ACD&P)</i>	-	0.000	0.577	0.866	-	0.866	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

The projects in this program element (PE) support technology, engineering, integration, and life-cycle cost risk reduction activities (e.g. component development, prototyping, and experimentation) prior to Milestone B.

Individual projects include:

- Contamination Avoidance (CA4): development of reconnaissance, detection, identification, and hazard prediction equipment, hardware, and software that minimize Chemical, Biological (CB) contamination and prevent further cross-contamination during operations.

- Decontamination (DE4): development of Contamination Mitigation (ConMit) systems utilizing solutions that will remove and/or detoxify contaminated material without damaging combat equipment, personnel, or the environment.

- Individual Protection (IP4): development of the next generation protective ensembles (e.g., suits, boots, and gloves) which enable the Joint Force to survive and continue the mission in CBR contaminated environments.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Chemical and Biological Defense Program	Date: May 2021
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603884BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)</i>
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- Information Systems (IS4): component development and prototyping of information architectures and applications for shaping the battlespace and providing integrated early warning against Chemical Biological (CB) threats.

- Medical Biological Defense (MB4): development of medical countermeasure platform technologies, medical countermeasures (vaccines and therapeutics), reagents, assays, and diagnostic equipment to provide an effective capability for medical defense against biological warfare agent threats facing U.S. Forces in the field.

- Test and Evaluation (TE4): critical test capabilities, planning, and infrastructure improvements/modifications necessary to evaluate CBRN Defense systems in realistic operating environments.

- Techbase Medical Defense (TM4): reduces risk and establishes safety and tolerability for vaccines prior to transition to System Development & Demonstration.

- Technology Transition (TT4): validates high-risk/high-payoff technologies and their respective concepts-of-operations for significant improvement to Warfighter capabilities in preparation for transition of mature technologies to advanced development programs requiring chemical and biological (CB) defense technologies. This effort facilitates transitions of Integrated Early Warning and Integrated Layered Defense products.

The projects in this PE support the advanced component technology development phase of the DoD acquisition system and are therefore correctly placed in Budget Activity 4.

B. Program Change Summary (\$ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	80.162	76.167	70.953	-	70.953
Current President's Budget	104.580	76.167	129.445	-	129.445
Total Adjustments	24.418	0.000	58.492	-	58.492
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	0.000	-			
• Congressional Directed Transfers	0.000	-			
• Reprogrammings	26.700	-			
• SBIR/STTR Transfer	-2.282	-			
• Other Adjustments	0.000	-	58.492	-	58.492

Change Summary Explanation

Funding: FY20 (+\$26.700 Million): Internal Reprogramming (FY20-31 IR) for the Coronavirus Aid, Relief, and Economic Security (CARES) Act (+\$29.200 Million), as well as a below threshold reprogramming to RDT&E Management Support for support to laboratory infrastructure for laboratory operations, facilities sustainment, and regulatory compliance for critical chemical biological defense activities at USAMRIID and USAMRICD (-\$2.500 Million).

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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603884BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)</i>
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FY20 (-\$2.282 Million): Transfer of funding to support Small Business Innovative Research/Small Business Technology Transfer efforts.

FY22 (+\$58.492 Million): Increase for 1) Advanced and Emerging Threat Defense Enhancements, 2) COVID-19 vaccine and antibody development efforts, and 3) Emerging Threat Rapid Response Capabilities (+\$61.511 Million).
Departmental inflation/travel adjustments (-\$3.019 Million).

Schedule: N/A

Technical: Provides for critical new start programs, Tactical Contamination Mitigation System (TCMS) and Wide Area Decontamination System (WADS).

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) CA4 / Contamination Avoidance (ACD&P)
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
CA4: Contamination Avoidance (ACD&P)	-	18.806	10.326	32.923	-	32.923	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

The Contamination Avoidance Advanced Component Development and Prototypes (ACD&P) Project supports reconnaissance, detection, identification, and hazard prediction equipment, hardware, and software.

Efforts included in this project are:

- (1) Compact Vapor Chemical Agent Detector (CVCAD),
- (2) Biosurveillance (BSV),
- (3) Enhanced Capability Demonstration - Integrated Early Warning (ECD IEW),
- (4) CBRN Support to Command and Control (CSC2),
- (5) Enhanced Capability Demonstration Joint Chemical Biological Radiological Nuclear Advanced Capability Sets (ECD JCACS),
- (6) Chemical Biological Radiological and Nuclear (CBRN) Sensor Integration on Robotics Platforms (CSIRP),
- (7) Non-Traditional Agent Defense (NTA DEFENSE), and
- (8) Advanced Emerging Threat Defense (AET DEFENSE)

CVCAD is designed to be an unobtrusive, low-profile chemical detection capability that will continuously, and autonomously, monitor and alert general and specialized units to an unsafe environment without further burdening the warfighters payload or interfering with the primary mission. The small form factor is amenable to both man-worn and unmanned aerial or ground system operations to enable timely personnel protective action and other force protection decisions. In FY22 CVCAD will conduct and complete Technology Maturation and Risk Reduction (TMRR) Evaluation and Down Select to support transition into EMD.

The BSV program provided analytical capabilities and integration of environmental monitoring solutions and incident management reporting for Commanders' situational awareness. Capabilities delivered and lessons learned from BSV will be applied to the CSC2 enduring effort. BSV effort completed in FY20.

The ECD IEW program integrates advanced technologies and currently fielded capabilities into a common architecture with situational understanding decision tools to facilitate effective (timely) decision making, so the force can continue military operations or assist partners or civilians in a CBRN environment. The Joint Force requires tactical, enhanced, and CBRN detection, protection, contamination mitigation, contamination characterization, situational awareness, and hazard understanding early warning capability and decision tools to provide operational commanders time, space, and confidence for decisions that enable mission success. ECD IEW will demonstrate these capabilities by focusing on the complex integration of currently disconnected and disparate battlefield systems to enable a Joint Integrated Early Warning Capability for all phases of operations. ECD IEW efforts will transition to CBRN IEW (Project Information Systems (IS4)) in FY21.

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program	Date: May 2021
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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) CA4 / Contamination Avoidance (ACD&P)
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CSC2 is the continuation of the ECD IEW (Project CA4) and CBRN IEW (Project IS4) efforts that are renamed CSC2 in FY22. CSC2 is predicated on rapidly deploying CBRN situational awareness and understanding capabilities to the Joint Force through Capability Development Packages (CDPs). CSC2 will pull technology from S&T partners as well as integrate mature technologies into a baseline framework that enables risk based decision making. IEW Campaign Plan Lines of Effort are the driving bodies for service requirements and rapid capability development and deployment. Applicable technologies within the CBDP will be experimented, integrated, networked, and deployed through rapid acquisition methods. In FY22 CSC2 will initiate and conduct integration of the CBRN sensor portfolio through a common sensor management system and conduct automated warning and reporting/analysis to support operations, planning & execution.

The ECD JCACS demonstrated new technologies to enhance the ability of Joint operators to locate, identify, characterize, sample, digitally report, protect against, and mitigate CBRN threats. The ECD JCACS will integrate advanced technologies to provide capability sets of equipment and situational awareness tools to protect against and mitigate the effects of contamination during WMD interdiction and site characterization missions. The robotics efforts will enhance these missions and will transition over to CSIRP in FY21.

CSIRP is a prototyping and fielding effort that will focus on repackaging and integrating modular sensor solutions to enhance Unmanned Air Systems (UAS) and Unmanned Ground Systems (UGS) Programs of Record (PORs) to provide situational awareness across the echelons of command in order to enable freedom of maneuver and action on the battlefield. An integrated CSIRP capability will exploit advances in artificial intelligence, machine learning and autonomy, sensing and communication capabilities that enable timely and accurate detection, warning and reporting of CBRN hazards for increased risk reduction opportunities at tactical and operational echelons in mounted and dismounted configurations. CSIRP gives the Joint Force an opportunity to enhance capabilities and maintain operational advantage in a lethal and sophisticated operating environment. CSIRP transitions to EMD starting in FY21 to continue efforts on robotic integration.

The AET DEFENSE program, formerly known as the NTA DEFENSE program, continues to address the highest priority CBRN gaps and supports the Chemical Biological Defense Program (CBDP) Strategic Line of Effort to meet current and emerging threats by anticipating CB hazards and developing capabilities to counter emerging and future threats. The AET Defense program collaborates with the Joint Services, interagency, and international partners to align RDT&E resources to determine readiness against emerging threats, to include NTAs, such as Novichoks and Pharmaceutical-Based Agents (PBA) (e.g. synthetic opioids), emerging biological threats, and other advanced and emerging threats as they are identified across the entire CBDP enterprise portfolio. NTA DEFENSE efforts transition to the AET DEFENSE program in FY22 to better align with strategic guidance and expand to threats beyond those identified specifically as NTAs. In FY22, AET Defense activities continue to focus on demonstrating and evaluating technologies to assess performance against emerging threats.

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

	FY 2020	FY 2021	FY 2022
<p>Title: 1) Compact Vapor Chemical Agent Detector (CVCAD)</p> <p>Description: Product Development - To fill critical gaps for the general forces (man worn, unmanned, and vehicle mounted) by providing a low burden, continuously monitoring, detect to warn device, to immediately alert the forces to chemicals and confined space vapor hazards to inform protective posture.</p> <p>FY 2021 Plans:</p>	-	0.996	6.137

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) CA4 / Contamination Avoidance (ACD&P)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
Leverage existing Other Transactional Authority (OTA) contracts to support Milestone (MS) A award, and conduct early user feedback event to inform form, fit, and function of early prototypes, and conduct a test bed assessment against draft requirements. FY 2022 Plans: Conduct and complete Technology Maturation and Risk Reduction (TMRR) Evaluation and Down Select Phase - This phase of the program will inform MS B activities by conducting a Technology Readiness Assessment (TRA) with breadboard prototypes and conduct development testing (DT) with prototypes to access technology readiness level to support movement into EMD. Testing during this phase will include, limited MIL-STD 810 such as false alarm testing, human system integration testing, RAM analysis, and chemical agent detection performance against chemical warfare agents (CWA), toxic industrial chemicals (TIC) and confined space gases of concern to support system improvements and inform brassboard prototypes for test in MS B. FY 2021 to FY 2022 Increase/Decrease Statement: Program/project transitioned to Advanced Development. Transition from MS A in FY21 to MS B in FY23. FY22 activities to support MS B decision in FY23.			
Title: 2) Biosurveillance (BSV) Description: FY20 efforts concluded analysis under biosurveillance for situational awareness and capabilities will be used to further the IEW mission.	0.384	-	-
Title: 3) Enhanced Capability Demonstration Integrated Early Warning (ECD IEW) Description: Early Warning common CBRN architecture development and capability integration.	2.902	-	-
Title: 4) ECD IEW Description: Early Warning capability RDT&E test article procurement and assessment.	1.163	-	-
Title: 5) CSC2 Description: Warning, Reporting & Analysis FY 2022 Plans: Initiate and conduct automated warning and reporting/analysis to support operations, planning & execution. FY 2021 to FY 2022 Increase/Decrease Statement: Program/project funding transferred from another funding line. FY20 funds under ECD IEW, FY21 funds under CBRN IEW. FY22 name changed to CSC2.	-	-	4.400
Title: 6) CSC2	-	-	2.321

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) CA4 / Contamination Avoidance (ACD&P)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Description: Program Management</p> <p>FY 2022 Plans: Initiate Program office management and administration processes to include but not limited to program oversight, resource justification, budgeting and programming, milestone and schedule tracking.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program/project funding transferred from another funding line. FY20 funds under ECD IEW, FY21 funds under CBRN IEW. FY22 name changed to CSC2.</p>			
<p>Title: 7) CSC2</p> <p>Description: Integration Sensor Management</p> <p>FY 2022 Plans: Initiate and conduct integration of CBRN sensor portfolio through a common sensor management system to include data visualization, analysis and movement of data from CBRN sensors to and through a network.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program/project funding transferred from another funding line. CBRN IEW was renamed to CSC2 starting in FY22. Funded under ECD IEW in FY20 & CBRN IEW in FY21.</p>	-	-	14.381
<p>Title: 8) ECD Joint CBRN Advanced Capability Sets (ECD JCACS)</p> <p>Description: Product Development</p>	0.200	-	-
<p>Title: 9) ECD JCACS</p> <p>Description: Program Management, Support, Test and Evaluation</p>	1.683	-	-
<p>Title: 10) CBRN Sensor Integration on Robotic Platforms (CSIRP)</p> <p>Description: Development, Program Management, Support, Testing and Evaluation.</p> <p>FY 2021 Plans: Continue multiple sensor integration efforts for unmanned ground and air platforms. Initiate market studies on sensor and platform technology for next cycle of prototypes. Continue prototype testing. Continue supporting technology demonstrations on</p>	7.820	4.061	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) CA4 / Contamination Avoidance (ACD&P)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
<p>robotic platforms. Transition to Engineering and Manufacturing Development (EMD). Continue Program Management including government system engineering, program/financial management, costing, personnel support, travel and overhead.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program/project transitioned to Advanced Development. Program transitioned to EMD starting in FY21 to continue efforts on robotic integration.</p>				
<p>Title: 11) Non-Traditional Agent (NTA) Defense</p> <p>Description: Program Management, Product Development, Support and Testing to demonstrate and evaluate technologies to assess performance against NTAs.</p> <p>FY 2021 Plans: Continue to leverage expanded requirements to broaden data set for PBAs. Produce additional data to better assess detection and decontamination capabilities against new requirements and inform rapid fielding decisions. Conduct a table top exercise and field exercise to support Joint Service and interagency tactics, techniques, and procedures (TTP) development. Expand classified NTA Data Library with newly available data to ensure widest dissemination possible. Implement new data management plan. Initiate new market surveys and assessments of technologies for rapid fielding of Chemical Biological Defense Program (CBDP) capabilities, focused on emerging priority threats. Invest in technology prototyping and assessment to provide capability improvements.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program/project funding transferred to another funding line. AET Defense is a continuation of NTA Defense funding and efforts. The purpose of the AET Defense program remains the same as that of the NTA Defense program, though the scope of threats being addressed has expanded from just NTAs to other advanced and emerging threats to better align with strategic guidance.</p>		4.654	5.269	-
<p>Title: 12) Advanced Emerging Threat (AET) Defense</p> <p>Description: Program Management, Product Development, Support and Testing to demonstrate and evaluate technologies to assess performance against advanced and emerging threats.</p> <p>FY 2022 Plans: Continue efforts from NTA Defense to leverage expanded requirements to broaden data set for emerging biological threats and PBAs. Continue updates to spectral libraries and hazard data management tools to incorporate emerging threat information. Produce additional data to better assess detection and decontamination capabilities against new requirements and inform rapid fielding decisions. Conduct table top exercises and field exercises to support Joint Service and interagency tactics, techniques,</p>		-	-	5.684

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) CA4 / Contamination Avoidance (ACD&P)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
and procedures (TTP) development and gaps analysis for materiel solutions. Initiate market surveys and assessments of new technologies for rapid fielding by Chemical Biological Defense Program to mitigate emerging threat gaps as threats are identified.			
FY 2021 to FY 2022 Increase/Decrease Statement: Program/project funding transferred from another funding line. AET Defense is a continuation of NTA Defense funding and efforts. The purpose of the AET Defense program remains the same as that of the NTA Defense program, though the scope of threats being addressed has expanded from just NTAs to other advanced and emerging threats in order to better align with strategic guidance.			
Accomplishments/Planned Programs Subtotals	18.806	10.326	32.923

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• CA5: Contamination Avoidance (SDD)	126.019	128.954	82.295	-	82.295	-	-	-	-	-	-
• JF0100: JOINT CHEMICAL AGENT DETECTOR (JCAD)	2.246	0.000	0.000	-	0.000	-	-	-	-	-	-
• MC0100: JOINT NBC RECONNAISSANCE SYSTEM (JNBCRS)	1.900	0.000	0.000	-	0.000	-	-	-	-	-	-
• MC0101: CBRN DISMOUNTED RECONNAISSANCE SYSTEMS (CBRN DRS)	58.020	52.393	21.799	-	21.799	-	-	-	-	-	-
• MX0001: JOINT BIO TACTICAL DETECTION SYSTEM (JBTDS)	0.000	0.000	17.060	-	17.060	-	-	-	-	-	-
• SA0005: CBRN SENSOR INTEGRATION ON ROBOTIC PLATFORMS (CSIRP)	1.747	0.503	3.561	-	3.561	-	-	-	-	-	-
• SA0050: CBRN SUPPORT TO C2 (CSC2)	0.000	0.000	1.750	-	1.750	-	-	-	-	-	-

Remarks

D. Acquisition Strategy
COMPACT VAPOR CHEMICAL AGENT DETECTOR (CVCAD)

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)</i>	Project (Number/Name) CA4 / <i>Contamination Avoidance (ACD&P)</i>

FY20 Other Transactional Authority (OTA) activities were initiated by the Defense Threat Reduction Agency (DTRA) to evaluate systems against Warfighter requirements and conduct science and technology development to mature systems to the program of record in FY21. The CVCAD program will use the CWMD OTA contract vehicle in FY21 to transition technology from S&T to support a TMRR award. This streamlined acquisition approach uses one contracting mechanism to award follow-on acquisition phases up to LRIP. CVCAD will transition a lightweight chemical detection capability to CBRN Sensors Integrated onto Robotic Platforms (CSIRP), and to the Chemical Biological Radiological Nuclear Dismounted Reconnaissance Systems (CBRN DRS) for integration onto unmanned and manned aerial or ground platforms.

BIOSURVEILLANCE (BSV)

BSV utilizes lessons learned for situational awareness and force health protection in support of decision support for Commanders both operationally and at the tactical edge. Applicable technologies will be developed, integrated, deployed, operated and sustained, through Other Transaction Agreements (OTA) and procurement contracts. Completion of the effort will serve as a baseline configuration for IEW efforts within the Chemical Biological Defense Program (CBDP) to include technologies, lessons learned and test data that will be transitioned to the programs of record such as Enhanced Capability Demonstration (ECD) IEW, Enhanced Maritime Biological Detection (EMBD), Next Generation Diagnostics System (NGDS), Joint Biological Tactical Detection System (JBTDs) & Common Analytical Laboratory System (CALs).

ENHANCED CAPABILITY DEMO INTEGRATED EARLY WARNING (ECD IEW)

The Enhanced Capability Demonstration Integrated Early Warning (ECD IEW Project IS4) will conduct an analysis of alternatives and leverage the IEW Advanced Capability Demonstration (ATD), and various operational responses to procure developmental equipment and decision support tools for experimentation and demonstration to reduce risk and inform supporting materiel solutions, CONOPS TTPs, Non-CBRN sensors, and requirements to provide operational commanders time and space for freedom to maneuver and action. The ECD IEW will utilize Table Top Exercises (TTX), Operational Demonstrations, and other test events to provide cross commodity equipment sets evaluation leading to the operational deployment through rapid prototyping to a unit to be determined, further requirements development, CBDP program of record insertion, and concepts of employment. ECD IEW transitions to CBRN IEW in FY21.

CBRN SUPPORT TO C2 (CSC2)

CSC2 focuses on technology maturation, demonstration, integration and transitioning early warning capability sets to fielded CBDP programs of record to combat emerging and potentially urgent threats within Joint All Domain Operations. Contracting strategy includes the use of Other Transaction Authority R&D and prototyping. Annual development cycles and capability drops are requested and validated by all DoD services in the OASD (NCB/CB) IEW Campaign Plan as well as approved capability development packages designated through the Joint Requirements Office and prioritized based on National Defense Strategy and National Military Strategy goals. Current strategy also collaborates with multi-agency partners to obtain synergy and interoperability across the areas of sensor data analytics, integrated early warning, and protect to warn/protect to treat capabilities. Efforts within CSC2 are driven by service CBRN capability gaps that are identified on an annual basis and evaluated by CBDP stakeholders; possible solutions and applicable technologies within the CBDP will be experimented, integrated, networked, and deployed through rapid acquisition methods.

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)</i>	Project (Number/Name) CA4 / <i>Contamination Avoidance (ACD&P)</i>

ENHANCED CAPABILITY DEMONSTRATION JOINT CBRNE ADV CAPABILITY SETS (ECD JCACS)

The ECD JCACS evaluates various equipment during User Feedback Events (UFE) and other test events. The acquisition strategy is to use Other Transactional Agreements (OTAs) and collaborate with CBRN Sensor Integration onto Robotic Platforms (CSIRP) to acquire the equipment and technical support required. Additionally, JCACS and CSIRP will utilize Government Agencies and Federally Funded Research and Development Centers to provide development, testing and technical support. ECD JCACS will focus on the use and integration of robotics to enhance these missions.

CBRN SENSOR INTEGRATION ON ROBOTIC PLATFORMS (CSIRP)

CSIRP is a streamlined acquisition effort to rapidly prototype and field capabilities distinct from the traditional acquisition system. CSIRP will provide unmanned CBRN payload prototypes in 2-3 year prototyping plan cycles based on service requirements. The prototyping plans will utilize a streamlined acquisition process in order to keep pace with industry and the rapid advancement of technologies. The CSIRP strategy is to utilize the rapid prototyping process enabled by the Other Transactional Agreements (OTA) contract vehicle. Upon award, the awardees will have up to two years to produce prototype sensors that are integrated onto service chosen (air and/or ground) platforms. These prototypes will be demonstrated, evaluated and tested by the Services as well as laboratories and academia. The most successful will be transitioned to the services for the next steps in acquisition, production and eventual fielding across the services. BA4 funding will provide market research to support the refinement and the building of technologically mature prototypes. BA5 funding will provide demonstrations, testing and operational assessments of prototypes to support transition decisions and final configurations to POR or sustained capability.

NON TRADITIONAL AGENT DEFENSE (NTA DEFENSE)

The NTA Defense program will use a variety of acquisition approaches to survey, develop, assess, and rapidly field technologies to inform and fill NTA gaps. The program will utilize an existing Multiple Award Indefinite Delivery Indefinite Quantify Task Order Contract to provide technical support to studies and assessments of performance against emerging threats. For Program of Record (PoR) systems currently in development that will be assessed for performance against NTAs, those PoR's existing contracts will be modified to incorporate development engineering and test support for additional NTA capability. The NTA Defense program will utilize OTAs for system development and prototyping activities and Government Agencies and Federally Funded Research and Development Centers to provide development, testing and technical support.

ADVANCED AND EMERGING THREAT DEFENSE (AET DEFENSE)

The AET Defense program will use a variety of acquisition approaches to survey, develop, assess, and rapidly field technologies to inform and fill advanced and emerging threat gaps. The program will utilize an existing Multiple Award Indefinite Delivery Indefinite Quantify Task Order Contract to provide technical support to studies and assessments of performance against emerging threats. For Program of Record (PoR) systems currently in development that will be assessed for performance against emerging threats, those PoR's existing contracts will be modified to incorporate development engineering and test support for emerging threat capability. The AET Defense program will utilize OTAs for system development and prototyping activities and Government Agencies and Federally Funded Research

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)</i>	Project (Number/Name) CA4 / <i>Contamination Avoidance (ACD&P)</i>

and Development Centers to provide development, testing and technical support. BA5 activities focus on engineering and manufacturing of technologies that have demonstrated TRL 6 or higher.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) CA4 / Contamination Avoidance (ACD&P)
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CVCAD - HW C - Transition from DTRA	MIPR	TBD : N/A	0.000	0.000		0.168	May 2021	0.000		0.000		0.000	0.000	0.168	0.000
CVCAD - HW S - Advanced Prototype Development	C/FFP	Advanced Technologies International : Summerville, SC	0.000	0.000		0.000		4.538	Oct 2021	0.000		4.538	0.000	4.538	0.000
ECD IEW - Government Product Development Team Labor	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	0.000	0.200	Jul 2020	0.000		0.000		0.000		0.000	0.000	0.200	0.000
CSC2 - Contractor Product Development Team Labor	MIPR	JPEO Chem : Bio, Rad, and Nuc Defense (JPEO-CBRND)	0.000	0.000		0.000		0.500	Feb 2022	0.000		0.500	0.000	0.500	0.000
CSC2 - CSC2 Operational Capability	C/CPAF	TBD : N/A	0.000	0.000		0.000		12.281	Feb 2022	0.000		12.281	0.000	12.281	0.000
CSC2 - Government Product Development Team Labor	MIPR	Various : Various	0.000	0.000		0.000		2.500	Oct 2021	0.000		2.500	0.000	2.500	0.000
ECD JCACS - HW C - Matrix Labor	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	0.000	0.200	Jan 2020	0.000		0.000		0.000		0.000	0.000	0.200	0.000
CSIRP - HW C Contractor Product Development Team Labor	C/FFP	Patricio Enterprises : Inc., Woodbridge, VA	0.267	0.283	Jan 2020	0.410	Feb 2021	0.000		0.000		0.000	0.000	0.960	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CSIRP - HW C - Government Product Development Team Labor	MIPR	Various : Various	1.284	1.442	Oct 2019	0.168	Dec 2020	0.000		0.000		0.000	0.000	2.894	0.000
CSIRP - SW C UAS and Sensor Manufacturing and Design	C/CPFF	T2S Solutions (T2S : LLC), Belcamp, MD	0.616	0.470	Apr 2020	0.425	Dec 2020	0.000		0.000		0.000	0.000	1.511	0.000
CSIRP - SW C Sensor Integration	C/CPFF	Charles Stark Draper Laboratories : Inc., Cambridge, MA	0.497	1.418	Nov 2019	1.270	Dec 2020	0.000		0.000		0.000	0.000	3.185	0.000
CSIRP - HW C - Sensor/ Platform Integration	Various	Various : Various	0.000	2.148	Jul 2020	0.300	Oct 2020	0.000		0.000		0.000	0.000	2.448	0.000
CSIRP - HW C - HW C RN Sensor Design	C/FFP	Radiation Monitoring Devices : Inc, Boston, MA	0.000	0.000		0.549	Oct 2020	0.000		0.000		0.000	0.000	0.549	0.000
CSIRP - HW C OTA - Chemical sensor Prototype and Integration	C/FFP	Intelligent Optical Systems (IOS) : Torrance, CA	0.687	0.000		0.320	Dec 2020	0.000		0.000		0.000	0.000	1.007	0.000
NTA DEFENSE - HW S - Threat Understanding and Characterization	MIPR	Various : Various	1.860	0.748	Dec 2019	0.449	Jan 2021	0.000		0.000		0.000	0.000	3.057	0.000
NTA DEFENSE - HW S - Government SE & Technical Management Team	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	1.284	0.731	Dec 2019	1.461	Dec 2020	0.000		0.000		0.000	0.000	3.476	0.000
AET DEFENSE - HW C - Emerging threat detection/ decontamination/protection capability prototyping	Various	Various : Various	0.000	0.000		0.000		0.936	Dec 2021	0.000		0.936	0.000	0.936	0.000

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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
AET DEFENSE - SW C - Spectral library enhancements	MIPR	Various : Various	0.000	0.000		0.000		2.021	Nov 2021	0.000		2.021	0.000	2.021	0.000
AET DEFENSE - SW C - Hazard awareness tool updates	MIPR	Various : Various	0.000	0.000		0.000		1.076	Dec 2021	0.000		1.076	0.000	1.076	0.000
Subtotal			6.495	7.640		5.520		23.852		0.000		23.852	0.000	43.507	N/A

Remarks
CVCAD: The CVCAD program will fully transition from DTRA S&T development to Acquisition in FY21. The CWMD OTA is the contract vehicle leveraged by the program to competitively award several contractors for MS A - TMRR. The OTA award efforts are broken out into four phases - Phase I DTRA S&T Development, Phase II - Transition to TMRR and assessing technology readiness level, Phase III - Addressing shortfalls and gaps identified in Phase II, and final phase IV will initiate brass board system testing to get systems ready for MS B.

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CVCAD - ES S - Human System Integration (HSI) Support	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	0.000	0.000		0.000		0.114	Oct 2021	0.000		0.114	0.000	0.114	0.000
CVCAD - TD/D S - ARL S&T Analyst Support	MIPR	Army Research Lab (ARL) : Adelphi, MD	0.000	0.000		0.142	Apr 2021	0.000		0.000		0.000	0.000	0.142	0.000
CVCAD - ES S - Readiness, Availability, and Maintainability (RAM) Analysis	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center	0.000	0.000		0.000		0.155	Nov 2021	0.000		0.155	0.000	0.155	0.000

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Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
		(CBC) : Aberdeen Proving Ground, MD													
BSV - ES S - Systems Analysis Study	MIPR	MA Institute of Tech - Lincoln Labs (MIT-LL) : Lexington, MA	0.000	0.029	Apr 2020	0.000		0.000		0.000		0.000	0.000	0.029	0.000
BSV - TD/D C - Biological Identification Capability Sets sustainment assays	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	7.388	0.355	May 2020	0.000		0.000		0.000		0.000	0.000	7.743	0.000
ECD IEW - Acquisition, Integration and decision tool demonstration	C/CPFF	Various : Various	3.463	2.475	Jan 2020	0.000		0.000		0.000		0.000	0.000	5.938	0.000
ECD IEW - System Integration	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	0.700	0.227	Jan 2020	0.000		0.000		0.000		0.000	0.000	0.927	0.000
CSC2 - Contractor Support	C/CPAF	TBD : N/A	0.000	0.000		0.000		0.800	Feb 2022	0.000		0.800	0.000	0.800	0.000
CSC2 - Support	MIPR	TBD : N/A	0.000	0.000		0.000		0.700	Feb 2022	0.000		0.700	0.000	0.700	0.000
ECD JCACS - ES C - SIL Support	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	0.250	0.113	Jan 2020	0.000		0.000		0.000		0.000	0.000	0.363	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

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Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CSIRP - HW/SW Sensor Interface Design and Concept Development	Various	Various : Various	0.000	0.545	Feb 2020	0.050	Nov 2020	0.000		0.000		0.000	0.000	0.595	0.000
Subtotal			11.801	3.744		0.192		1.769		0.000		1.769	0.000	17.506	N/A

Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CVCAD - DTE S - MIL-STD Testing	MIPR	Aberdeen Test Center (ATC) : Aberdeen Proving Ground, MD	0.000	0.000		0.000		0.500	Jun 2022	0.000		0.500	0.000	0.500	0.000
CVCAD - DTE S - Chemical Surety Testing	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	0.000	0.000		0.000		0.200	Aug 2022	0.000		0.200	0.000	0.200	0.000
ECD IEW - CWMD OTA	C/CPFF	TBD : N/A	0.000	0.663	Sep 2020	0.000		0.000		0.000		0.000	0.000	0.663	0.000
ECD IEW - TTX & OP DEMOs	MIPR	Various : Various	1.750	0.500	Jan 2020	0.000		0.000		0.000		0.000	0.000	2.250	0.000
CSC2 - Technical/Operational Demo	MIPR	TBD : N/A	0.000	0.000		0.000		2.000	Feb 2022	0.000		2.000	0.000	2.000	0.000
ECD JCACS - DTE - Test and Evaluation	MIPR	Various : Various	1.689	0.550	Jan 2020	0.000		0.000		0.000		0.000	0.000	2.239	0.000
CSIRP - DTE C - Testing and Evaluation	MIPR	Various : Various	0.000	1.237	Mar 2020	0.000		0.000		0.000		0.000	0.000	1.237	0.000
NTA DEFENSE - DTE S - Technology Assessments	MIPR	U.S. Army Combat Capabilities Development	0.520	0.425	Jan 2020	0.610	Dec 2020	0.000		0.000		0.000	0.000	1.555	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

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Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
		Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD													
NTA DEFENSE - DTE S - Systems Prototyping and Development	MIPR	Various : Various	0.000	1.956	Jan 2020	1.901	Nov 2020	0.000		0.000		0.000	0.000	3.857	0.000
AET DEFENSE - DTE S - Technology Assessments	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	0.000	0.000		0.000		1.156	Dec 2021	0.000		1.156	0.000	1.156	0.000
Subtotal			3.959	5.331		2.511		3.856		0.000		3.856	0.000	15.657	N/A

Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CVCAD - PM/MS S - Program Management Support	MIPR	Various : Various	0.000	0.000		0.686	Feb 2021	0.630	Nov 2021	0.000		0.630	0.000	1.316	0.000
CSC2 - JPEO Program Management Support	MIPR	Various : Various	0.000	0.000		0.000		2.321	Oct 2021	0.000		2.321	0.000	2.321	0.000
ECD JCACS - PM- Program Management Support	MIPR	JPM CBRN Sensors : JPEO-CBRND, Aberdeen Proving Ground, MD	2.190	1.020	Apr 2020	0.000		0.000		0.000		0.000	0.000	3.210	0.000
CSIRP - PM/MS C Program Management Support	MIPR	Various : Various	0.453	0.277	Dec 2019	0.569	Dec 2020	0.000		0.000		0.000	0.000	1.299	0.000

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Chemical and Biological Defense Program			Date: May 2021		
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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
CVCAD - Milestone A																												
CVCAD - CDD																												
CVCAD - Milestone B																												
BSV - BSV																												
ECD IEW - Exercises																												
CSC2 - Operational Capability Drop 1																												
CSC2 - Technical/Operational Demo 1																												
CSC2 - Operational Capability Drop 2																												
CSC2 - Technical/Operational Demo 2																												
ECD JCACS - Extended Evaluation																												
CSIRP - Test and Evaluation of Prototypes - Prototyping Plan #1																												
CSIRP - Transition Decision - Prototyping Plan #1																												
NTA DEFENSE - Capabilities Assessment																												
NTA DEFENSE - Technology Assessments																												
NTA DEFENSE - Strategic Coordination/ Information Management																												
NTA DEFENSE - Systems Prototyping and Development																												
AET DEFENSE - Technology Assessments																												
AET DEFENSE - Systems Engineering/ Program Management																												
AET DEFENSE - System Development and Prototyping																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program		Date: May 2021
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
CVCAD - Milestone A	3	2021	3	2021
CVCAD - CDD	2	2021	2	2021
CVCAD - Milestone B	3	2023	3	2023
BSV - BSV	1	2020	4	2020
ECD IEW - Exercises	1	2020	4	2020
CSC2 - Operational Capability Drop 1	2	2022	2	2022
CSC2 - Technical/Operational Demo 1	2	2022	2	2022
CSC2 - Operational Capability Drop 2	4	2022	4	2022
CSC2 - Technical/Operational Demo 2	4	2022	4	2022
ECD JCACS - Extended Evaluation	2	2020	4	2020
CSIRP - Test and Evaluation of Prototypes - Prototyping Plan #1	2	2020	3	2022
CSIRP - Transition Decision - Prototyping Plan #1	3	2022	3	2022
NTA DEFENSE - Capabilities Assessment	1	2020	4	2021
NTA DEFENSE - Technology Assessments	1	2020	4	2021
NTA DEFENSE - Strategic Coordination/Information Management	1	2020	4	2021
NTA DEFENSE - Systems Prototyping and Development	1	2020	4	2021
AET DEFENSE - Technology Assessments	1	2022	4	2026
AET DEFENSE - Systems Engineering/Program Management	1	2022	4	2026
AET DEFENSE - System Development and Prototyping	1	2022	4	2026

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
DE4: <i>Decontamination (ACD&P)</i>	-	7.009	6.286	18.385	-	18.385	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

This project supports the development of Contamination Mitigation (ConMit) systems that reduce operational impact and logistics burden, reduce sustainment costs, increase safety, and minimize environmental effects associated with decontamination and contamination mitigation operations. These efforts align with the National Defense Strategy by prioritizing preparedness for war and sustaining Joint Force military advantage and resilient force posture.

Efforts included in this project are:

- (1) Tactical Contamination Mitigation System (TCMS),
- (2) Wide Area Decontamination System (WADS),
- (3) Chemical, Biological, Radiological, and Nuclear (CBRN) Covers, Coatings and Protective Overlays (C3PO),
- (4) Mass Personnel Decontamination (MPD),
- (5) Service Equipment Decontamination System (SEDS), and
- (6) Tactical Disablement System (TacDS)

TCMS is a FY22 new start program and is one of two respond components (along with the Wide Area Decontamination System) of the Interdependent Contamination Mitigation concept and intends to address gaps related to the decontamination of sensitive equipment, personal equipment, individual & crew served weapons, and it will reduce the time and logistics associated with decontamination. TCMS will limit the spread and mitigate the effects of Chemical, Biological, and Radiological (CBR) contamination to allow warfighters to continue their mission for an extended period of time in a high threat, CBR contaminated environment. The Program's intent is to mitigate the risk to personnel and limit the potential spread of CBR contamination by minimizing contact and transfer hazards. TCMS will greatly enhance or eliminate the need for subsequent decontamination to mitigate contamination on military equipment by allowing the Warfighter to see areas of contamination, target contamination for treatment early, with minimal expenditure of time and material. Following application of TCMS, combined with weathering, Mission Oriented Protective Posture (MOPP) levels may be reduced without further decontamination, depending on the surface or material being decontaminated and the agent. In FY22 the TCMS program will initiate market research, award a prototyping Other Transaction Authority (OTA) contract and draft program documentation for a Milestone A decision.

The WADS is a FY22 new start program that will provide contamination mitigation capabilities against chemical and biological warfare agents on various types of terrain and exterior of fixed site facilities. The WADS will be employed to conduct Airport of Debarkation, Seaport of Debarkation, Terrain, Fix Site and Anti-access/Anti-denial decontamination operations. The WADS will be a replacement for the M12. The M12A1, Power Driven Decontamination Apparatus (PDDA) system is an Army lead program that consists of a pump unit, a 500 gallon tank unit, and a 600 gallon per hour liquid fuel water heater with a spray bar mounted to the system for terrain decontamination. The WADS will use the principles of the PDDA to further enhance terrain decontamination capabilities. In FY22 the WADS program will initiate market research, release the Request for Prototype Proposal, and draft program documentation for a Milestone A decision in FY23.

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program	Date: May 2021
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The C3PO program uses a Family of Systems approach to provide contamination mitigation capability to critical equipment and assets prior to a CBRN attack to mitigate the effects and amount of CBRN contamination exposure allowing the Joint Force to be better prepared for war, maintain a resilient force posture, and remain lethal. These capabilities include but are not limited to CBRN protective covers, coatings, paints, and other preventative measures. In FY22, the C3PO program will continue user testing through iterative (test-fix-test) prototyping to improve system performance.

The MPD program will provide Warfighters with the capability to reduce the hazards associated with mass casualty decontamination efforts for protected and unprotected personnel, casualties and contaminated human remains potentially exposed to CBRN hazards. The program will develop an array of rugged and reliable best-of-breed hardware in a manageably sized, easy to erect, modular system that can be quickly tailored to different Mass Casualty events in order to support decontamination of ambulatory and non-ambulatory patients, and allow for the processing of contaminated human remains. This reduces and limits the spread of contamination among potentially contaminated population groups through a standardized, modular system scalable to increase capability, aligning with the National Defense Strategy by prioritizing preparedness for war in order to remain lethal. The MPD program funding ends in FY21 and all program contract, test, and acquisition documentation will be archived and the Joint Requirements Office will enter the Draft Capability Development Document into Knowledge Management/Decision Support tool for archiving.

The SEDS program will develop reliable and modular hardware intended to decontaminate military equipment including personal effects, and weapons to pre-contamination conditions, which sustains Joint Force military advantages and a resilient force posture, and align with the National Defense Strategy. SEDS will provide contamination mitigation capabilities for critical equipment that have been exposed to chemical and biological contamination and achieve efficacy levels that allow unprotected post-decontamination exposures for long periods with less than negligible severity effects. In FY22, the SEDS program will initiate Special Operations Forces (SOF) combined Developmental Test/Operational Test (DT/OT) and conduct Early Developmental Testing (EDT) for remaining Services, and prepare for Preliminary Design Review (PDR).

The TacDS program is a family of systems (FoS) that will provide tactical commanders a suite of products to disable (delay, disrupt, and/or degrade) or defeat (destroy) small quantities of chemical or biological materials of concern (C/BMOC) contained in munitions and bulk containers. The TacDS will operate in locations both remote and accessible, during hostile and non-hostile conditions, and within established time periods, to reduce or eliminate the employability of C/BMOC against the Joint Force and/or prevent state adversaries and non-state actors from acquiring, proliferating, or using weapons of mass destruction, a defense objective in the National Defense Strategy. The TacDS suite of capabilities will provide a new warfighter capability at the tactical level and play a critical role in DoD's ability to respond effectively to WMD crises and C/BMOC. Development of two products was initiated in FY19; Product #1, Thermite Bag, a man-portable destruction capability, and Product #2, Epoxy Kit, a delay capability. Development and evaluation of Products #1 and #2 through delivery of advanced prototypes and associated technical data/training packages was conducted in FY20 as part of approved closeout activities. For Product #2, development was accelerated in FY20 to include operational testing with USSOCOM forces to allow USSOCOM to procure/field the product under their Title 10 Authority. Data/Intellectual Property (IP) and documentation for both products as well as the overarching TacDS program are archived to facilitate further development in the future if funding becomes available and the program is revived; archived information will be shared with USSOCOM as needed. In FY21 and beyond, the Defense-Wide Review (DWR) reduced the program for higher priorities. Advanced prototypes and associated technical data packages for these two products will be delivered in FY20 and archived along with programmatic documentation for future efforts, consistent with the approved close-out strategy.

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021	
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) DE4 / Decontamination (ACD&P)	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021
Title: 1) TCMS Description: Milestone (MS) A support and Prototype Development FY 2022 Plans: Initiate market research and conduct a requirements table top exercise in order to release the Request for Prototype Proposal (RPP) and award a prototyping Other Transaction Authority (OTA) contract. Draft program documentation for a Milestone A decision. FY 2021 to FY 2022 Increase/Decrease Statement: Program/project is new start effort in FY 2022.		-	-
Title: 2) WADS Description: Prototype Development and Evaluation FY 2022 Plans: Initiate market research, conduct a requirements table top exercise, and release the Request for Prototype Proposal in order to award a prototyping Other Transaction Authority (OTA) contract. Draft program documentation for a Milestone A decision in FY23. FY 2021 to FY 2022 Increase/Decrease Statement: Program/project is new start effort in FY 2022.		-	-
Title: 3) C3PO Description: Milestone (MS) A and Prototype Development FY 2021 Plans: Initiate Proof of Concept Demonstration and Testing. Conduct MS A, System Readiness Review (SRR), Technology Readiness Assessment (TRA), and Affordability Assessment. FY 2022 Plans: Continue using agile program management to obtain laboratory and user testing through iterative (test-fix-test) prototyping to improve system performance. FY 2021 to FY 2022 Increase/Decrease Statement: Program/project transitioned to Advanced Development.		-	1.643
Title: 4) MPD		3.270	2.867
			3.433
			2.392
			3.572
			-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) DE4 / Decontamination (ACD&P)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Description: Milestone (MS) A Support and Preliminary Systems Component Testing</p> <p>FY 2021 Plans: Conduct Technology Readiness Assessment (TRA) and Manufacturing Readiness Assessment (MRA). Further down select and procure approximately (3) additional prototypes to support Developmental Testing (DT). Complete prototype testing in order to inform Operational Testing (OT) in FY22.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program/project is entering completion and all activities will be closed.</p>			
<p>Title: 5) SEDS</p> <p>Description: Milestone (MS) A support and Prototype Development</p> <p>FY 2021 Plans: Conduct MS A; Initiate contract award to purchase prototype systems for testing. System Readiness Review (SRR), Technology Readiness Assessment (TRA), and Affordability Assessment.</p> <p>FY 2022 Plans: Initiate Special Operations Forces (SOF) combined Developmental Test/Operational Test (DT/OT) and conduct Early Developmental Testing (EDT) for remaining Services, prepare for Preliminary Design Review (PDR).</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to change in program/project schedule. FY22 increase is due to cost of developing and maturing SEDS system technologies based on market research and will fund additional test activities for USSOCOM variant Developmental, Operational, and Early Developmental Testing.</p>	-	1.776	8.988
<p>Title: 6) TACDS</p> <p>Description: Prototype Development and Evaluation</p>	3.739	-	-
Accomplishments/Planned Programs Subtotals	7.009	6.286	18.385

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

Line Item	FY 2020	FY 2021	FY 2022	FY 2022	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
			Base	OCO	Total						
• DE5: Decontamination (SDD)	9.113	21.954	7.874	-	7.874	-	-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) DE4 / Decontamination (ACD&P)
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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• JD0050: DECONTAMINATION FAMILY OF SYSTEMS (DFoS)	14.932	10.804	4.166	-	4.166	-	-	-	-	-	-
• JD0070: JOINT BIOLOGICAL AGENT DECONTAMINATION SYSTEM (JBADS)	20.361	3.404	26.367	-	26.367	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

TACTICAL CONTAMINATION MITIGATION SYSTEM (TCMS)

TACTICAL CONTAMINATION MITIGATION SYSTEM (TCMS)

The TCMS program will develop the equipment, processes and procedures for contamination mitigation related to post-incident operations in a CBRN contaminated environment. The acquisition strategy includes market research through both Requests for Information and a call for White Papers through an Other Transaction Authority (OTA) contracting approach. Data collected will inform a Milestone A decision in FY23. The OTA vehicle will also be used to request prototypes, which will undergo technology demonstrations and Early Field testing, followed by an analysis to determine the most suitable candidate. Results of Prototyping will inform Milestone B and Request for Proposals in FY24 followed by developmental and operational testing and Milestone C/Full Rate Production Approval.

WIDE AREA DECONTAMINATION SYSTEM (WADS)

The WADS program will develop the equipment, processes and procedures for contamination mitigation of various types of terrain and the exterior of DoD fixed site facilities contaminated by chemical, biological, and radiological agents. The acquisition strategy includes market research through both Requests for Information and a call for White Papers through an Other Transaction Authority (OTA) contracting approach. The program plans for a Milestone A decision in FY23. The OTA vehicle will also be used to request prototypes, which will undergo technology demonstrations and Early Field testing, followed by an analysis to determine the most suitable candidate. Results of Prototyping will inform Milestone B in FY25 and Request for Proposals in FY26 followed by developmental and operational testing and Milestone C/Full Rate Production Approval.

CBRN COVERS COATINGS AND PROTECTIVE OVERLAYS (C3PO)

The C3PO acquisition approach involves the use of the Countering Weapons of Mass Destruction Other Transaction Authority (CWMD OTA), Competitive/Firm Fixed Price (C/FFP) contract, to design and develop state of the art equipment using competitive and iterative (test-fix-test) prototyping. The C3PO program will evaluate Commercial Off the Shelf options to reduce development costs. The program will test prototypes against live chemical warfare agents and biological warfare agents,

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program	Date: May 2021
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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)</i>	Project (Number/Name) DE4 / <i>Decontamination (ACD&P)</i>
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conduct reliability, availability, and maintainability testing, conduct regular user evaluations to identify human system integration issues, and will conduct testing to ensure the system meets military standards.

MASS PERSONNEL DECON (MPD)

The MPD program will develop the equipment, processes and procedures for DoD-affiliated personnel contaminated by chemical, biological, and radiological agents to achieve ambulatory and non-ambulatory throughput requirements as dictated by the needs of the Services, while considering various mission scenarios. As part of the acquisition strategy, key product developmental efforts the program achieved MS A in February 2020, and includes efforts for the reduction of current MPD System costs by assessing existing Mass Casualty Decontamination (MCD) equipment and processes as well as new technology through the use of Requests For Information (RFI's), Market Research Analyses and Technology Demonstrations. Data collected from prior equipment demonstrations as well as fieldings of commercial MCD systems in support of two validated Operational Needs Statements will inform the program as well. A competitive/sole source contract for prototyping and production units will be awarded, followed by Milestone B. Results of Prototyping will inform developmental and operational testing effort, followed by Milestone C/Full Rate Production Approval. These efforts will additionally support the development of hazardous waste disposal and integration with a Contaminated Human Remains capability. The MPD program funding ends in FY21 and all program contract, test, and acquisition documentation will be archived and the Joint Requirements Office will enter the Draft Capability Development Document into Knowledge Management/Decision Support tool for archiving.

SERVICE EQUIPMENT DECONTAMINATION SYSTEM (SEDS)

The SEDS program will utilize the Countering Weapons of Mass Destruction Other Transaction Authority (CWMD OTA) to design and develop state of the art equipment using competitive and iterative prototyping. The program will test prototypes against live chemical warfare agents and biological warfare agents, conduct reliability, availability, and maintainability testing, conduct regular user evaluations to identify human system integration issues, and will conduct testing to ensure the system meets military standards. The program plans for a Milestone A decision in FY21. The OTA vehicle will be used to request prototype development. Request for Proposals planned for 4QFY21 followed by developmental and operational testing starting in FY22 and Milestone C/LRIP Approval in FY23 for the SOCOM variant.

TACTICAL DISABLEMENT SYSTEM (TACDS)

TacDS was planned as a FoS using GOTS, modified COTS, and developmental technologies of varying maturity; up to 7 products may be needed to fully satisfy the entire requirements set. The program successfully obtained a MS A decision authorizing entry of all capabilities to be developed under the program into the Technology Maturation and Risk Reduction (TMRR) phase of the Acquisition Lifecycle in March 2018. Development of two products was initiated in FY19 using an approved streamlined A to C acquisition approach; Product #1, Thermite Bag, a man-portable destruction capability, and Product #2, Epoxy Kit, a delay capability. The initial acquisition strategy included an IPR to replace the traditional MS B checkpoint and be conducted for each product to authorize transition from TMRR to EMD phase activities. Separate contracts/transactions were used to develop, test, and procure each product, with the Countering Weapons of Mass Destruction Other Transaction Agreement (CWMD OTA) being used to maximum extent possible as a flexible mechanism to engage industry, drive competition, and reduce transaction timelines. Development and evaluation of Products #1 and #2 through delivery of advanced prototypes and associated technical data/training packages was conducted in FY20 as part of approved closeout activities. For Product #2, development was accelerated in FY20 to include operational testing with USSOCOM forces to allow USSOCOM to

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)
0400 / 4	PE 0603884BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)</i>	DE4 / <i>Decontamination (ACD&P)</i>

procure/field the product under their Title 10 Authority. Data/Intellectual Property (IP) and documentation for both products as well as the overarching TacDS program are archived to facilitate further development in the future if funding becomes available and the program is revived; archived information will be shared with USSOCOM as needed. In FY21 and beyond, the Defense-Wide Review (DWR) reduced the program for higher priorities. Advanced prototypes and associated technical data packages for these two products will be delivered in FY20 and archived along with programmatic documentation for future efforts, consistent with the approved close-out strategy.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) DE4 / Decontamination (ACD&P)
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
TCMS - HW S - Product Development	C/FFP	TBD : N/A	0.000	0.000		0.000		0.730	Mar 2022	0.000		0.730	0.000	0.730	0.000
WADS - HW S - Small and Large Scale Spray Mechanisms	C/FFP	TBD : N/A	0.000	0.000		0.000		0.206	Feb 2022	0.000		0.206	0.000	0.206	0.000
MPD - HW S - Hardware System	C/FFP	Advanced Technologies International : Summerville, SC	0.188	0.253	May 2020	0.312	Jan 2021	0.000		0.000		0.000	0.000	0.753	0.000
SEDS - HW S - SEDS Product Development	C/FFP	TBD : N/A	0.000	0.000		0.681	Jul 2021	2.607	Jan 2022	0.000		2.607	0.000	3.288	0.000
Subtotal			0.188	0.253		0.993		3.543		0.000		3.543	0.000	4.977	N/A

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
TCMS - ES SB - Logistics, Engineering and IPT Support	MIPR	Various : Various	0.000	0.000		0.000		1.935	Jan 2022	0.000		1.935	0.000	1.935	0.000
WADS - TD/D S - IPT and Technical Support	MIPR	Various : Various	0.000	0.000		0.000		1.628	Jan 2022	0.000		1.628	0.000	1.628	0.000
C3PO - ES SB - Logistics, Engineering and IPT Support	MIPR	Various : Various	0.000	0.000		0.676	Mar 2021	1.310	Nov 2021	0.000		1.310	0.000	1.986	0.000
MPD - ES SB S - Logistics, Engineering, and IPT Support	Various	Various : Various	0.053	0.003	May 2020	1.152	Dec 2020	0.000		0.000		0.000	0.000	1.208	0.000
SEDS - ES SB - SEDS Logistics, Engineering and IPT Support	MIPR	Various : Various	0.000	0.000		0.208	Mar 2021	2.265	Jan 2022	0.000		2.265	0.000	2.473	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) DE4 / Decontamination (ACD&P)
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Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
TACDS - TD/D S - Logistics, Engineering, and IPT Support	Various	Various : Various	2.633	2.042	Feb 2020	0.000		0.000		0.000		0.000	0.000	4.675	0.000
Subtotal			2.686	2.045		2.036		7.138		0.000		7.138	0.000	13.905	N/A

Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
TCMS - OTHT S - Prototype T&E IPR Test Planning	MIPR	Various : Various	0.000	0.000		0.000		0.254	Jun 2022	0.000		0.254	0.000	0.254	0.000
WADS - OTHT C - Component Testing	MIPR	Various : Various	0.000	0.000		0.000		0.200	Jan 2022	0.000		0.200	0.000	0.200	0.000
C3PO - Other S - Developmental Testing and Test Planning Support	MIPR	Various : Various	0.000	0.000		0.721	Mar 2021	1.727	Dec 2021	0.000		1.727	0.000	2.448	0.000
MPD - OTHT S - System Component Testing, Prototype Testing, DT, Test Planning	C/FFP	Advanced Technologies International : Summerville, SC	0.207	2.285	May 2020	0.800	Mar 2021	0.000		0.000		0.000	0.000	3.292	0.000
SEDS - OTHT S - SEDS T&E IPR Test Planning	MIPR	Various : Various	0.000	0.000		0.621	Aug 2021	2.768	Jan 2022	0.000		2.768	0.000	3.389	0.000
TACDS - DTE S - Test Support	Various	Various : Various	0.000	0.707	Feb 2020	0.000		0.000		0.000		0.000	0.000	0.707	0.000
Subtotal			0.207	2.992		2.142		4.949		0.000		4.949	0.000	10.290	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) DE4 / Decontamination (ACD&P)
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Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
TCMS - PM/MS S - Program Management Support	C/FFP	TBD : N/A	0.000	0.000		0.000		0.514	Jan 2022	0.000		0.514	0.000	0.514	0.000
WADS - PM/MS S - Program Management Support	MIPR	Various : Various	0.000	0.000		0.000		0.358	Jan 2022	0.000		0.358	0.000	0.358	0.000
C3PO - PM/MS S - Program Management Support	MIPR	Various : Various	0.000	0.000		0.246	Mar 2021	0.535	Nov 2021	0.000		0.535	0.000	0.781	0.000
MPD - PM/MS S - Program Management Support	MIPR	Various : Various	0.078	0.729	Feb 2020	0.603	Dec 2020	0.000		0.000		0.000	0.000	1.410	0.000
SEDS - PM/MS S - Program Management Support	MIPR	Various : Various	0.000	0.000		0.266	Mar 2021	1.348	Jan 2022	0.000		1.348	0.000	1.614	0.000
TACDS - PM/MS S - Program Management Support	MIPR	Various : Various	1.149	0.990	Nov 2019	0.000		0.000		0.000		0.000	0.000	2.139	0.000
Subtotal			1.227	1.719		1.115		2.755		0.000		2.755	0.000	6.816	N/A

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	4.308	7.009	6.286	18.385	0.000	18.385	0.000	35.988	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) DE4 / Decontamination (ACD&P)
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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
TCMS - System Engineering Plan (SEP)																												
TCMS - Milestone A																												
TCMS - Request for Proposal (RFP)																												
TCMS - Capability Development Document (CDD)																												
TCMS - Life Cycle Sustainment Plan (LCSP)																												
TCMS - Test and Evaluation Master Plan (TEMP)																												
TCMS - Milestone B																												
TCMS - TCMS - Acquisition Program Baseline (APB)																												
TCMS - Milestone C																												
TCMS - Full Rate Production (FRP)																												
WADS - Systems Engineering Plan																												
WADS - Milestone A																												
WADS - Life Cycle Sustainment Plan																												
WADS - Capability Development Document																												
WADS - Test and Evaluation Master Plan																												
WADS - Milestone B																												
WADS - Acquisition Program Baseline																												
WADS - Request for Proposal																												
C3PO - Proof of Concept Demostration and Testing																												
C3PO - MS A																												
C3PO - Test and Evaluation Master Plan (TEMP)																												

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) DE4 / Decontamination (ACD&P)
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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
C3PO - System Engineering Plan (SEP)								■																				
C3PO - Request for Proposal (RFP)									■																			
C3PO - Developmental Testing (DT)										■	■	■	■	■	■													
C3PO - Capabilities Development Document (CDD)															■													
C3PO - Acquisition Program Baseline (APB)																■												
C3PO - MS C LRIP Decision																■												
C3PO - FRP Decision																			■									
C3PO - Lifecycle Sustainment Plan (LCSP)																										■		
C3PO - Initial Operational Capability (IOC)																											■	
MPD - MS A		■																										
MPD - Prototype Testing			■	■	■	■																						
MPD - Contract Option							■																					
MPD - Development Test (DT)								■	■	■	■																	
SEDS - MS A Preparation (SOF and Other Service)							■	■																				
SEDS - MS A (SOF and Other Service)									■																			
SEDS - Acquisition Decision Memorandum (ADM) (SOF and Other Service)										■																		
SEDS - System Engineering Plan (SEP) (SOF and Other Service)											■																	
SEDS - Request For Proposal (RFP) (SOF and Other Service)												■																
SEDS - Early Developmental Testing (Other Service)													■	■	■	■												
SEDS - Developmental Testing/Operational Testing (SOF)														■	■	■	■											

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) DE4 / Decontamination (ACD&P)
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026							
	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				
SEDS - Capability Development Document (CDD) (Other Service)																																
SEDS - MS B (Other Service)																																
SEDS - MS C/FRP (SOF)																																
SEDS - Developmental Testing (DT) (Other Service)																																
SEDS - Initial Operational Capability (SOF)																																
SEDS - MS C/ Initial Low Rate Production Decision (Other Service)																																
SEDS - Full Operational Capability (SOF)																																

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) DE4 / Decontamination (ACD&P)
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
TCMS - System Engineering Plan (SEP)	4	2022	4	2022
TCMS - Milestone A	1	2023	1	2023
TCMS - Request for Proposal (RFP)	1	2023	1	2023
TCMS - Capability Development Document (CDD)	2	2024	2	2024
TCMS - Life Cycle Sustainment Plan (LCSP)	3	2024	3	2024
TCMS - Test and Evaluation Master Plan (TEMP)	3	2024	3	2024
TCMS - Milestone B	4	2024	4	2024
TCMS - TCMS - Acquisition Program Baseline (APB)	4	2024	4	2024
TCMS - Milestone C	4	2026	4	2026
TCMS - Full Rate Production (FRP)	4	2026	4	2026
WADS - Systems Engineering Plan	1	2023	1	2023
WADS - Milestone A	2	2023	2	2023
WADS - Life Cycle Sustainment Plan	2	2025	2	2025
WADS - Capability Development Document	3	2025	3	2025
WADS - Test and Evaluation Master Plan	4	2025	4	2025
WADS - Milestone B	4	2025	4	2025
WADS - Acquisition Program Baseline	4	2025	4	2025
WADS - Request for Proposal	1	2026	1	2026
C3PO - Proof of Concept Demonstration and Testing	3	2021	4	2021
C3PO - MS A	4	2021	4	2021
C3PO - Test and Evaluation Master Plan (TEMP)	4	2021	4	2021
C3PO - System Engineering Plan (SEP)	4	2021	4	2021

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) DE4 / Decontamination (ACD&P)
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Events	Start		End	
	Quarter	Year	Quarter	Year
C3PO - Request for Proposal (RFP)	1	2022	1	2022
C3PO - Developmental Testing (DT)	2	2022	3	2023
C3PO - Capabilities Development Document (CDD)	2	2023	2	2023
C3PO - Acquisition Program Baseline (APB)	3	2023	3	2023
C3PO - MS C LRIP Decision	3	2023	3	2023
C3PO - FRP Decision	3	2024	3	2024
C3PO - Lifecycle Sustainment Plan (LCSP)	1	2025	1	2025
C3PO - Initial Operational Capability (IOC)	2	2025	2	2025
MPD - MS A	2	2020	2	2020
MPD - Prototype Testing	3	2020	1	2021
MPD - Contract Option	2	2021	2	2021
MPD - Development Test (DT)	3	2021	1	2022
SEDS - MS A Preparation (SOF and Other Service)	1	2021	2	2021
SEDS - MS A (SOF and Other Service)	3	2021	3	2021
SEDS - Acquisition Decision Memorandum (ADM) (SOF and Other Service)	3	2021	3	2021
SEDS - System Engineering Plan (SEP) (SOF and Other Service)	3	2021	3	2021
SEDS - Request For Proposal (RFP) (SOF and Other Service)	4	2021	4	2021
SEDS - Early Developmental Testing (Other Service)	1	2022	1	2023
SEDS - Developmental Testing/Operational Testing (SOF)	1	2022	1	2023
SEDS - Capability Development Document (CDD) (Other Service)	2	2023	2	2023
SEDS - MS B (Other Service)	4	2023	4	2023
SEDS - MS C/FRP (SOF)	4	2023	4	2023
SEDS - Developmental Testing (DT) (Other Service)	2	2024	4	2025
SEDS - Initial Operational Capability (SOF)	4	2024	4	2024
SEDS - MS C/ Initial Low Rate Production Decision (Other Service)	2	2026	2	2026

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program			Date: May 2021	
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)</i>	Project (Number/Name) DE4 / <i>Decontamination (ACD&P)</i>		

Events	Start		End	
	Quarter	Year	Quarter	Year
SEDS - Full Operational Capablility (SOF)	4	2026	4	2026

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)				Project (Number/Name) IP4 / Individual Protection (ACD&P)			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
IP4: Individual Protection (ACD&P)	-	1.997	2.483	3.968	-	3.968	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project includes the development of next generation individual protective ensembles (e.g., suits, boots, and gloves) that enable the Joint Forces to survive and continue the mission in Chemical and Biological (CB) contaminated environments.

Efforts included in this project are:

- (1) Uniform Integrated Protection Ensemble Family of Systems (UIPE FoS),
- (2) UIPE FoS Gloves, and
- (3) UIPE FoS General Purpose (GP) (i.e. Land)

The UIPE FoS program is a family of systems that provides the broad spectrum of users with individual percutaneous protective equipment allowing the ability to operate in a contaminated environment with no or minimal degradation in performance. UIPE FoS provides protection from operationally relevant traditional and non-traditional CBRN threats likely to be encountered during joint force operations. In FY21, UIPE FoS is separated into UIPE FoS GP, UIPE FoS Air and UIPE FoS Gloves.

UIPE FoS Gloves provides percutaneous protection to the Warfighter against traditional and non-traditional CBRN threats. UIPE FoS Gloves provides improved comfort, tactility and dexterity, and for some mission profiles advanced features such as touch screen and flame resistance. In FY22 UIPE FoS Gloves will continue prototype development, conduct Early User Tests/Wear events, material and system level testing and initiate and complete operational testing (OT).

UIPE FoS GP provides a family of systems that will give the Warfighter percutaneous protection from operationally relevant traditional, non-traditional, and advanced CBRN/Toxic Industrial Material (TIM) threats likely to be encountered during joint force operations. In FY22 UIPE FoS GP will continue prototype development, conduct Critical Design Review (CDR), Joint Independent Logistics Assessment (JILA), and update the Capability Development Document (CDD).

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

	FY 2020	FY 2021	FY 2022
Title: 1) UIPE FoS	1.997	-	-
Description: Concept Design Evaluation/Technology Maturation and Risk Reduction (TMRR)			
Title: 2) UIPE FoS GP	-	1.989	3.028
Description: Development of the Next Generation Protective Ensembles			

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) IP4 / Individual Protection (ACD&P)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>FY 2021 Plans: Conduct evaluation to determine which candidates are ready to enter the Engineering and Manufacturing Development (EMD) phase; conduct the Independent Logistics Assessment; conduct a Preliminary Design Review and receive Milestone B approval, and begin Developmental/Operational Testing (DT/OT).</p> <p>FY 2022 Plans: Conduct Critical Design Review (CDR), Conduct the Joint Independent Logistics Assessment (JILA), Prototype Development, update the Capability Development Document (CDD), Engineering/Technical IPT Support, and Technical Manual validation and verification.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to change in program/project technical parameters.</p>			
<p>Title: 3) UIPE FoS Gloves</p> <p>Description: Development of the Next Generation Protective Glove</p> <p>FY 2021 Plans: Conduct program planning that includes developing the Statement of Objectives for a call for White Papers and the overall Acquisition and Test Strategy. Begin glove prototype development (qty 2). Mission area focus includes: Land, Sea, Air, and Homeland Defense.</p> <p>FY 2022 Plans: Finalize UIPE FoS Glove prototype development and testing for multiple mission profiles (General Purpose, Air and All Hazard). Conduct DT/OT events on mature prototypes.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.</p>	-	0.494	0.940
Accomplishments/Planned Programs Subtotals	1.997	2.483	3.968

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2022</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u>	<u>Total Cost</u>
			<u>Base</u>	<u>OCO</u>	<u>Total</u>					<u>Complete</u>	
• IP5: Individual Protection (SDD)	12.179	12.960	18.941	-	18.941	-	-	-	-	-	-
• JI0002: JS AIRCREW MASK (JSAM)	53.839	67.950	42.059	-	42.059	-	-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) IP4 / Individual Protection (ACD&P)
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C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• JI0003: JOINT SERVICE GENERAL PURPOSE MASK (JSGPM)	13.209	19.802	15.128	-	15.128	-	-	-	-	-	-
• MA0401: CBRN UNIFORM INTEGRATED PROTECTION ENSEMBLE (UIPE)	9.984	0.000	0.000	-	0.000	-	-	-	-	-	-
• PHM033: UNIFORM INTEGRATED PROTECTIVE ENSEMBLE GENERAL PURPOSE (UIPE FOS GP)	0.000	1.543	23.067	-	23.067	-	-	-	-	-	-
• PHM034: UNIFORM INTEGRATED PROTECTION ENSEMBLE FOS AIR (UIPE FOS AIR)	0.000	4.786	36.818	-	36.818	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

CBRN UNIFORM INTEGRATED PROTECTION ENSEMBLE FAMILY OF SYSTEMS (UIPE FOS)

The UIPE FoS program will conduct market research through both Requests For Information (RFIs) and a call for White Papers through an Other Transaction Authority (OTA) contracting approach. Candidate technologies will follow the same acquisition strategy employed for the suit: Early User Tests/Wear events and material and system level testing to identify available capabilities followed by a Trade Space Analysis to determine the most suitable glove(s). The UIPE FoS GP program will monitor S&T activities for possible technology transitions.

In FY21, UIPE FoS transitions to UIPE FoS GP, UIPE FoS Air and UIPE FoS Gloves. In order to reflect the structure of the program, UIPE FoS will meet Mission Area needs, not individual Service needs. The four Mission Areas are: Land (i.e. GP), Air, Sea, and All Hazards. Each of the Mission Areas has unique mission requirements that the UIPE FoS GP, Air and Gloves solutions will seek to fulfill.

UNIFORM INTEGRATED PROTECTIVE ENSEMBLE GENERAL PURPOSE (UIPE FOS GP)

UIPE FoS GP used an Other Transaction Authority (OTA) and Government designed prototypes produced in conjunction with an Industry Partner to acquire prototypes for early user testing. Warfighter feedback, trade space analysis, and chemical testing resulted in three government designed candidates being down selected in

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)
0400 / 4	PE 0603884BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)</i>	IP4 / <i>Individual Protection (ACD&P)</i>

3QFY20. These three candidates are designed to minimize operational burden and provide improved form, fit, function, and integration with the current Warfighter kits compared to legacy systems.

UNIFORM INTEGRATED PROTECTIVE ENSEMBLE FOS GLOVES (UIPE FOS GLOVES)

The UIPE FoS program will conduct market research through both Requests For Information (RFIs) and a call for White Papers through an Other Transaction Authority (OTA) contracting approach. Candidate technologies will undergo Early User Tests/Wear events and material and system level testing to identify available capabilities followed by a Trade Space Analysis to determine the most suitable solution(s).

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) IP4 / Individual Protection (ACD&P)
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
UIPE FOS - HW S - Prototype Development	Various	Various : Various	1.768	0.200	Nov 2019	0.000		0.000		0.000		0.000	0.000	1.968	0.000
UIPE FOS GP - HW C - Prototype Development	Various	Various : Various	0.000	0.000		0.584	Dec 2020	1.367	Nov 2021	0.000		1.367	0.000	1.951	0.000
UIPE FOS GLOVES - HW C - Prototype Development	MIPR	Various : Various	0.000	0.000		0.290	Dec 2020	0.302	Nov 2021	0.000		0.302	0.000	0.592	0.000
Subtotal			1.768	0.200		0.874		1.669		0.000		1.669	0.000	4.511	N/A

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
UIPE FOS - UIPE - ES S - Engineering and Technical IPT Support / SME Support	MIPR	Various : Various	0.286	0.069	Nov 2019	0.000		0.000		0.000		0.000	0.000	0.355	0.000
UIPE FOS GP - ES C - Engineering and Technical IPT Support/PM and SME Support	Various	Various : Various	0.000	0.000		1.107	Dec 2020	0.808	Nov 2021	0.000		0.808	0.000	1.915	0.000
UIPE FOS GLOVES - ES C - Engineering and Technical IPT Support / SME Support	MIPR	Various : Various	0.000	0.000		0.130	Dec 2020	0.271	Nov 2021	0.000		0.271	0.000	0.401	0.000
Subtotal			0.286	0.069		1.237		1.079		0.000		1.079	0.000	2.671	N/A

Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
UIPE FOS - UIPE - DTE S - DT Design	MIPR	Various : Various	1.118	1.429	Nov 2019	0.000		0.000		0.000		0.000	0.000	2.547	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) IP4 / Individual Protection (ACD&P)
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Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
UIPE FOS GP - DTE C - Surveillance Testing	MIPR	Defense Technical Information Center (DTIC) : Fort Belvoir, VA	0.000	0.000		0.000		0.399	Nov 2021	0.000		0.399	0.000	0.399	0.000
UIPE FOS GLOVES - DTE C - Prototype Testing & Test Support	MIPR	Various : Various	0.000	0.000		0.000		0.226	Nov 2021	0.000		0.226	0.000	0.226	0.000
Subtotal			1.118	1.429		0.000		0.625		0.000		0.625	0.000	3.172	N/A

Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
UIPE FOS - PM/MS C - Program Management Support	MIPR	Various : Various	0.001	0.299	Nov 2019	0.000		0.000		0.000		0.000	0.000	0.300	0.000
UIPE FOS GP - PM/MS C - Program Management Support	Various	Various : Various	0.000	0.000		0.298	Dec 2020	0.454	Nov 2021	0.000		0.454	0.000	0.752	0.000
UIPE FOS GLOVES - PM/MS C - Program Management Support	Various	Various : Various	0.000	0.000		0.074	Dec 2020	0.141	Nov 2021	0.000		0.141	0.000	0.215	0.000
Subtotal			0.001	0.299		0.372		0.595		0.000		0.595	0.000	1.267	N/A

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals		3.173	1.997	2.483	3.968	0.000	3.968	0.000	11.621	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) IP4 / Individual Protection (ACD&P)
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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
UIPE FOS - Air System Testing	■																											
UIPE FOS - Land System Testing	■	■																										
UIPE FOS - Land Manufacture Test Articles (Prototypes)	■	■																										
UIPE FOS - Land Early User Evaluation	■	■	■																									
UIPE FOS GP - Self Assessment Joint Independent Logistics Assessment							■																					
UIPE FOS GP - Capability Development Document (CDD)							■																					
UIPE FOS GP - Milestone B							■																					
UIPE FOS GP - Test & Evaluation Master Plan (TEMP) Update							■																					
UIPE FOS GP - DT/OT							■	■	■	■	■	■																
UIPE FOS GP - Manufacturing Readiness Assessment (MRA)							■																					
UIPE FOS GP - Critical Design Review (CDR)							■																					
UIPE FOS GP - Operational Assessment											■																	
UIPE FOS GP - Joint Independent Logistics Assessment (JILA)												■																
UIPE FOS GP - Capability Development Document (CDD) Update												■																
UIPE FOS GP - Milestone C															■													
UIPE FOS GP - FRP																■												
UIPE FOS GP - Initial Operational Capability (IOC)																										■	■	■
UIPE FOS GLOVES - Draft CDD							■																					

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) IP4 / Individual Protection (ACD&P)
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
UIPE FOS - Air System Testing	1	2020	1	2020
UIPE FOS - Land System Testing	1	2020	2	2020
UIPE FOS - Land Manufacture Test Articles (Prototypes)	1	2020	2	2020
UIPE FOS - Land Early User Evaluation	1	2020	4	2020
UIPE FOS GP - Self Assessment Joint Independent Logistics Assessment	1	2021	1	2021
UIPE FOS GP - Capability Development Document (CDD)	1	2021	1	2021
UIPE FOS GP - Milestone B	2	2021	2	2021
UIPE FOS GP - Test & Evaluation Master Plan (TEMP) Update	2	2021	2	2021
UIPE FOS GP - DT/OT	2	2021	3	2022
UIPE FOS GP - Manufacturing Readiness Assessment (MRA)	3	2021	3	2021
UIPE FOS GP - Critical Design Review (CDR)	3	2021	3	2021
UIPE FOS GP - Operational Assessment	1	2022	1	2022
UIPE FOS GP - Joint Independent Logistics Assessment (JILA)	3	2022	3	2022
UIPE FOS GP - Capability Development Document (CDD) Update	4	2022	4	2022
UIPE FOS GP - Milestone C	3	2023	3	2023
UIPE FOS GP - FRP	1	2024	1	2024
UIPE FOS GP - Initial Operational Capability (IOC)	4	2025	4	2026
UIPE FOS GLOVES - Draft CDD	1	2021	1	2021
UIPE FOS GLOVES - Prototype Development	1	2021	4	2022
UIPE FOS GLOVES - Milestone A	4	2021	4	2021
UIPE FOS GLOVES - Early User, material and system level testing	1	2022	1	2022
UIPE FOS GLOVES - DT	2	2022	4	2022

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)</i>	Project (Number/Name) IP4 / <i>Individual Protection (ACD&P)</i>
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Events	Start		End	
	Quarter	Year	Quarter	Year
UIPE FOS GLOVES - Milestone B	2	2023	2	2023
UIPE FOS GLOVES - OT	1	2023	1	2024
UIPE FOS GLOVES - Milestone C	3	2024	3	2024

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) IS4 / Information Systems (ACD&P)
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
IS4: Information Systems (ACD&P)	-	0.517	4.661	0.000	-	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

This Project provides for Advanced Component Development and Prototypes (ACD&P) responsible for providing the information architecture and applications for shaping the battlespace against the Chemical and Biological (CB) threat. Experimentation and demonstration will be used in this phase to reduce risk and inform supporting materiel solutions, CONOPS and TTPs.

Efforts included in this project are:

- (1) Global Biosurveillance Portal (G-BSP),
- (2) Joint Effects Model 2 (JEM 2),
- (3) Software Support Activity (SSA), and
- (4) CBRN Integrated Early Warning (CBRN IEW).

The G-BSP program provides a web-based enterprise environment that facilitates collaboration, communication, and information sharing in support of the detection, management, and mitigation of man-made and naturally occurring biological events. G-BSP provides a central access point for biosurveillance information and situational awareness for DoD, interagency and allied partners supporting the early identification and response to biological events. G-BSP provides an integrated suite of web-based components designed to support public health officers, environmental officers, clinicians, physicians, and CBRN personnel as they maintain their situational awareness of local, regional, and global biological threats to the force. G-BSP does not duplicate existing DoD capabilities, but rather leverages existing tools and technologies to provide users across multiple organizations and disciplines with a centralized "one-stop shop" for all of their biosurveillance resources. The G-BSP will transition to USSOCOM for sustainment in FY23.

The JEM 2 program provides a software application that provides the Department of Defense (DoD) with the only operationally tested and accredited tool to model and simulate the effects of CBRN weapon strikes and incidents that is approved for use by operational warfighters. JEM 2 applies advanced physics using weather, terrain, and agent characteristics to predict the time-phased impact of CBRN and Toxic Industrial Chemical/Material (TIC/TIM). JEM 2 displays hazard information on the Common Operational Picture (COP) and allows commanders to assess risk and take steps to mitigate the effects of Weapons of Mass Destruction (WMD) on operational forces. The JEM 2 program was directed to complete development and enter sustainment 2 years early due to the FY21 Defense Wide Review. JEM 2 will complete development and transition to the BA7 MOD CBRN IS program (Project IS7) starting in FY22.

The SSA program provides for enterprise services in the areas of software development, system/network architectures, cybersecurity, information assurance standards and policies and interoperability. The SSA emphasizes development of reference implementations to guide Government and industry system and software developers

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) IS4 / Information Systems (ACD&P)
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to ensure that their products meet risk management framework compliance and common interoperability standards such as the Integrated Sensor Architecture (ISA). SSA efforts will transition to the BA7 MOD CBRN IS program (Project IS7) starting in FY22.

CBRN IEW program is a continuation of ECD IEW and will utilize lessons learned to transition and integrate successful mature technologies into a baseline IEW framework to support environmental monitoring and biological surveillance to support immediate force health protection requirements. Applicable technologies within the CBDP will be experimented, integrated, networked, and deployed through rapid acquisition methods and transitioned to programs of record to achieve integrated early warning in accordance with OSD IEW Campaign Plan. CBRN IEW will utilize Table-Top exercises (TTX), Operational Demonstrations, and other venues to provide sensor interoperability and interdependence and integrated layered defense in order to increase readiness within the CBDP. CBRN IEW efforts will move from Project IS4 to Project CA4 in FY22 and will be incorporated into program entitled CBRN Support to Command and Control (CSC2).

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

	FY 2020	FY 2021	FY 2022
Title: 1) Global-BSP Description: Program Management	0.021	-	-
Title: 2) Global-BSP Description: Product Development	0.135	-	-
Title: 3) Global-BSP Description: Training and Logistics Support	0.048	-	-
Title: 4) Joint Effects Model 2 (JEM 2) Description: Prototyping and Development	0.205	-	-
Title: 5) JEM 2 Description: Management Support	0.029	-	-
Title: 6) Software Support Activity (SSA) Description: Enterprise Service FY 2021 Plans: Continue to engage with enterprise programs to assist with the development of acquisition products and documentation in the areas of system/network architectures, cybersecurity risk management framework, information assurance, interoperability, and standards and policy compliance for Milestone C activities to reduce risk. FY 2021 to FY 2022 Increase/Decrease Statement:	0.079	0.074	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) IS4 / Information Systems (ACD&P)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
Program/project funding transferred to another funding line. SSA will utilize BA7 beginning in FY22 to support software modernization efforts.			
Title: 7) CBRN Integrated Early Warning (CBRN IEW)	-	4.587	-
Description: Implementation of common CBRN integrated systems architecture throughout the sensor portfolio enabling a common operating environment and integration hub with sensor data analysis and integrated layered defense.			
FY 2021 Plans: Begin integrated systems architecture using current COTS and GOTS sensors and software to test interoperability and increase commanders situational awareness and speed of effects in fielded systems.			
FY 2021 to FY 2022 Increase/Decrease Statement: Program/project funding transferred to another funding line. Program/project funding transferred to CSC2 (Research, Development Test & Evaluation (RDT&E) Item CA4).			
Accomplishments/Planned Programs Subtotals	0.517	4.661	-

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• IS5: Information Systems (SDD)	20.723	6.019	0.000	-	0.000	-	-	-	-	-	-
• IS7: Information Systems (Op Sys Dev)	15.773	3.234	15.281	-	15.281	-	-	-	-	-	-
• G47101: JOINT WARNING & REPORTING NETWORK (JWARN)	0.942	0.000	0.000	-	0.000	-	-	-	-	-	-
• JC0208: JOINT EFFECTS MODEL (JEM)	1.189	0.000	0.000	-	0.000	-	-	-	-	-	-
• JS5230: MODERNIZATION CBRN INFORMATION SYSTEMS (MOD CBRN IS)	0.081	0.074	0.611	-	0.611	-	-	-	-	-	-
• JX0301: BIOSURVELLENCE PORTAL (BSP)	3.276	0.000	0.000	-	0.000	-	-	-	-	-	-
• SA0006: CBRN INFORMATION SYSTEMS (CBRN IS)	0.276	0.512	0.000	-	0.000	-	-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program	Date: May 2021
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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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Remarks

D. Acquisition Strategy

BIOSURVEILLANCE PORTAL (BSP)

The Global Biosurveillance Portal (G-BSP) program is using the SOFCIDS (Special Operations Capabilities Integration and Development System) requirements approach and the JROC IT Box acquisition construct which allows fielding of operational capabilities while continued R&D matures technology required for follow-on versions. IT Box enables programs to tailor the incrementally fielded software program model in the DODI 5000.02 to conduct multiple iterative fielding events in lieu of a single fielding event, and field products to the warfighter utilizing an incremental delivery approach. G-BSP will achieve Full Operational Capability in 2020. G-BSP will transition to Total Package Fielding in 2021-2022 prior to USSOCOM Sustainment beginning in FY23. In FY21 and beyond, the Defense-Wide Review (DWR) reduced this program for higher priorities.

JOINT EFFECTS MODEL (JEM)

JEM 2 acquisition utilizes Agile software development practices, employing the incrementally fielded software program model in the DODI 5000.02 to conduct multiple, more frequent fieldings in lieu of a single fielding event. As part of the strategy, an over-arching MS B was approved by the MDA. JEM Requirements Definition packages have been approved along with Capability Drops (CD) that define capability sets to be developed, tested, and fielded operationally. These CDs are additive in nature, increasing the total capability of JEM 2 that was originally scheduled to be completed in FY22. However, funding in FY21 and beyond was reduced through the Defense-Wide Review (DWR) and the program will be moved to sustainment in FY21 and managed through MOD CBRN IS beginning 1QFY22.

SOFTWARE SUPPORT ACTIVITY (SSA)

Software Support Activity (SSA) is a non-acquisition, service organization that provides professional subject matter expertise support throughout the CBDP Enterprise. These services are provided by government and contract personnel with expertise in software development, network architecture, cybersecurity, technology transitions, information assurance, and standards and policies compliance, and are provided throughout the lifecycle of programs within the CBDP portfolio. These efforts facilitate the efficient development, transition, fielding, modernization, and sustainment of interoperable and integrated CBRN capabilities. In FY22, SSA efforts will transition to Modernization CBRN Information Systems (MOD CBRN IS).

CBRN INTEGRATED EARLY WARNING (CBRN IEW)

CBRN IEW focuses on technology maturation, demonstration, integration and transitioning early warning capability sets to fielded CBDP programs of record to combat emerging and potentially urgent threats within the multi-domain operations spectrum. Contracting strategy includes the use of Other Transaction Authority R&D

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)</i>	Project (Number/Name) IS4 / <i>Information Systems (ACD&P)</i>
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and prototyping. Annual development cycles and capability drops are requested and validated by all DoD services in the OASD(NCB/CB) IEW Campaign Plan and prioritized based on National Defense Strategy and National Military Strategy goals. Current strategy also collaborates with multi-agency partners to obtain synergy and interoperability across the areas of sensor data analytics, integrated early warning, and protect to warn/protect to treat capabilities.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) IS4 / Information Systems (ACD&P)
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
BSP - SW S - Software Development	MIPR	Johns Hopkins University - Applied Physics Lab : Laurel, MD	2.663	0.181	Dec 2019	0.000		0.000		0.000		0.000	0.000	2.844	0.000
JEM - JEM 2 - Development and Integration	C/CPAF	General Dynamics Information Technologies : Fairfax, VA	6.911	0.234	Jan 2020	0.000		0.000		0.000		0.000	0.000	7.145	0.000
Subtotal			9.574	0.415		0.000		0.000		0.000		0.000	0.000	9.989	N/A

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
SSA - TD/D C - Engineering Support	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	0.577	0.079	Nov 2019	0.074	Nov 2020	0.000		0.000		0.000	0.000	0.730	0.000
CBRN IEW - Network Architecture	C/CPFF	TBD : N/A	0.000	0.000		1.500	Mar 2021	0.000		0.000		0.000	0.000	1.500	0.000
CBRN IEW - Systems Integration	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	0.000	0.000		0.750	Jan 2021	0.000		0.000		0.000	0.000	0.750	0.000
Subtotal			0.577	0.079		2.324		0.000		0.000		0.000	0.000	2.980	N/A

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) IS4 / Information Systems (ACD&P)

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
BSP - FOC	3	2021	3	2021
JEM Increment 2 - RDP 4 Approval	1	2021	1	2021
JEM Increment 2 - FD 4 USMC	3	2020	3	2020
JEM Increment 2 - Govt DT / OT / V&V	1	2020	4	2020
SSA - Provide Integration and Test, M&S, VV&A Certification and Accreditation	1	2020	4	2021
SSA - Provide Enterprise Architecture Products and Services	1	2020	4	2021
SSA - Provide Information Assurance Certification/Acceptance products/services, including compliance testing	1	2020	4	2021
SSA - Provide Modeling, Simulation, VV&A, Integration/Test support and interoperability demonstrations.	1	2020	4	2021
SSA - Provide Net-Centric Assessment and assist programs with implementation of policy	1	2020	4	2021
SSA - Sustain Common Components products, process and services	1	2020	4	2021
SSA - Develop and provide CBRN Data Model implementation guidance, including reference implementations	1	2020	4	2021
SSA - Provide CBRN Interface Standards, including reference implementations, e.g. Common CBRN Sensor Interface	1	2020	4	2021
CBRN IEW - ICD	2	2021	2	2021
CBRN IEW - Initial Sensor Integration	1	2021	4	2021

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) MB4 / Medical Biological Defense (ACD&P)
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
MB4: Medical Biological Defense (ACD&P)	-	41.997	47.727	47.351	-	47.351	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

This project includes Medical Countermeasure platform technologies, Medical Countermeasures (vaccines and therapeutics), development of reagents, assays, diagnostic equipment, biosurveillance and supporting efforts.

Efforts included in this project are:

- (1) COVID Therapies Monoclonal Antibodies (COVID TX MAB)
- (2) COVID Vaccine Validated Nucleic Acid Vaccine Construction (COVID VAC)
- (3) Biosafety Level 4 Good Laboratory Practice Test and Evaluation (BSL4 GLP T&E)
- (4) Chem Bio Incident Preparedness and Response - Biosafety Level 4 Research Institute of Infectious Diseases (CBIPR - BSL4 RIID)
- (5) Chem Bio Incident Preparedness and Response - Advanced Development and Manufacturing (CBIPR - ADM)
- (6) Medical Countermeasure Platform Technologies (MCMPT)
- (7) Next Generation Diagnostic System 2 (NGDS Increment 2)
- (8) NGDS 2 Chemical Diagnostics (NGDS 2 CHEMDX)
- (9) Filovirus Vaccine (VAC FILO)
- (10) Venezuelan Equine Encephalitis (VAC VEE)

The COVID TX MAB program will leverage lessons learned from the COVID response to rapidly discover, manufacture and clinically evaluate new monoclonal antibodies to deliver short term capabilities against long standing biological threats. Monoclonal antibodies are a proven technology and first line of defense for many biological threats. In FY22, COVID TX MAB will target the discovery, identification and small scale manufacture of mAbs, with sufficient material to support non-clinical and clinical testing.

The COVID VAC Validated Nucleic Acid Vaccine Construction program will leverage lessons learned from the COVID response to shorten future emergency response timelines and create interim capabilities for prophylaxis. In FY22, COVID VAC will work with interagency, industry, and academia to design and construct vaccine prototypes on validated nucleic acid vaccine platforms then evaluate them in appropriate animal models through Phase 1 clinical trials for safety as needed.

The BSL4 GLP T&E program performs T&E and provides the essential data packages to support US Food and Drug Administration (FDA) approval of leading biodefense medical countermeasure candidates to protect the Warfighter and the Nation. This capability provides dedicated capacity at U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID) for Department of Defense (DoD) to conduct biosafety level "4" studies that produce Good Laboratory Practices (GLP) study reports required by the FDA.

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
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The CBIPR - BSL4 RIID program continues to utilize and maintain a testing capability at the existing and planned new USAMRIID facilities supporting testing of Medical Countermeasures (MCM) against threats that require high-level containment using non-human primates.

The CBIPR-ADM program is the capability building effort at the DoD ADM to establish and enhance proven biopharmaceutical and vaccine manufacturing technologies and accelerate the delivery of medical countermeasures as part of a medical integrated layered defense. The CBIPR-ADM return on investment is an increased level of preparedness and responsiveness to counter current and emerging chemical and biological threats. By establishing and enhancing proven enabling technologies, the DoD ADM will accelerate development of medical countermeasures (MCMs) at all stages of development, enhance preparedness for existing threats, and accelerate response to emerging threats. MCMs impacted by these efforts include: Vaccines for Viral Agents, Vaccines for Bacterial Agents and Toxins, Monoclonal antibodies, antibody fragments, and antibody conjugates for therapeutic and prophylactic use across all agent classes, and Adjuvants. Funds to support the state of readiness were previously provided through individual product development and manufacturing funding lines. The Department is providing dedicated funds to support operational availability. In FY22, CBIPR-ADM continues tech transfer and enhancement of manufacturing technologies to support MCM development against biological threats.

The MCMPT program intends to streamline and accelerate medical countermeasure delivery to the Warfighter by reducing developmental risk using the CBDP's strategic framework, the Agile Medical Paradigm. MCMPT is establishing enabling technologies and prepositioning platform systems at the DoD's Advanced Development Manufacturing (ADM) facility using standardized discovery, design, manufacturing, and testing processes to reduce the medical countermeasure (MCM) development risks. Efforts will center on leveraging the ADM's facility and developing robust manufacturing processes. A subset of these technologies will be adapted to deliver a rapid response capability to novel and emerging threats. Through the Advanced Development and Manufacturing Antibody Technologies (ADAMANT) and Rapid Response platforms, MCMPT will deliver an enduring capability from which future candidates can be manufactured. In FY22 the MCMPT program continues development of a rapid response capability.

The NGDS is a family of systems providing increments of diagnostic capabilities over time that address varied chemical, biological and radiological (CBR) threats across the different echelons of the Combat Health Support System. The mission of the NGDS is to provide CBR threat and infectious disease identification and FDA-cleared diagnostics to inform individual patient treatment and CBR situational awareness and disease surveillance. NGDS Increment 1 improves diagnostic capabilities in deployable and laboratory-based combat health support units. NGDS Increment 2 will complement NGDS Increment 1 by developing diagnostics for unmet biological pathogen and toxin threats, chemical and radiological exposures, and provide capability to lower echelons of care. NGDS Increment 2 will provide additional capability for diagnosis of CBR-induced diseases, suitable for use in far forward environments, by developing lightweight, portable, and simple-to-use instruments and test kits. In FY21 NGDS Increment 2 transitions into two programs of record; NGDS 2 Man Portable Diagnostic System (MPDS) Program and NGDS 2 CHEMDX Program. NGDS 2 MPDS will complement NGDS Increment 1 by providing a lightweight, portable, and simple-to-use diagnostic capability to end-users in non-laboratory, far-forward environments. NGDS 2 CHEMDX will provide a lightweight, portable, and simple-to-use diagnostic capability against chemical threat agents to end-users in non-laboratory, far-forward environments.

The VAC FILO Program develops vaccines that will offer protection against the threat of Ebola and Marburg viruses. The program office is prioritizing the development and delivery of a licensed Marburg vaccine while working with Science & Technology (S&T) to further develop Ebola vaccine candidates to meet the DoD requirement. The current budget supports responsible closeout of program development efforts. The DoD anticipates that the FDA will approve a vaccine using the Animal Rule,

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

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which allows for the demonstration of efficacy in a relevant animal model(s). Program continuing to conduct market research to identify viable candidates for transition in the out years.

The VAC VEE Program develops a vaccine that will protect the Warfighter against aerosolized exposure to the alphavirus Venezuelan equine encephalitis. Additionally, the Program Office will partner with Health and Human Services/National Institute of Allergies and Infectious Diseases (HHS/NIAID), DoD agencies, and laboratories. This DoD program is the Public Health Emergency Medical Countermeasures lead for the advanced development of this vaccine and is leveraging expertise across the Federal and International sectors to ensure programmatic success. FY20 budget supports responsible closeout of program.

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Title: 1) COVID TX MAB</p> <p>Description: Rapid Monoclonal Antibody Development</p> <p>FY 2022 Plans: Target the discovery, identification and small scale manufacture of mAbs, with sufficient material to support non-clinical and clinical testing.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to accelerated development effort. Supports COVID-19/pandemic response efforts.</p>	-	-	10.000
<p>Title: 2) COVID VAC</p> <p>Description: Validated Nucleic Acid Vaccine Construction Development</p> <p>FY 2022 Plans: Leverage lessons learned from the COVID response to design and construct vaccine prototypes on validated nucleic acid vaccine platforms then evaluate them in appropriate animal models through Phase 1 clinical trials for safety as needed.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to accelerated development effort. Supports COVID-19/pandemic response efforts.</p>	-	-	10.000
<p>Title: 3) BSL-4 GLP Test & Evaluation</p> <p>Description: Clinical Studies</p> <p>FY 2021 Plans: Complete of one GLP BSL-4 T&E medical countermeasure non-human primate study in a safe and secure environment. Complete work to help implement laboratory draw-down and transition to new facility. Complete strategic planning, program management, and scheduling for GLP BSL-4 T&E capability.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement:</p>	3.114	3.826	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
Decrease due to change in program/project schedule. The Chemical Biological Defense Program FY 2021 funding request was reduced to account for program being restructured.			
<p>Title: 4) CBIPR-BSL4 RIID</p> <p>Description: Performs T&E and provides the essential data packages to support US Food and Drug Administration approval of leading biodefense medical countermeasure candidates to protect the Warfighter and the Nation</p> <p>FY 2021 Plans: Conduct two GLP BSL-4 T&E medical countermeasure non-human primate studies in a safe and secure environment, implement laboratory draw-down and transition to new facility, continue to provide strategic planning, program management, and scheduling for GLP BSL-4 T&E capability. Provides support for operational availability.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Decrease due to change in program/project schedule.</p>	-	2.498	-
<p>Title: 5) CBIPR - ADM</p> <p>Description: Establish proven enabling manufacturing technologies at the DoD ADM Capability Building.</p> <p>FY 2021 Plans: Continue tech transfer and enhancement of manufacturing technologies to support MCM development against biological threats. Manufacturing technologies can come from any government sources (including JSTO, WRAIR, BARDA, etc. when mature enough for BA4 funding) and other external sources and targets of opportunity from industry.</p> <p>FY 2022 Plans: Continue tech transfer and enhancement of manufacturing technologies to support MCM development against biological threats. Manufacturing technologies can come from any government sources (including JSTO, WRAIR, BARDA, etc. when mature enough for BA4 funding) and other external sources and targets of opportunity from industry.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.</p>	8.000	8.126	8.290
<p>Title: 6) Medical Countermeasure Platform Technologies (MCMPT)</p> <p>Description: Rapid Response</p> <p>FY 2021 Plans:</p>	7.104	13.104	8.875

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
Continue development of a rapid response capability. FY 2022 Plans: Complete development of Biologics On Demand (BOD) rapid response capability and continue polyclonals rapid response capability. FY 2021 to FY 2022 Increase/Decrease Statement: Decrease due to change in program/project technical parameters.				
Title: 7) MCMPT Description: ADAMANT FY 2021 Plans: Continue optimization and development of ADAMANT Plague mAbs to support delivery of a product MCM. FY 2022 Plans: Continue development of ADAMANT Plague mAbs to support delivery of a product MCM. FY 2021 to FY 2022 Increase/Decrease Statement: Decrease due to change in program/project technical parameters.		11.572	17.621	10.186
Title: 8) Next Generation Diagnostic System 2 (NGDS 2) Description: Chemical Diagnostic System		0.606	-	-
Title: 9) NGDS 2 Chemical Diagnostics (NGDS 2 CHEMDX) Description: Chemical Diagnostic System FY 2021 Plans: Complete Technology Maturation and Risk Reduction (TMRR) phase for Chemical agent diagnostics. TMRR will conclude with a Systems Engineering Trade-off Analysis, a Technology Readiness Assessment and a Preliminary Design Review to inform major design parameters culminating in a Beta 2 Prototype technology risk reduction effort. FY 2021 to FY 2022 Increase/Decrease Statement: Program/project transitioned to Engineering and Manufacturing Development Phase.		-	2.552	-
Title: 10) Filovirus Vaccine (VAC FILO) Description: Assays and nonclinical		6.303	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
Title: 11) VAC FILO Description: Manufacturing	2.578	-	-
Title: 12) Venezuelan Equine Encephalitis (VAC VEE) Description: Non Clinical and Clinical	2.720	-	-
Accomplishments/Planned Programs Subtotals	41.997	47.727	47.351

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• MB5: Medical Biological Defense (SDD)	170.345	117.956	137.348	-	137.348	-	-	-	-	-	-
• MB7: Medical Biological Defense (Op Sys Dev)	2.663	2.308	3.833	-	3.833	-	-	-	-	-	-
• JM6677: ADVANCED ANTICONVULSANT SYSTEM (AAS)	0.000	0.000	4.243	-	4.243	-	-	-	-	-	-
• JM8788: NEXT GENERATION DIAGNOSTICS SYSTEM (NGDS)	1.418	0.970	1.290	-	1.290	-	-	-	-	-	-
• JX0005: DOD BIOLOGICAL VACCINE PROCUREMENT (VACCINES)	0.173	5.500	0.000	-	0.000	-	-	-	-	-	-
• JX0210: DEFENSE BIOLOGICAL PRODUCTS ASSURANCE PROGRAM (DBPAP)	2.961	2.845	2.760	-	2.760	-	-	-	-	-	-
• SA0043: NEXT GEN DIAG 2 CHEMICAL DIAGNOSTICS (NGDS 2 CHEM DX)	0.000	0.000	0.000	-	0.000	-	-	-	-	-	-
• SA0044: NEXT GEN DIAG 2 MAN PORTABLE DIAGNOSTIC SYSTEM (NGDS 2 MPDS)	0.000	0.455	4.624	-	4.624	-	-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program	Date: May 2021
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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
Remarks											

D. Acquisition Strategy

COVID THERAPIES MONOCLONAL ANTIBODIES (COVID TX MAB)

COVID TX MAB will leverage industry capabilities, in the interest of speed, in order to establish capabilities that can be tech transferred to the DoD ADM for longer term use and scale up as necessary.

COVID VACCINE (COVID VAC)

The COVID VAC Validated Nucleic Acid Vaccine Construction program will leverage lessons learned from the COVID response to shorten future emergency response timelines and creating interim capabilities for prophylaxis. COVID VAC will work with the interagency, industry, and academia to design and construct vaccine prototypes on validated nucleic acid vaccine platforms then evaluate them in appropriate animal models through Phase 1 clinical trials for safety as needed in FY22.

BSL4 GOOD LABORATORY PRACTICES TEST & EVALUATION (BSL4 GLP T&E)

The Medical Countermeasure Systems (MCM) Biosafety Level (BSL) 4 Test and Evaluation (T&E) capability continues to utilize and maintain a testing capability at the existing and planned new USAMRIID facilities. MCM BSL-4 T&E costs support testing of Medical Countermeasures (MCMs) against threats that require high-level containment using non-clinical studies. The period of FY18 and beyond will continue to support the BSL-4 T&E capability with funding that supports the testing , training and continuous qualification of the lab equipment and resources to ensure Good Laboratory Practices (GLP) Food and Drug Administration (FDA) standards are maintained as RIID is the only BSL 4 lab with GLP capability to support the Department of Defense (DoD). In FY21 and beyond, the Defense-Wide Review (DWR) reduced this program for higher priorities.

CHEM BIO INCIDENT PREPAREDNESS AND RESPONSE - BIOSAFETY LEVEL 4 RESEARCH INSTITUTE OF INFECTIOUS DISEASES (CBIPR-BSL4 RIID)

The Medical Countermeasure Systems (MCM) Biosafety Level (BSL) 4 Test and Evaluation (T&E) capability continues to utilize and maintain a testing capability at the existing and planned new USAMRIID facilities. MCM BSL-4 T&E costs support testing of Medical Countermeasures (MCMs) against threats that require high-level containment using non-clinical studies. The BSL-4 capability supports the testing , training and continuous qualification of the lab equipment and resources to ensure Good Laboratory Practices (GLP) Food and Drug Administration (FDA) standards are maintained as RIID is the only BSL 4 lab with GLP capability to support the Department of Defense (DoD).

CHEM BIO INCIDENT PREPAREDNESS AND RESPONSE - ADM

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)</i>	Project (Number/Name) MB4 / <i>Medical Biological Defense (ACD&P)</i>

A contract was awarded to Ology Bioservices on 20 March 2013 (then Nanotherapeutics, Inc.) to establish a Department of Defense (DoD) Advanced Development and Manufacturing (ADM) capability that can rapidly develop and manufacture MCMs from early stage development up through FDA licensure. The establishment of this capability consisted of designing, commissioning, and validating a biopharmaceutical facility (both its infrastructure and equipment) that is equipped with two (2) advanced development and manufacturing suites, which utilize flexible, agile, single-use (disposable), modular, and multi-product technologies that comply with GMPs and can operate at Biological Safety Level-3 (BSL-3). The capability was established on 31 March 2017.

Since its establishment, the DoD ADM has been sustained in a state of operational readiness so that it can continue to be an enduring domestic MCM manufacturing capability that provides the DoD with priority access. The original sustainment strategy consisted of directly funding all costs/activities (i.e. calibration, maintenance, etc.) via sustainment options on the original contract. The CBIPR funds were designated to support this critical DoD infrastructure. The CBIPR-ADM funding line supports the infrastructure by funding new capability-building efforts (such as manufacturing platforms using FDA known technologies) that will enable new additional MCM product development. This strategy will result in the self-sustainability of the DoD ADM by spreading the sustainment costs equally across all projects (including commercial clients), which mimics the standard practice across the contract development and manufacturing organization (CDMO) industry.

MCM PLATFORM TECHNOLOGIES (MCMPT)

The goal of the MCMPT is to rapidly counter a broad-spectrum of threat agents using standardized discovery, design, manufacturing, and testing processes to reduce the MCM development risks. Efforts will focus on establishing advanced platform technologies within the DoD's Advanced Development Manufacturing (ADM) facility and evaluating that capability through nonclinical and clinical testing. A subset of these technologies will be adapted to deliver a rapid response capability to novel and emerging threats. Once established, future programs will be able to leverage these platforms for the development of future medical countermeasures. It is anticipated that these efforts will leverage the Other Transactions Authority (OTA) through the medical OTA consortium.

NEXT GENERATION DIAGNOSTICS SYSTEM (NGDS)

The NGDS 1 program was a MS A to MS C - acquisition strategy, with MS C approval granted in Dec 2016. NGDS 1 replaces the legacy Joint Biological Agent Identification and Diagnostic System (JBAIDS). NGDS 1 Full Rate Production was approved in Aug 2018.

NGDS 2 will employ a family of systems approach to bridge identified capability gaps for man-portable diagnostics, immunoassay diagnostics, and chemical diagnostics systems. NGDS 2 continued the technology maturation and risk reduction of a man-portable diagnostic capability in FY18 and transitioned to engineering and manufacturing development phase in FY19. NGDS 2 initiated prototyping of a chemical diagnostic capability in FY18. Separate decisions will be utilized to proceed with further development and production for each capability, based on individual determinations of technology maturity to meet user requirements. Development efforts are cost-plus awards using Other Transactions Authority (OTA) agreements to take advantage of nontraditional Defense contractor offerings. NGDS 2 will transition into NGDS 2 CHEMDx and NGDS 2 MPDS starting in FY21.

NEXT GEN DIAG 2 CHEMICAL DIAGNOSTICS (NGDS 2 CHEMDX)

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)</i>	Project (Number/Name) MB4 / <i>Medical Biological Defense (ACD&P)</i>

NGDS Increment 2 will employ a family of systems approach to bridge identified capability gaps for man-portable diagnostics, immunoassay diagnostics, and chemical diagnostics systems. NGDS 2 CHEMDX will provide a lightweight, portable, and simple-to-use diagnostic capability against chemical threat agents to end-users in non-laboratory, far-forward environments. NGDS 2 CHEMDX initiated prototyping in FY18 and will enter Engineering and Manufacturing Development in FY21. NGDS 2 CHEMDX is using an Other Transactions Authority (OTA) agreement to take advantage of nontraditional Defense contractor offerings. Starting in FY21, NGDS Increment 2 program of record transitions to NGDS 2 CHEMDX.

FILOVIRUS (VAC FILO)

The Filovirus Vaccine Program acquisition strategy develops products for pre-exposure prophylaxis that will offer protection against the threat of Ebola and Marburg viruses, with the initial increment focused on Marburg. The current budget supports responsible close out of program development efforts for prototype transition from our Science and Technology (S&T) partners. Work to develop and qualify necessary assays is on-going to support successful transitions of potential Marburg and Ebola candidates from S&T. Assays will be used to compare transitioned products in order to have a meaningful down select at Milestone B. Program is continuing to conduct market research to identify viable candidates for transition in the out years.

VENEZUELAN EQUINE ENCEPHALITIS VACCINE (VAC VEE)

The VAC VEE acquisition strategy uses a parallel evaluation of Modified Vaccinia Ankara (MVA) and Virus Like Particle (VLP) vaccine prototypes through Phase I clinical trials to achieve competitive prototyping in the Technology Maturation & Risk Reduction phase and one of these candidates will be selected to fill the gap with the Services until a future S&T candidate is ready for transition into advanced development with a successful Phase 1 clinical trial. Several potential decision points will be used to assess the prototypes at competitive selection at MS B. The schedule is based on a competitive selection to one prototype at MS B with delivery of a FDA-licensed VEE vaccine. The current S&T efforts do not have a potential candidate with a completed Phase I clinical trial until FY24. The MDA and an ADM are signed to closeout currently funded work at completion of current activities. The current candidates are based on development of known mature vaccine platforms with potential to utilize the DoD Advanced Development Manufacturing facility for production. The development efforts will be a Cost Plus and Firm Fixed Price CLINs.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) MB4 / Medical Biological Defense (ACD&P)
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
COVID TX MAB - Development	Various	Various : Various	0.000	0.000		0.000		8.275	Dec 2021	0.000		8.275	0.000	8.275	0.000
COVID VAC - Vaccine - Development	Various	Various : Various	0.000	0.000		0.000		8.275	Dec 2021	0.000		8.275	0.000	8.275	0.000
CBIPR-ADM - Enabling Manufacturing Technologies	C/CPFF	Ology : Alachua, FL	0.000	6.706	Dec 2019	7.380	Dec 2020	8.290	Dec 2021	0.000		8.290	0.000	22.376	0.000
MCMPT - HW S - ADAMANT MCM Development	C/CPFF	Ology : Alachua, FL	12.847	9.659	Dec 2019	12.590	Dec 2020	8.281	Dec 2021	0.000		8.281	0.000	43.377	0.000
MCMPT - HW S - Rapid Response	C/CPFF	Ology : Alachua, FL	6.386	5.163	Dec 2019	9.330	Dec 2020	6.159	Dec 2021	0.000		6.159	0.000	27.038	0.000
NGDS - HW C - NGDS 2 Develop and mature prototypes for Chemical Agent Diagnostics	C/CPFF	MRIGlobal : Palm Bay, FL	3.244	0.451	Dec 2019	0.000		0.000		0.000		0.000	0.000	3.695	0.000
NGDS - HW C - NGDS 2 Develop and mature Assays for Chemical Agent Diagnostics	MIPR	US Army Medical Research Institute of Chemical Defense : Fort Detrick, MD	0.128	0.040	May 2020	0.000		0.000		0.000		0.000	0.000	0.168	0.000
NGDS 2 CHEMDX - HW C - Develop and mature Assays for Chemical Agent Diagnostics	MIPR	US Army Medical Research Institute of Chemical Defense : Fort Detrick, MD	0.000	0.000		0.032	Dec 2020	0.000		0.000		0.000	0.000	0.032	0.000
NGDS 2 CHEMDX - HW C - Develop and mature prototypes for Chemical Agent Diagnostics	C/CPFF	MRIGlobal : Palm Bay, FL	0.000	0.000		0.548	Nov 2020	0.000		0.000		0.000	0.000	0.548	0.000
VAC VEE - Prototypes Phase 1 Clinical Trials	C/CPFI	Various : Various	6.446	2.720	Oct 2019	0.000		0.000		0.000		0.000	0.000	9.166	0.000
Subtotal			29.051	24.739		29.880		39.280		0.000		39.280	0.000	122.950	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) MB4 / Medical Biological Defense (ACD&P)
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Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
NGDS 2 CHEMDX - ES C - Studies and WIPT Support	C/CPFF	Johns Hopkins University - Applied Physics Lab : Laurel, MD	0.000	0.000		0.150	Dec 2020	0.000		0.000		0.000	0.000	0.150	0.000
VAC FILO - ES S - Regulatory Integration (Environmental and FDA Documentation) and Delivery System	Various	US Army Medical Materiel Development Activity (USAMMDA) : Fort Detrick, MD	3.428	0.576	Dec 2019	0.000		0.000		0.000		0.000	0.000	4.004	0.000
Subtotal			3.428	0.576		0.150		0.000		0.000		0.000	0.000	4.154	N/A

Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
BSL4 GLP T&E - DTE SB - T&E Facility	MIPR	US Army Medical Research Institute of Infectious Disease (USAMRIID) : Fort Detrick, MD	34.630	0.062	Dec 2019	2.777	Dec 2020	0.000		0.000		0.000	0.000	37.469	0.000
BSL4 GLP T&E - DTE C - Non Clinical Studies	MIPR	US Army Medical Research Material Command (USAMRMC) : Fort Detrick, MD	0.000	2.111	Dec 2019	0.000		0.000		0.000		0.000	0.000	2.111	0.000
CBIPR-BSL4 RIID - DTE C - DTE SB - T&E Facility	MIPR	US Army Medical Research Institute of Infectious Disease (USAMRIID) : Fort Detrick, MD	0.000	0.000		2.498	Dec 2020	0.000		0.000		0.000	0.000	2.498	0.000
Subtotal			34.630	2.173		5.275		0.000		0.000		0.000	0.000	42.078	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) MB4 / Medical Biological Defense (ACD&P)
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Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
COVID TX MAB - PM/MS C - Program Management	Various	JPEO Chem : Bio, Rad, and Nuc Defense (JPEO-CBRND)	0.000	0.000		0.000		0.725	Dec 2021	0.000		0.725	0.000	0.725	0.000
COVID TX MAB - PM/MS C - Program Management #2	Various	JPL Enabling Biotechnologies : Fort Detrick, MD	0.000	0.000		0.000		0.500	Dec 2021	0.000		0.500	0.000	0.500	0.000
COVID TX MAB - PM/MS C - Management Support (SETA)	C/FFP	Various : Various	0.000	0.000		0.000		0.500	Dec 2021	0.000		0.500	0.000	0.500	0.000
COVID VAC - PM/MS C - Program Management	Various	JPEO Chem : Bio, Rad, and Nuc Defense (JPEO-CBRND)	0.000	0.000		0.000		0.725	Dec 2021	0.000		0.725	0.000	0.725	0.000
COVID VAC - PM/MS C - Management Support	Various	JPM CBRN Medical : JPEO-CBRND, Fort Detrick, MD	0.000	0.000		0.000		0.500	Dec 2021	0.000		0.500	0.000	0.500	0.000
COVID VAC - PM/MS C - PM/MS S - Program Management (SETA)	C/CPFF	Various : Various	0.000	0.000		0.000		0.500	Dec 2021	0.000		0.500	0.000	0.500	0.000
BSL4 GLP T&E - Program Management (SETA)	C/FFP	Various : Various	1.107	0.416	Dec 2019	0.000		0.000		0.000		0.000	0.000	1.523	0.000
BSL4 GLP T&E - Program Management Support	Various	JPM CBRN Medical : Ft. Detrick, MD	0.019	0.123	Dec 2019	0.544	Dec 2020	0.000		0.000		0.000	0.000	0.686	0.000
BSL4 GLP T&E - Program Management	Various	JPEO Chem : Bio, Rad, and Nuc Defense (JPEO-CBRND)	0.558	0.402	Dec 2019	0.505	Dec 2020	0.000		0.000		0.000	0.505	1.970	0.000
CBIPR-ADM - PM/MS C - Program Management Support	Various	JPM CBRN Medical : JPEO-CBRND, Fort Detrick, MD	0.000	0.734	Dec 2019	0.746	Dec 2020	0.000		0.000		0.000	0.000	1.480	0.000
CBIPR-ADM - PM/MS C - Program Management Support #2	Various	JPEO Chem/Bio Defense (JPEO-	0.000	0.560	Dec 2019	0.000		0.000		0.000		0.000	0.000	0.560	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) MB4 / Medical Biological Defense (ACD&P)
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Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
		CBD) : Aberdeen Proving Ground, MD													
MCMPT - Program Management (SETA)	C/FFP	Various : Various	0.000	0.480	Dec 2019	0.000		0.508	Dec 2021	0.000		0.508	0.000	0.988	0.000
MCMPT - PM/MS C - JPL EB Support	Various	JPM CBRN Medical : JPEO-CBRND, Fort Detrick, MD	1.454	1.515	Dec 2019	3.162	Dec 2020	1.779	Dec 2021	0.000		1.779	0.000	7.910	0.000
MCMPT - PM/MS C Program Management	Various	JPEO Chem : Bio, Rad, and Nuc Defense (JPEO-CBRND)	2.602	1.202	Dec 2019	3.490	Dec 2020	1.620	Dec 2021	0.000		1.620	0.000	8.914	0.000
MCMPT - PM/MS S - Management	Various	JPM CBRN Medical : JPEO-CBRND, Fort Detrick, MD	2.312	0.657	Dec 2019	2.153	Dec 2020	0.714	Dec 2021	0.000		0.714	0.000	5.836	0.000
NGDS - PM/MS SB - Program Management (JPM) Support	Various	JPM CBRN Medical : JPEO-CBRND, Fort Detrick, MD	5.406	0.060	Dec 2019	0.000		0.000		0.000		0.000	0.000	5.466	0.000
NGDS - PM/MS S - Program Management (JPEO) Support	Various	JPEO Chem/Bio Defense (JPEO-CBD) : Aberdeen Proving Ground, MD	1.567	0.045	Dec 2019	0.000		0.000		0.000		0.000	0.000	1.612	0.000
NGDS - PM/MS S - Program Management (Dx) Support	Various	JPM CBRN Medical : JPEO-CBRND, Fort Detrick, MD	4.263	0.010	Dec 2019	0.000		0.000		0.000		0.000	0.000	4.273	0.000
NGDS 2 CHEMDX - PM/MS S - Program Management Support	Various	JPM CBRN Medical : JPEO-CBRND, Fort Detrick, MD	0.000	0.000		0.290	Dec 2020	0.000		0.000		0.000	0.000	0.290	0.000
NGDS 2 CHEMDX - PM/MS S - Program Management	Various	JPEO Chem : Bio, Rad, and Nuc Defense (JPEO-CBRND)	0.000	0.000		0.281	Dec 2020	0.000		0.000		0.000	0.000	0.281	0.000
NGDS 2 CHEMDX - PM/MS S - Program Management (ChemDx)	Various	JPM CBRN Medical : JPEO-CBRND, Fort Detrick, MD	0.000	0.000		0.486	Dec 2020	0.000		0.000		0.000	0.000	0.486	0.000

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) MB4 / Medical Biological Defense (ACD&P)
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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
VAC VEE - Competitive Prototypes - Phase 1 Clinical Trials																												
VAC VEE - Stability Testing																												
VAC VEE - Competitive Prototypes - Non-Clinical Studies																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) MB4 / Medical Biological Defense (ACD&P)

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
COVID TX MAB - Development	1	2022	4	2022
COVID VAC - Development	1	2022	4	2022
BSL4 GLP T&E - T&E - Maintain Bio-Safety Level and Evaluation Capability	1	2020	4	2021
CBIPR-BSL4 RIID - T&E - Maintain Bio-Safety and Evaluation Capability	1	2021	4	2021
CBIPR-ADM - MCM Enabling Manufacturing Technologies	1	2020	4	2026
CBIPR-ADM - MCM Development and Manufacturing Support	1	2020	4	2026
MCMPT - Rapid Response Design, Manufacturing, Testing	1	2020	4	2026
MCMPT - MCM Optimization Phase Design, Manufacturing, Testing	1	2020	4	2023
MCMPT - Vaccine Platform Design, Manufacturing, Testing	1	2020	4	2020
MCMPT - ADAMANT Plague	1	2020	4	2024
MCMPT - Plague Manufacturing	4	2021	1	2023
MCMPT - Plague Nonclinical Studies	1	2022	2	2024
MCMPT - Plague Clinical Studies	1	2023	2	2024
NGDS Increment 2 - CHEMDX TMRR	1	2020	4	2020
NGDS 2 CHEMDX Increment 2 - CHEMDX MS B	3	2021	3	2021
VAC FILO - Non Clinical Efficacy and Safety Studies	1	2020	4	2020
VAC FILO - Manufacturing Stability Testing	1	2020	4	2020
VAC FILO - Program Closeout Activities	1	2020	4	2020
VAC VEE - Competitive Prototypes - Phase 1 Clinical Trials	1	2020	4	2020
VAC VEE - Stability Testing	1	2020	4	2020
VAC VEE - Competitive Prototypes - Non-Clinical Studies	1	2020	4	2020

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) TE4 / Test & Evaluation (ACD&P)
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
TE4: Test & Evaluation (ACD&P)	-	5.054	4.107	0.000	-	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

This Project supports the Chemical Biological Material Assessment Infrastructure (CBMAI). CBMAI addresses test infrastructure needs with improvements, modifications, and/or new critical test capabilities for chemical, biological, and emerging threat products across the Chemical Biological Defense Program (CBDP). CBMAI provides test fixtures and methodology to support advanced development test and evaluation intended to meet a changing threat regardless of the test site/location.

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

	FY 2020	FY 2021	FY 2022
<p>Title: 1) CBMAI</p> <p>Description: CBMAI conducts requirements analysis to ensure the availability of needed test infrastructure to meet POR testing and milestone schedules. Conduct studies of the capabilities and limitations of existing infrastructure and methodologies to align with POR test requirements. Initiate requirements generation and early development of new test infrastructure to support POR test requirements.</p> <p>FY 2021 Plans: Continue to study and prioritize future program requirements and test infrastructure needs. Initiate the development of a chemical standoff detection test fixture, and multiple test fixtures providing accurate protective ensemble performance data.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program/project is entering completion and all activities will be closed. Funding for CBMAI ends in FY21, any additional developmental costs will be directly tied to programs of record.</p>	4.248	3.306	-
<p>Title: 2) CBMAI</p> <p>Description: Government Integrated Product Team program management and IPT Support to all JPEO programs and external partners.</p> <p>FY 2021 Plans: Continue Program Management including Government system engineering, program/financial management, costing, personnel support, travel and overhead.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement:</p>	0.806	0.801	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) TE4 / Test & Evaluation (ACD&P)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
Program/project is entering completion and all activities will be closed. Funding for CBMAI ends in FY21, any additional developmental costs will be directly tied to programs of record.			
Accomplishments/Planned Programs Subtotals	5.054	4.107	-

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

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• TE5: Test & Evaluation (SDD)	7.523	6.352	0.000	-	0.000	-	-	-	-	-	-
• TE7: Test & Evaluation (Op Sys Dev)	5.280	0.000	0.000	-	0.000	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

CHEMICAL BIOLOGICAL MATERIEL ASSESSMENT INFRASTRUCTURE (CBMAI)

CBMAI efforts are supported through competitive contract actions, academia, and other Government agencies. Infrastructure solutions will leverage commercially available systems to provide state-of-the-art capabilities that address current and future CBMAI test and evaluation needs. The CBMAI program will be ending in FY21 as development efforts come to completion. Future test infrastructure needs, improvements, or modifications will be managed and funded by the supported programs of record beginning in FY22.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) TE4 / Test & Evaluation (ACD&P)
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CBMAI - HW C - Seams & Closure Fixture Development	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	0.000	0.000		0.150	Mar 2021	0.000		0.000		0.000	0.000	0.150	0.000
CBMAI - HW C - Low Volume Surface Deposition	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	0.000	0.000		0.373	Mar 2021	0.000		0.000		0.000	0.000	0.373	0.000
CBMAI - HW C - OADMS	C/CPFF	MRIGlobal : Kansas City, MO	0.000	0.000		0.537	Dec 2020	0.000		0.000		0.000	0.000	0.537	0.000
CBMAI - HW C - Joint Ambient Breeze Tunnel Active Standoff Chamber Upgrades	C/CPFF	MRIGlobal : Kansas City, MO	0.000	0.000		0.831	Mar 2021	0.000		0.000		0.000	0.000	0.831	0.000
CBMAI - HW C - WSLAT	MIPR	West Desert Test Center : Dugway, UT	0.000	0.000		0.650	Apr 2021	0.000		0.000		0.000	0.000	0.650	0.000
CBMAI - HW S - TI Analysis and Requirements	C/CPFF	Various : Various	0.932	3.360	Dec 2019	0.000		0.000		0.000		0.000	0.000	4.292	0.000
CBMAI - HW S - Government/Contractor SE & Technical Management Team	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	1.508	0.888	Nov 2019	0.765	Mar 2021	0.000		0.000		0.000	0.000	3.161	0.000

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Chemical and Biological Defense Program			Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) TE4 / Test & Evaluation (ACD&P)	

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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
CBMAI - Real Time MeS Sensor	██████████																											
CBMAI - Whole System Live Agent Test (WSLAT) System	████████████████████																											
CBMAI - Swatch Test Fixtures	██████████																											
CBMAI - Glove Test Fixtures	██████████																											
CBMAI - Remote Detection Chemical Test Fixture	██████████████████																											
CBMAI - Wearable MeS Sensor	██████████																											
CBMAI - Test Infrastructure Analysis & Requirements (TIA & R)	██████████																											
CBMAI - JABT, ASC, Staging Facility Upgrades					██████████																							
CBMAI - Seams & Closure Fixture Development					██████████																							
CBMAI - Low Volume Service Deposition					██████████																							
CBMAI - Open Architecture Data Management System (OADMS) Development					██████████																							

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) TE4 / Test & Evaluation (ACD&P)

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
CBMAI - Real Time MeS Sensor	1	2020	4	2020
CBMAI - Whole System Live Agent Test (WSLAT) System	1	2020	4	2021
CBMAI - Swatch Test Fixtures	1	2020	4	2020
CBMAI - Glove Test Fixtures	1	2020	4	2020
CBMAI - Remote Detection Chemical Test Fixture	1	2020	2	2021
CBMAI - Wearable MeS Sensor	1	2020	4	2020
CBMAI - Test Infrastructure Analysis & Requirements (TIA & R)	1	2020	4	2020
CBMAI - JABT, ASC, Staging Facility Upgrades	2	2021	4	2021
CBMAI - Seams & Closure Fixture Development	2	2021	4	2021
CBMAI - Low Volume Service Deposition	2	2021	4	2021
CBMAI - Open Architecture Data Management System (OADMS) Development	2	2021	4	2021

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program										Date: May 2021		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)				Project (Number/Name) TM4 / Techbase Medical Defense (ACD&P)			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
TM4: Techbase Medical Defense (ACD&P)	-	29.200	0.000	25.952	-	25.952	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project TM4 supports early-phase clinical development of vaccines and therapeutic drugs to provide safe and effective medical defense against validated biological threat agents and emerging infectious disease biothreats including bacteria, toxins, and viruses. This effort reduces programmatic risk of failure in the advanced development phase by generating clinical and supporting non-clinical safety, tolerability and toxicity data for candidate vaccines and therapeutic drugs prior to transition to System Development & Demonstration.

Individual efforts in this project include:

- Supports the advanced development of medical countermeasures to include prophylaxes, pretreatments, antidotes and therapeutic drugs against identified and emerging biological warfare threat agents.
- Demonstration of human safety and tolerability prior to entry of candidate vaccines and therapeutics into advanced development, supporting the preparation of technical data packages that conform to the Food and Drug Administration (FDA) Investigational New Drug (IND) processes, DoD acquisition regulations, and the oversight of early phase clinical trials in accordance with FDA guidelines.
- In addition, this project supports innovative biotechnology approaches to advance medical systems designed to rapidly identify, diagnose, prevent, and treat emerging biological threats whether naturally occurring or engineered.
- Focuses on therapeutic and prophylactic strategies to effectively minimize injuries resulting from exposure to Chemical Weapons Agents. This effort involves the evaluation FDA approved therapeutics for operational use, as well as generation of novel drug products and formulations to enhance level of protection and/or operational utility for the Warfighter. Efforts in this area are designed to develop drug candidates that will ultimately be submitted for FDA licensure or to identify previously licensed products for new uses in the treatment and pretreatment against chemical warfare injury.

FY20-22 reorganizes, renames previous Bullet titles and introduces new Bullets (Thrust Area). These new "Thrust" titles are in line with the CBDP Core Capability Areas and intended to provide more detail and traceability from the S&T program to advanced development.

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

	FY 2020	FY 2021	FY 2022
Title: 1) CARES Act: DOMANE (Discovery of MCM against Novel Entities)	29.200	-	-
Description: DOMANE effort seeks to accelerate MCM development against novel threats and emerging diseases of pandemic potential. The planned studies will assess the DOMANE capability in a real-world scenario through execution of proof-of-concept COVID-19 inpatient and outpatient clinical trials. The studies are designed to assess the effectiveness of the DOMANE strategy and identify gaps for future developmental efforts.			

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) TM4 / Techbase Medical Defense (ACD&P)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Title: 2) DOMANE/LIMIT (Layered Integrated Medical Countermeasure Intervention Technologies) (TBMD TMTI)</p> <p>Description: Develop both prophylactic and therapeutic medical countermeasures against viral, bacterial, and biological toxin threats using a layered approach looking at combinations of effective therapies.</p> <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Initiate plans to evaluate new countermeasures for novel and emerging threats in animal and organoid models. - Initiate plans to conduct clinical trials to evaluate safety and efficacy for new medical countermeasures. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program/project funding transferred from another funding line.</p>	-	-	9.000
<p>Title: 3) Bacterial Therapeutics</p> <p>Description: Develop therapeutic countermeasures to mitigate the effects of known and emerging bacterial threats to the warfighter.</p> <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Initiate human clinical trial and supportive current Good Manufacturing Practice (cGMP) manufacture and Non-Human Primate (NHP) studies to establish safety, tolerability, and efficacy of broad spectrum antibacterial candidate. <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program/project transitioned to Advanced Development. Effort reduces programmatic risk of failure in the advanced development phase by generating clinical and supporting non-clinical safety, tolerability and toxicity data for candidate vaccines and therapeutic drugs prior to transition to advanced development.</p>	-	-	7.476
<p>Title: 4) Viral Prophylaxis</p> <p>Description: Provide the warfighter protection against biothreat agents through the pre exposure administration of prophylactics against known viral threats of interest and emerging infectious threats.</p> <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Initiate support of cGMP manufacture to supply and the initiation of phase 1 human clinical trial for antiviral vaccine candidate. <p>FY 2021 to FY 2022 Increase/Decrease Statement:</p>	-	-	7.476

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) TM4 / Techbase Medical Defense (ACD&P)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
Program/project transitioned to Advanced Development. Effort reduces programmatic risk of failure in the advanced development phase by generating clinical and supporting non-clinical safety, tolerability and toxicity data for candidate vaccines and therapeutic drugs prior to transition to advanced development.			
Title: 5) PBA Medical Countermeasures	-	-	2.000
Description: Focuses on therapeutic and prophylactic strategies to effectively minimize injuries resulting from exposure to Pharmaceutical Based Agents (PBA), including opioids. This effort involves the evaluation FDA approved therapeutics for operational use, as well as generation of novel drug products and formulations to enhance level of protection and/or operational utility for the Warfighter. Efforts in this area are designed to develop drug candidates that will ultimately be submitted for Food and Drug Administration (FDA) licensure or to identify previously licensed products for new uses in the treatment and pretreatment against PBA injury.			
FY 2022 Plans: - Initiate medical countermeasures clinical studies to treat respiratory depression and intoxication caused by synthetic opioids.			
FY 2021 to FY 2022 Increase/Decrease Statement: Program/project transitioned to Advanced Development. Effort reduces programmatic risk of failure in the advanced development phase by generating clinical and supporting non-clinical safety, tolerability and toxicity data for candidate vaccines and therapeutic drugs prior to transition to advanced development.			
Accomplishments/Planned Programs Subtotals	29.200	-	25.952

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

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• TM3: Techbase Medical Defense (ATD)	142.123	137.829	137.495	-	137.495	-	-	-	-	-	-
• MB5: Medical Biological Defense (SDD)	170.345	117.956	137.348	-	137.348	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

TECH BASE MEDICAL TRANSITIONAL MED TECHNOLOGY INTIATIVE (TBMD TMTI)

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)
0400 / 4	PE 0603884BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)</i>	TM4 / <i>Techbase Medical Defense (ACD&P)</i>

Project TM4 supports early-phase clinical development and supporting non-clinical safety, tolerability and toxicity data for candidate vaccines and therapeutic drugs prior to transition to System Development & Demonstration. This work provides safe and effective medical defense against validated biological threat agents and emerging infectious disease biothreats including bacteria, toxins, and viruses. This work also involves the evaluation of Food and Drug Administration (FDA)-approved therapeutics for operational use, as well as generation of novel drug products and formulations, to enhance level of protection and/or operational utility for the Warfighter. This effort reduces programmatic risk of failure in the advanced development phase.

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Chemical and Biological Defense Program			Date: May 2021		
Appropriation/Budget Activity 0400 / 4		R-1 Program Element (Number/Name) PE 0603884BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)</i>		Project (Number/Name) TM4 / <i>Techbase Medical Defense (ACD&P)</i>	

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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
TBMD TMTI - DOMANE (COVID-19)					██████████																							
TBMD TMTI - Biological Therapeutics									██																			
TBMD TMTI - Viral Prophylaxis									██																			
TBMD TMTI - DOMANE/LIMIT (Layered Integrated Medical Countermeasure Intervention Technologies)									██																			
TBMDC CHEM CM - PBA Medical Countermeasures									██																			

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)</i>	Project (Number/Name) TM4 / <i>Techbase Medical Defense (ACD&P)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
TBMD TMTI - DOMANE (COVID-19)	1	2021	4	2021
TBMD TMTI - Biological Therapeutics	1	2022	4	2026
TBMD TMTI - Viral Prophylaxis	1	2022	4	2026
TBMD TMTI - DOMANE/LIMIT (Layered Integrated Medical Countermeasure Intervention Technologies)	1	2022	4	2026
TBMDC CHEM CM - PBA Medical Countermeasures	1	2022	4	2024

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)				Project (Number/Name) TT4 / Technology Transition (ACD&P)			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
TT4: Technology Transition (ACD&P)	-	0.000	0.577	0.866	-	0.866	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project TT4 validates technologies and their respective concepts-of-operations in preparation for transition to advanced development programs requiring chemical and biological (CB) defense technologies. These demonstrations seek to demonstrate the potential for enhanced military operational capability and/or cost effectiveness while soliciting end-user determination of the military utility and operational impact of the technology and capability demonstrated. Successfully demonstrated technologies with proven military utility can either be left in place for extended user evaluations, accepted into advanced stages of the formal acquisition process, proceed directly into limited or full-scale production or be returned to the technical base for further development.

FY20-22 reorganizes, renames legacy Bullet titles and introduces new Bullets (Thrust Areas). These new "Thrust" titles are in line with the CBDP Core Capability Areas and intended to provide more detail and traceability from the S&T program to advanced development.

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

	FY 2020	FY 2021	FY 2022
Title: 1) Techbase Technology Transition (ACD&P)	-	0.577	-
<p>Description: Integrated Early Warning (IEW) and Integrated Layered Defense (ILD) ATD Transition: This project (TT4) validates high-risk/high-payoff technologies and their respective concepts-of-operations for significant improvement to Warfighter capabilities in preparation for transition of mature technologies to advanced development programs requiring chemical and biological (CB) defense technologies. In FY21 this effort is being transferred to new thrust area: Advanced Technology Demonstration.</p> <p>FY 2021 Plans: Demonstrate in the Resolute Dragon 1 Integrated Threat Response (ITR) ATD, novel and innovative S&T Chemical, Biological, Radiological, and Nuclear (CBRN) technologies. Ensure efforts are compatible with the CBDP Enterprise, Joint Requirements Office (JRO) led, CBRN Support to Command and Control (CSC2) requirements development initiative and from there into the overarching Joint All Domain Command and Control (JADC2) cross service environment. Integrate, mature, and deliver to advanced development CBRN defense capabilities to include sensors, controllers, and other CBRN enabling capabilities. Facilitate transitions of Integrated Early Warning and Integrated Layered Defense products to CBRN-Information Systems (CBRN-</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) TT4 / Technology Transition (ACD&P)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
IS)/Sensor Integration on Robotic Platforms (C-SIRP), Dismounted Reconnaissance Sets, Kits and Outfits (DRSKO), and Joint Project Manager Protection (JPM-P) Programs of Record.				
FY 2021 to FY 2022 Increase/Decrease Statement: Program/project funding transferred to another funding line.				
Title: 2) Advanced Technology Demonstration		-	-	0.866
Description: ATDs enable the effective transition of cutting edge CBRN S&T Technologies to the Warfighter by providing them an opportunity to engage with these new technologies in a mission oriented demonstration. Feedback from the Warfighters ensures that these technologies are operationally relevant, value added, and can be matured and transitioned in a timely and effective manner to end users for employment.				
FY 2022 Plans: Demonstrate in the Resolute Dragon 2 Integrated Threat Response (ITR) ATD, novel and innovative S&T CBRN technologies and the integration of their information outputs into a Command and Control (C2) Common Operating Picture (COP). The C2 COP will be instantiated through the employment of integrated systems architectures, software, and hardware and will measuring the information's impact to C2 Decisions using decision support tools. Ensure demonstrations compatibility with the CBDP Enterprise, Joint Requirements Office (JRO) led CBRNE Support to Command and Control (CSC2) initiative and into the overarching Joint All Domain Command and Control (JADC2) cross service environment. Develop, integrate and deliver integrated Chemical, Biological, Radiological, and Nuclear (CBRN) defense capabilities to include sensors, controllers, and other CBRN enabling capabilities such as medical counter measures (MCMs) and modeling and simulation tools. Technologies to be integrated include an Expeditionary Field Forwarding and Sequencing Technology (F-FAST) and other biological sensors and mitigating technologies, UAV-Borne Hyperspectral Imager (HIS) chemical vapor stand-off detector, Opioid and Pharmaceutical Based Agents (PBAs) prophylaxis and therapeutics, Rapid Analysis of Threat Exposure (RATE) Algorithm, EpiGrid Human Effects and Medical modeling tool, advanced service aligned integrated command and control Common Operating Picture (COP) hardware and software capabilities, and medical diagnostics such as Layered and Integrated Medical Intervention Technologies (LIMIT). Delivered products will increase mission readiness profiles for personnel and resources during operations in hazardous environments.				
FY 2021 to FY 2022 Increase/Decrease Statement: Program/project funding transferred from another funding line.				
Accomplishments/Planned Programs Subtotals		-	0.577	0.866

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) TT4 / Technology Transition (ACD&P)
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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• TT3: <i>Technology Transition (ATD)</i>	12.659	10.416	8.787	-	8.787	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

TECHBASE TECH TRANSITION (TECHTRAN)

Advanced Technology Demonstrations (ATDs) exploit mature and maturing technologies to solve important military problems. ATDs emphasize technology integration, operational utility assessment, and transition of operational prototypes for practical use. The goals of efforts under Project TT4 are to provide a prototype capability to the Warfighter and support the evaluation of that capability in operationally-relevant field environments. This will allow Warfighters to evaluate the capabilities in real military exercises and at a scale sufficient to fully assess military utility. The Defense Threat Reduction Agency (DTRA) will fund DoD laboratories and DoD Federally Funded Research Development Centers (FFRDCs) through the Military Interdepartmental Purchase Request (MIPR) in accordance with the Economy Act in order to conduct operational evaluation of technology solutions for Integrated Early Warning (IEW) and Integrated Layered Defense (ILD) ATD efforts. Upon completion of efforts under this project, operational prototypes of Technology Readiness Level (TRL) 6 or TRL 7 with documented operational utility assessment outcomes will be transitioned to Service stakeholders and programs of record to support rapid acquisition and fielding decisions.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)	Project (Number/Name) TT4 / Technology Transition (ACD&P)
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Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
TECHTRAN - IEW and ILD Transition	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	0.116	0.000		0.116	Nov 2020	0.174	Nov 2021	0.000		0.174	0.000	0.406	0.000
Subtotal			0.116	0.000		0.116		0.174		0.000		0.174	0.000	0.406	N/A

Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
TECHTRAN - IEW and ILD Transition	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	0.412	0.000		0.411	Nov 2020	0.617	Nov 2021	0.000		0.617	0.000	1.440	0.000
Subtotal			0.412	0.000		0.411		0.617		0.000		0.617	0.000	1.440	N/A

Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
TECHTRAN - PM/MS S - IEW and ILD Transition	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center	0.000	0.000		0.050	Nov 2020	0.075	Nov 2021	0.000		0.075	0.000	0.125	0.000

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)</i>	Project (Number/Name) TT4 / <i>Technology Transition (ACD&P)</i>

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
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

TECHTRAN - IEW ATD	[REDACTED]																											
TECHTRAN - ITR ATD	[REDACTED]																											

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (ACD&P)</i>	Project (Number/Name) TT4 / <i>Technology Transition (ACD&P)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
TECHTRAN - IEW ATD	1	2021	2	2021
TECHTRAN - ITR ATD	3	2021	4	2025

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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0604384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (EMD)</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	417.723	356.472	299.848	-	299.848	-	-	-	-	-	-
CA5: <i>Contamination Avoidance (SDD)</i>	-	126.019	128.954	82.295	-	82.295	-	-	-	-	-	-
CM5: <i>Homeland Defense (SDD)</i>	-	9.414	0.000	0.000	-	0.000	-	-	-	-	-	-
CO5: <i>Collective Protection (SDD)</i>	-	7.138	7.885	3.028	-	3.028	-	-	-	-	-	-
DE5: <i>Decontamination (SDD)</i>	-	9.113	21.954	7.874	-	7.874	-	-	-	-	-	-
IP5: <i>Individual Protection (SDD)</i>	-	12.179	12.960	18.941	-	18.941	-	-	-	-	-	-
IS5: <i>Information Systems (SDD)</i>	-	20.723	6.019	0.000	-	0.000	-	-	-	-	-	-
MB5: <i>Medical Biological Defense (SDD)</i>	-	170.345	117.956	137.348	-	137.348	-	-	-	-	-	-
MC5: <i>Medical Chemical Defense (SDD)</i>	-	55.269	54.392	50.362	-	50.362	-	-	-	-	-	-
TE5: <i>Test & Evaluation (SDD)</i>	-	7.523	6.352	0.000	-	0.000	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

The projects in this program element (PE) support the development, build, and test of products to verify that all operational and derived requirements have been met, and to support production or deployment decisions. The activities include mature system development, integration, and demonstration to support Milestone C decisions, and conducting operational test and evaluation of production representative articles.

Individual projects include:

- Contamination Avoidance (CA5): system development of reconnaissance, detection, identification, and warning systems that minimize chemical and biological (CB) contamination and prevent further cross-contamination during operations.

- Homeland Defense (CM5): system development of common analytical laboratory system capabilities to conduct on-site analysis of any unknown sample and test potential life-threatening substances.

- Collective Protection. (CO5): system development of collectively protected systems that are smaller, lighter, less costly to produce and maintain, and more logistically supportable enabling mission accomplishment in spaces safe from the effects of CB contamination.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Chemical and Biological Defense Program	Date: May 2021
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0604384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (EMD)</i>
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- Decontamination (DE5): system development of Contamination Mitigation (ConMit) systems utilizing solutions that will remove/eliminate and/or detoxify contaminated material without damaging combat equipment, personnel, or the environment.

- Individual Protection (IP5): system development of the next generation protective ensembles (e.g., suits, boots, and gloves) and respiratory and ocular protection equipment (e.g., protective masks) which enable the Joint Force to operate in a contaminated CB environment with little or no degradation to his/her performance.

- Information Systems (IS5): system development of information architectures, applications, and cybersecurity hardening for shaping the battlespace against CB threats.

- Medical Biological Defense (MB5): product development of medical biological countermeasure platform technologies, medical biological countermeasures (vaccines and therapeutics), reagents, assays, and diagnostic equipment to provide an effective capability for medical defense against biological warfare agent threats facing U.S. Forces in the field.

- Medical Chemical Defense (MC5): product development of medical materiel and other medical equipment items (e.g., diagnostic equipment, prophylactic, pre-treatment, and therapeutic drugs, and individual/casualty decontamination compounds) necessary to provide an effective capability for medical defense against chemical warfare agent threats facing U.S. Forces in the field.

- Test and Evaluation (TE5): critical test capabilities, planning, and infrastructure improvements/modifications necessary to evaluate CB Defense systems in realistic operating environments.

The projects in this PE support the engineering and manufacturing development phase of the Department of Defense (DoD) acquisition system and are therefore correctly placed in Budget Activity 5.

B. Program Change Summary (\$ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	385.047	319.976	211.037	-	211.037
Current President's Budget	417.723	356.472	299.848	-	299.848
Total Adjustments	32.676	36.496	88.811	-	88.811
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	0.000	36.496			
• Congressional Directed Transfers	0.000	-			
• Reprogrammings	40.100	-			
• SBIR/STTR Transfer	-7.424	-			
• Other Adjustments	0.000	-	88.811	-	88.811

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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0604384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (EMD)</i>
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Congressional Add Details (\$ in Millions, and Includes General Reductions)	FY 2020	FY 2021
Project: DE5: Decontamination (SDD)		
Congressional Add: 1) <i>Decontamination Technologies - Development and Testing</i>	-	5.000
Congressional Add Subtotals for Project: DE5	-	5.000
Project: MB5: Medical Biological Defense (SDD)		
Congressional Add: 1) <i>Antiviral Prophylaxis Studies</i>	11.000	4.500
Congressional Add: 2) <i>Recombinant Botulinum and Plague Vaccines - Storage</i>	-	1.040
Congressional Add: 3) <i>Recombinant Botulinum and Plague Vaccines - Adaptive Clinical Trial</i>	-	21.456
Congressional Add: 4) <i>Recombinant Botulinum and Plague Vaccines - Stability Testing</i>	-	4.500
Congressional Add Subtotals for Project: MB5	11.000	31.496
Congressional Add Totals for all Projects	11.000	36.496

Change Summary Explanation

Funding: FY20 (+\$40.100 Million): Internal Reprogramming (FY20-31 IR) for the Coronavirus Aid, Relief, and Economic Security (CARES) Act.

FY20 (-\$7.424 Million): Transfer of funding to support Small Business Innovative Research/Small Business Technology Transfer efforts.

FY21 (+\$36.496 Million): Congressional Add for Joint vaccine for botulinum and plague vaccines funding restoration (+\$26.996 Million), Congressional Add for decontamination technologies (+\$5.000 Million), and Congressional Add for smallpox antiviral (+\$4.500 Million).

FY22 (+\$88.811 Million): Increase focuses on the Botulinum Monoclonal Antibodies (BOT MAB) advanced development program, the Countering Emerging Threats - Rapid Acquisition and Investigation of Drugs for Repurposing (CET RAIDR) program which supports continuation of CARES Act funded efforts, and the Aerosol & Vapor Chemical Agent Detector (AVCAD) advanced development program (+\$90.742 Million). Departmental inflation/travel adjustments (-\$1.931 Million).

Schedule: N/A

Technical: N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) CA5 / Contamination Avoidance (SDD)
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
CA5: Contamination Avoidance (SDD)	-	126.019	128.954	82.295	-	82.295	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

This project supports Engineering and Manufacturing Development (EMD) and Low Rate Initial Production (LRIP) of an array of reconnaissance, detection and identification equipment, and warning systems.

Efforts included in this Project are:

- (1) Aerosol & Vapor Chemical Agent Detector (AVCAD)
- (2) Multi-Phase Chemical Agent Detector (MPCAD)
- (3) Chemical Biological Radiological and Nuclear (CBRN) Sensor Integration on Robotics Platforms (CSIRP)
- (4) Enhanced Maritime Biological Detection (EMBD)
- (5) Joint Biological Tactical Detection System (JBTDS)
- (6) Joint Nuclear Biological Chemical Radiological System (JNBCRS) 1
- (7) Nuclear Biological Chemical Reconnaissance Vehicle Sensor Suite Upgrade (NBCRV SSU)
- (8) Mounted Manned Platform Radiological Detection System (MMPRDS)
- (9) Mounted Enhanced Radiac Long Range Imaging Networkable (MERLIN).
- (10) Non-Traditional Agent Defense (NTA DEFENSE)
- (11) Advanced Emerging Threat Defense (AET DEFENSE), and
- (12) Reactive Chemistry Orthogonal Surface and Environmental Threat Ticket Array (ROSETTA)

The AVCAD is a man portable system to detect aerosol and vapor chemical agents. AVCAD fills critical gaps in current Joint Force chemical sensor capabilities, in the areas of liquid, solid and dusty aerosol Chemical Warfare Agent detection, and detection of specific advanced threats/Non-Traditional Agents. The AVCAD will also detect low-level off-gassing, or residual vapors, to prevent/mitigate health effects associated with low concentration exposures, and perform remote alarm warning and reporting. AVCAD will support chemical and biological defense missions, including monitoring, collective protection, base defense, decontamination, unmasking, reconnaissance, and shipboard and aviation platform chemical detection. In FY22, AVCAD will continue chemical chamber testing and start multiple test efforts to support Multi-Service Operational Test and Evaluation.

The MPCAD is a two-man portable system that will conduct near real-time, near-laboratory grade analysis of solid, liquid, and vapor samples collected by the operator in a presumptively contaminated area. The MPCAD results will support the Commander's tactical and operational decisions regarding maneuver, protection, decontamination, and treatment measures. The Army and Marine Corps will employ MPCAD in Dismounted Reconnaissance and Site Assessment missions to substantiate presumptive detector results. The Air Force will employ the MPCAD to support Post-Event Reconnaissance in support of Reconnaissance and Surveillance

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program	Date: May 2021
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Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (EMD)</i>	Project (Number/Name) CA5 / <i>Contamination Avoidance (SDD)</i>
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missions by monitoring the environment at airbases after a chemical release. The Air Force will continuously monitor contaminated areas for chronic health effects levels through analysis of samples from collectors deployed at the contamination site and brought back to the analyzer for identification and quantification. This information will support commander decisions to determine Mission Oriented Protective Posture (MOPP) levels and eventual termination of cordon restrictions. In FY 22, MPCAD will continue two LRIP contracts, systems engineering support, complete LRIP testing and prepare for full rate production decision.

CSIRP is a prototyping and fielding effort that will focus on repackaging and integrating modular CBRN sensor solutions to enhance Unmanned Aircraft Systems (UAS) and Unmanned Ground Vehicles (UGV) to provide situational awareness across the echelons of command in order to enable freedom of maneuver and action on the battlefield. An integrated CSIRP capability will exploit advances in artificial intelligence, machine learning and autonomy, sensing and communication capabilities that enable timely and accurate detection, warning and reporting of CBRN hazards. This reduces risk at tactical and operational echelons in mounted and dismounted configurations. CSIRP gives the Joint Force an opportunity to enhance capabilities and maintain operational advantage in a lethal and sophisticated operating environment. FY22 CSIRP continues multiple sensor integration efforts for unmanned ground and air platforms for multiple Services.

The EMBD is the Navy's automated biological point detection, collection and identification system. EMBD replaces/upgrades the 135 Joint Biological Point Detection Systems (JBPDs) currently fielded to the Navy and provides 40 systems for new construction ships. EMBD improves detection sensitivity providing the Navy the ability to "detect to inform" reducing the number of contaminated ships during a biological warfare agent attack and minimizing sailor casualties. EMBD reduces false alarm rates, modernizes the computing architecture and increases reliability and sailors' confidence in the system. These improvements decrease fleet O&S costs and reduce the obsolescence issues with current biological detection capability. The EMBD program provides a lower cost biological point detection system.

The JBTDS is the first tactical lightweight, low-cost biological surveillance system to detect, collect, and identify Biological Warfare Agent (BWA) aerosols. JBTDS components are man-portable, battery operable and easy to employ by any military user. JBTDS provides notification of a hazard and enhances battle-space awareness to protect and preserve the forces and can archive a sample for follow up analysis. When networked, JBTDS augments existing biological detection systems providing a theater-wide array capable of biological detection, identification and warning to support time sensitive force protection decisions. The JBTDS provides surface sampling capability which interfaces with the JBTDS identifier to support sensitive site exploitation missions. FY22 JBTDS completes EMD and the Operational Evaluation Report (OER), finalizes development of TEMP update to support MS C, and conducts LRIP testing.

The JNBCRS 1, renamed NBCRV SSU in FY22, provides maneuver formations with the ability to conduct mounted reconnaissance and surveillance missions of CBRN named areas of interest (NAIs). The NBCRV SSU will answer the commanders' priority intelligence requirements (PIR) and facilitate proactive risk-based decisions to ensure freedom of action and survivability. A modern and capable NBCRV SSU is a critical component for Joint Force success when operating in the complex CBRN environment. Operating with combat vehicles fighting against increasingly capable and determined enemies requires like capability in protection, mobility, and lethality. The NBCRV SSU will accomplish this by integrating the capability for command and control of unmanned systems with CBRN payload. The NBCRV SSU will provide a CBRN detection, tipping and queuing system to accomplish desired standoff distances to keep the warfighter out of harm's way and reduce sustainment costs over the current system. A Chemical Surface Detector (CSD) will be developed to replace the Dual Wheel Sampling System to increase maneuver speed when conducting NBC missions and increase reliability. In FY22 the NBCRV SSU will complete Government Developmental and Operational Test to support a production decision.

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program	Date: May 2021
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Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) CA5 / Contamination Avoidance (SDD)
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The MMPRDS program includes two sets of mounted radiological and nuclear sensors: the MERLIN and the Vehicle Integrated Platform Enhanced Radiac (VIPER), both of which originate with technology transitions from the Defense Threat Reduction Agency (DTRA). MMPRDS will sunset at the end of FY20. Only the MERLIN program will be funded and complete development in FY21.

MERLIN is a set of externally mounted sensors used in joint operations on the Stryker NBCRV Sensor Suite Upgrade with the potential for integration on other Army platforms within the formation. The system supports manned and unmanned platform-mounted reconnaissance and surveillance of radiological and nuclear hazards at standoff distances. It is the first and only standoff radiological and nuclear detection capability for the Army; all previously fielded detectors require platforms to travel dangerously close to hazardous areas to detect radiological threats, which puts manned platform crews at risk of radiation exposure and presents contamination issues for the vehicle (be it manned or unmanned). The MERLIN funding in FY21 supports integration of the MERLIN system designed for the NBCRV.

The AET DEFENSE program, formerly known as the NTA DEFENSE program, continues to address the highest priority CBRN gaps and supports the Chemical Biological Defense Program (CBDP) Strategic Line of Effort to meet current and emerging threats by anticipating CB hazards and developing capabilities to counter emerging and future threats. The AET Defense program collaborates with the Joint Services, interagency, and international partners to align RDT&E resources to determine readiness against emerging threats, to include NTAs, such as Novichoks and Pharmaceutical-Based Agents (PBA) (e.g. synthetic opioids), emerging biological threats, and other advanced and emerging threats as they are identified across the entire CBDP enterprise portfolio. NTA DEFENSE efforts transition to the AET DEFENSE program in FY22 to better align with strategic guidance and expand to threats beyond those identified specifically as NTAs. In FY22, AET Defense continues to broaden data set for emerging biological threats and PBSs to better assess detection and decontamination capabilities.

The ROSETTA is a modernization effort to provide a higher confidence chemical hazard detection tickets in the currently fielded M256A2 kit for the Warfighter to make timely decisions for the general forces. These decisions will reduce casualties and improve the combat effectiveness of troops engaged in conflicts involving the use of chemical threats. ROSETTA is based on colorimetric technologies and will be eye-readable and ease the Warfighter from current training and operational burden. In addition, the ROSETTA tickets will provide improved hazard detection performance with reduced false alarm rate, potential for increased number of chemicals detected, reduced detection time especially for compounds of interest (CWAs, PBAs, NTAs and TICs), and potential for integration onto unmanned platforms especially micro-sized unmanned aerial sensors. In FY22, ROSETTA will continue program management and transition to TACOM including initial 12 month supply of M8 tickets.

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Title: 1) Aerosol & Vapor Chemical Agent Detector (AVCAD)</p> <p>Description: Product Development</p> <p>FY 2021 Plans: Continue EMD development contracts, Systems Engineering, and other IPTs for product development of AVCAD and award LRIP long lead items.</p> <p>FY 2022 Plans:</p>	14.626	17.343	12.745

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) CA5 / Contamination Avoidance (SDD)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
Completion of EMD Phase of development contracts and initiation of P&D Phase of Development contracts pending MS C decision. Continue Systems Engineering and other IPTs for product development of AVCAD. FY 2021 to FY 2022 Increase/Decrease Statement: Program/project transitioned to Production and Deployment Phase. Post-MS C decision contract support to complete EMD DT, OA and purchase LRIP Long Leads in FY21				
Title: 2) Aerosol & Vapor Chemical Agent Detector (AVCAD) Description: Test and Evaluation FY 2021 Plans: Continue chemical chamber testing, conduct multiple test requirements to support operational assessment in support of Milestone C decision. FY 2022 Plans: Initiate and complete LRIP chemical chamber testing, conduct multiple test requirements to support Multi-Service Operational Test and Evaluation. FY 2021 to FY 2022 Increase/Decrease Statement: Decrease due to change in program/project technical parameters. Complete remainder of EMD Record DT, and execute OA.		6.801	6.955	5.133
Title: 3) Aerosol & Vapor Chemical Agent Detector (AVCAD) Description: Program Management Support FY 2021 Plans: Continue Program Management including program/financial management, costing, travel and overhead. FY 2022 Plans: Continue Program office management and administration processes to include but not limited to program oversight, resource justification, budgeting and programming, milestone and schedule tracking. FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.		2.007	4.585	3.441
Title: 4) Aerosol & Vapor Chemical Agent Detector (AVCAD) Description: Support Costs - OGA Support costs for logistics, test evaluation results and safety and reliability. FY 2021 Plans:		-	2.164	1.250

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) CA5 / Contamination Avoidance (SDD)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
EMD support for Milestone C. FY 2022 Plans: Continue OGA Support for logistics and test evaluation results in support of MS C decision. FY 2021 to FY 2022 Increase/Decrease Statement: Program/project transitioned to Production and Deployment Phase.				
Title: 5) Multi-Phase Chemical Agent Detector (MPCAD) Description: Product Development FY 2021 Plans: Continue two EMD contract(s), Government and contracted Integrated Product Development team, systems engineering and IPT Support. Conduct Milestone C / Low Rate Initial Production (LRIP) and purchase 15 test articles to conduct LRIP testing and operational testing in FY22. FY 2022 Plans: Continue two LRIP contracts, Government and contracted Integrated Product Development team, systems engineering and IPT Support. Purchase an additional 15 items at \$200K each to complete LRIP testing. FY 2021 to FY 2022 Increase/Decrease Statement: Program/project transitioned to Production and Deployment Phase.		24.045	18.800	4.503
Title: 6) Multi-Phase Chemical Agent Detector (MPCAD) Description: Testing FY 2021 Plans: Continue EMD testing started in FY20. Continue OGA support of development and testing of MPCAD systems including development of logistics products, test plans, and reports. FY 2022 Plans: Complete LRIP testing and prepare for full rate production decision. Continue OGA support of development and testing of MPCAD systems including development of logistics products, test plans, and reports. FY 2021 to FY 2022 Increase/Decrease Statement: Program/project transitioned to Production and Deployment Phase.		4.188	10.658	4.035
Title: 7) Multi-Phase Chemical Agent Detector (MPCAD)		5.052	4.499	2.216

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) CA5 / Contamination Avoidance (SDD)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
<p>Description: Program Management Support</p> <p>FY 2021 Plans: Continue Program Management including Government system engineering, program/financial management, costing, personnel support, travel and overhead.</p> <p>FY 2022 Plans: Continue Program office management and administration processes to include but not limited to program oversight, resource justification, budgeting and programming, milestone and schedule tracking.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program/project transitioned to Production and Deployment Phase.</p>				
<p>Title: 8) CBRN Sensor Integration onto Robotic Platforms (CSIRP)</p> <p>Description: Product Development, Program Management, Test and Evaluation and Support.</p> <p>FY 2021 Plans: Transition from BA4. Continue multiple sensor integration efforts for unmanned ground and air platforms. Continue coordination of demonstrations and test events for end users evaluating the capabilities of the integrated sensors onto the Unmanned Air Systems (UAS) and Unmanned Ground Vehicles (UGV). Program management including government system engineering, program/financial management, costing, personnel support, travel and overhead. Initiate evaluation of capability and development of CONOPS.</p> <p>FY 2022 Plans: Prototype #2 will continue multiple sensor integration efforts to improve on Prototype #1 for unmanned ground and air platforms for multiple services. Continue coordination of demonstrations and test events for additional service end users evaluating the capabilities of the integrated sensor prototypes onto the Unmanned Air Systems (UAS) and Unmanned Ground Vehicles (UGV). Continue Program office management and administration processes to include but not limited to program oversight, resource justification, budgeting and programming, milestone and schedule tracking. Initiate evaluation of capability and development of CONOPS.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program/project transitioned to Advanced Development. BA4 funding ends in FY21 and program fully transitions to BA5 to continue efforts on robotic integration.</p>		-	11.251	16.581
<p>Title: 9) EMBD</p>		5.814	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) CA5 / Contamination Avoidance (SDD)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
Description: Product Development			
Title: 10) EMBD Description: Program management support and Test & Evaluation	7.078	-	-
Title: 11) JBTDS Description: EMD Contract & Program Management FY 2021 Plans: Continue Government systems engineering, program/financial management, and costing in support of the JBTDS program. Continue EMD contract to support testing events. Complete EMD testing and prepare for milestone C decision. FY 2022 Plans: Continue program office management and administration processes to include but not limited to program oversight, resource justification, budgeting and programming, milestone and schedule tracking. Conduct failure analysis and corrective action of issues identified in EMD testing. Complete preparation of MS C documents, negotiate and award LRIP contract. Conduct a Milestone C decision and move into Low Rate Initial Production (LRIP). FY 2021 to FY 2022 Increase/Decrease Statement: Program/project transitioned to Production and Deployment Phase. BA5 funding decreases in FY22 as program completes EMD and prepares for MS C.	6.856	6.887	1.620
Title: 12) JBTDS Description: Test & Evaluation FY 2021 Plans: Continue combat developer and test support. Complete EMD testing which include Detector/Collector aerosol agent testing, agent identification testing, collector characterization, false alarm testing, Mil-STD, interoperability, outdoor simulant testing, logistics demonstration, operational assessment, cyber adversarial assessment, and modeling and simulation. Continue updates to the JBTDS Test & Evaluation Master Plan (TEMP) to prepare for milestone C decision. FY 2022 Plans:	8.033	7.175	5.767

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) CA5 / Contamination Avoidance (SDD)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Complete Engineering Manufacturing and Development (EMD) and Operational Evaluation Report (OER). Finalizing development of TEMP update to support MS C. Conduct Low Rate Initial Production (LRIP) testing, continue combat developer and test community support.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program/project transitioned to Production and Deployment Phase. BA5 funding decreases in FY22 as program completes EMD and prepares for MS C.</p>			
<p>Title: 13) JNBCRS 1 (NBCRV SSU)</p> <p>Description: CBRN Sensor Development and Integration</p> <p>FY 2021 Plans: Continue CBRN sensor and integrated sensor suite prototype development, maturation, and procurement. Continue government strategic planning, systems engineering, logistics, training, test and evaluation, technical support, and the bulk of integration product development for the acceleration of the program. Conduct system level development testing.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program/project funding transferred to another funding line. In FY22, funding line will be renamed NBCRV SSU.</p>	24.095	22.789	-
<p>Title: 14) JNBCRS 1 (NBCRV SSU)</p> <p>Description: Program Management Support</p> <p>FY 2021 Plans: Continue Program Management including Government system engineering, program/financial management, costing, personnel support, travel and overhead.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program/project funding transferred to another funding line. In FY22, funding line will be renamed NBCRV SSU.</p>	4.227	4.073	-
<p>Title: 15) NBCRV SSU</p> <p>Description: CBRN Sensor Development and Integration</p> <p>FY 2022 Plans:</p>	-	-	17.714

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) CA5 / Contamination Avoidance (SDD)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
<p>Continue CBRN sensor and integrated sensor suite prototype development, maturation, and procurement. Continue government strategic planning, systems engineering, logistics, training, test and evaluation, technical support, integration, and the bulk of component and system level developmental testing. Conduct Limited User Test.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program/project funding transferred from another funding line. In FY22 the program name will change from JNBCRS 1 to NBCRV SSU.</p>				
<p>Title: 16) NBCRV SSU</p> <p>Description: Program Management Support</p> <p>FY 2022 Plans: Continue program office management and administration processes to include but not limited to program oversight, resource justification, budgeting and programming, milestone and schedule tracking.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program/project funding transferred from another funding line. In FY22 the program name will change from JNBCRS 1 to NBCRV SSU</p>		-	-	3.627
<p>Title: 17) Mounted Manned Platform Radiological Detection System (MMPRDS)</p> <p>Description: Capability Development (Vehicle Integrated Platform Enhanced Radiac (VIPER) and Mounted Enhanced Radiac Long Range Imaging Networkable (MERLIN))</p>		5.705	-	-
<p>Title: 18) Mounted Enhanced Radiac Long Range Imaging Networkable (MERLIN)</p> <p>Description: Risk reduction efforts for integration onto Army platforms.</p> <p>FY 2021 Plans: Initiate contract to begin integration kit design to mount MERLIN onto Army platforms in the formation.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program/project is entering completion and all activities will be closed.</p>		-	1.294	-
<p>Title: 19) NTA Defense</p> <p>Description: Program Management, Product Development, Support, and Testing of technologies that have been demonstrated to be TRL 6 or higher in order to rapidly field solutions to combat emerging threats.</p> <p>FY 2021 Plans:</p>		2.762	3.679	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) CA5 / Contamination Avoidance (SDD)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
Continue purchase of detection prototypes for user assessment. Continue performance assessment of existing capabilities against PBAs. Finalize development of prototype decontamination system. FY 2021 to FY 2022 Increase/Decrease Statement: Program/project funding transferred to another funding line. NTA Defense funding and efforts will be continued under the AET Defense funding line. The purpose of the AET Defense program remains the same as that of the NTA Defense program, though the scope of threats being addressed has expanded from just NTAs to other advanced and emerging threats in order to better align with strategic guidance.				
Title: 20) NTA Defense Description: Government Integrated Product Team program management and IPT Support.		0.751	-	-
Title: 21) Advanced Emerging Threat (AET) Defense Description: Program Management, Product Development, Support, and Testing of technologies that have been demonstrated to be TRL 6 or higher in order to rapidly field solutions to combat emerging threats. FY 2022 Plans: Continue efforts from NTA Defense to leverage expanded requirements to broaden data set for emerging biological threats and PBAs. Produce additional data to better assess detection and decontamination capabilities against new requirements and inform rapid fielding decisions. Conduct table top exercises and field exercises to support Joint Service and interagency tactics, techniques, and procedures (TTP) development and gap analysis for materiel solutions. Assess potential upgrades to systems in the Engineering and Manufacturing Development (EMD) phase of acquisitions to add emerging threat capability prior to or shortly after fielding. FY 2021 to FY 2022 Increase/Decrease Statement: Program/project funding transferred from another funding line. AET Defense is a continuation of NTA Defense funding and efforts. The purpose of the AET Defense program remains the same as that of the NTA Defense program, though the scope of threats being addressed has expanded from just NTAs to other advanced and emerging threats in order to better align with strategic guidance.		-	-	2.626
Title: 22) ROSETTA (M8) Description: Program Management, Product Development, T&E, Support, Technical Assessment to modernize the M256A2 Vapor Card. FY 2021 Plans:		3.979	6.802	1.037

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
Continue OTA contract and complete testing of ROSETTA M8 prototypes, support operational demonstrations of prototypes and development of technical data package for transition to production.			
FY 2022 Plans: Continue program management and transition to TACOM including initial 6 month supply of ROSETTA M8 tickets.			
FY 2021 to FY 2022 Increase/Decrease Statement: Program/project funding transferred to another funding line. ECP to existing M256A2 kit. Rosetta efforts continue in BA7 (Project CA7) in FY22.			
Accomplishments/Planned Programs Subtotals	126.019	128.954	82.295

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• CA4: Contamination Avoidance (ACD&P)	18.806	10.326	32.923	-	32.923	-	-	-	-	-	-
• JF0100: JOINT CHEMICAL AGENT DETECTOR (JCAD)	2.246	0.000	0.000	-	0.000	-	-	-	-	-	-
• MC0100: JOINT NBC RECONNAISSANCE SYSTEM (JNBCRS)	1.900	0.000	0.000	-	0.000	-	-	-	-	-	-
• MC0101: CBRN DISMOUNTED RECONNAISSANCE SYSTEMS (CBRN DRS)	58.020	52.393	21.799	-	21.799	-	-	-	-	-	-
• MX0001: JOINT BIO TACTICAL DETECTION SYSTEM (JBTDs)	0.000	0.000	17.060	-	17.060	-	-	-	-	-	-
• SA0015: AEROSOL VAPOR CHEMICAL AGENT DETECTOR (AVCAD)	0.000	0.000	0.000	-	0.000	-	-	-	-	-	-
• SA0017: MULTIPHASE CHEMICAL AGENT DETECTOR (MPCAD)	0.000	0.000	9.302	-	9.302	-	-	-	-	-	-

Remarks

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
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D. Acquisition Strategy

AEROSOL VAPOR CHEMICAL AGENT DETECTOR (AVCAD)

Aerosol & Vapor Chemical Agent Detector (AVCAD) awarded two MS B Engineering and Manufacturing Development (EMD) contracts with production options. The AVCAD program is conducting full EMD DT Record Testing in support of the Milestone C decision. If supported by EMD Test Data and funding, the program may conduct P&D phase testing with LRIP units from both vendors to promote FRP price competition.

MULTI-PHASE CHEMICAL AGENT DETECTOR (MPCAD)

The Multi-Phase Chemical Agent Detector (MPCAD) (formerly NGCD 3) is using a streamlined acquisition strategy. The MPCAD contract(s) are utilizing the Countering Weapons of Mass Destruction (CWMD) Other Transaction Authority (OTA) for EMD and LRIP items. The MPCAD will procure production items through a follow-on Federal Acquisition Regulation based contract. The program will develop and validate the systems during EMD and LRIP utilizing two contractors to increase competition.

CBRN SENSOR INTEGRATION ON ROBOTIC PLATFORMS (CSIRP)

CSIRP is a streamlined acquisition effort to rapidly prototype and field capabilities distinct from the traditional acquisition system. CSIRP will provide unmanned CBRN payload prototypes in 2-3 year prototyping plan cycles based on service requirements. The prototyping plans will utilize a streamlined acquisition process in order to keep pace with industry and the rapid advancement of technologies. The CSIRP strategy is to utilize the rapid prototyping process enabled by the Other Transactional Agreements (OTA) contract vehicle. Upon award, the awardees will have up to two years to produce prototype sensors that are integrated onto service chosen (air and/or ground) platforms. These prototypes will be demonstrated, evaluated and tested by the Services as well as laboratories and academia. The most successful will be transitioned to the services for the next steps in acquisition, production and eventual fielding across the services. BA4 funding will provide market research to support the refinement and the building of technologically mature prototypes. BA5 funding will provide demonstrations, testing and operational assessments of prototypes to support transition decisions and final configurations to POR or sustained capability.

ENHANCED MARITIME BIOLOGICAL DETECTION (EMBD)

The Enhanced Maritime Biological Detection (EMBD) program uses a streamlined acquisition strategy and acquired a Milestone B decision in June 2018. EMBD will replace/upgrade 135 Joint Biological Point Detection Systems (JBPDS) in the Navy and provide 40 systems for new construction ships. In July 2018 EMBD awarded a contract through Joint Enterprise Research, Development, Acquisition and Production/Procurement (JE-RDAP) contract for Engineering and Manufacturing Development (EMD) with options for Low Rate Initial Production (LRIP) in FY20. EMBD plans to award a Full Rate Production contract in FY21 with options for production of EMBD kits and Obsolescence Support in Production (OSIP). OSIP will address obsolescence concerns that may arise during the production of the EMBD kit.

JOINT BIO TACTICAL DETECTION SYSTEM (JBTDS)

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The Joint Biological Tactical Detection System (JBTDSD) program awarded a full and open contract to Chemring Sensors and Electronic Systems (CSES) in the 3rd Quarter of FY15 for Engineering and Manufacturing Development (EMD) with options for Low Rate Initial Production (LRIP) and Full Rate Production (FRP). The JBTDSD program uses an evolutionary acquisition strategy. Under this approach, capability is developed based on current technologies, recognizing up front the need for potential technology insertion as technology advances to provide better and more cost effective capabilities. Technology insertions will provide militarily useful and supportable operational capabilities that can be developed, produced, deployed, and sustained. Based on the results at Biological Point System Assessment (BPSA), JBTDSD selected integration with the TacBio2 as the detector and Joint Handheld Biological Identifier (JHBI) as the identification capability. These technologies will offer significant production and O&S cost savings.

JOINT NBC RECONNAISSANCE SYSTEM - STRYKER (JNBCRS)

Joint Nuclear Biological Chemical Radiological System (JNBCRS), includes the Stryker Nuclear Biological Chemical Reconnaissance Vehicle Sensor Suite Upgrade (NBCRV SSU). The acquisition strategy for the Stryker NBCRV SSU is to integrate mature sensors into the Stryker NBCRV to support the Joint Modernization Focused Assessment and system level testing. Following the testing and demonstration, the hardware and software will be fixed and updated for government developmental and operational testing. The Joint Modernization Command Focused Assessment will provide user feedback and operational data to support programmatic and technical decisions. An In Progress Review will be held after the Joint Modernization Command Focused Assessment and system testing to approve a Production Decision and Modification Work Order for fielding. The production and fielding are funded using Army funds. This schedule was accelerated from the previous schedule based on the maturity of the sensor and guidance from the Chief of Staff of the Army.

NBCRV SSU (NBCRV SSU)

Joint Nuclear Biological Chemical Radiological System (JNBCRS), includes the Stryker Nuclear Biological Chemical Reconnaissance Vehicle Sensor Suite Upgrade (NBCRV SSU). The acquisition strategy for the Stryker NBCRV SSU is to integrate mature sensors into the Stryker NBCRV to support Joint Warfighter Assessment 2020 and system level testing. Following the testing and demonstration, the hardware and software will be fixed and updated for government developmental and operational testing. The Joint Warfighter Assessments will provide user feedback and operational data to support programmatic and technical decisions. An In Progress Review will be held after Joint Warfighter Assessment 2020 and system testing to approve a Production Decision and Modification Work Order for fielding. The production and fielding are funded using Army funds. This schedule was accelerated from the previous schedule based on the maturity of the sensor and guidance from the Chief of Staff of the Army.

MOUNTED MANNED PLATFORM RADIOLOGICAL DETECTION SYSTEM (MMPRDS)

The MMPRDS program continued development of the VIPER and MERLIN radiological/nuclear sensor technologies originally developed by the Defense Threat Reduction Agency (DTRA). Sensor development and testing continued in FY20 using separate Countering Weapons of Mass Destruction (CWMD) Other Transaction Authority (OTA) for VIPER and MERLIN. The program awarded a MERLIN production contract in FY20 to support production verification testing, advanced vehicle integration, and initial/rapid fielding to the Joint Nuclear Biological and Chemical Reconnaissance Systems (JNBCRS) sensor suite upgrade platform under conditional

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<p>materiel release. MMPRDS will sunset at the end of FY20 and transition to a separate line of effort for MERLIN. MERLIN will complete development in FY21 and deliver systems to the NBCRV SSU program.</p> <p>MOUNTED ENHANCED RADIAC LONG RANGE IMAGING NETWORKABLE (MMPRDS MERLIN)</p> <p>The MERLIN BA5 line covers risk reduction efforts for the possible integration of the MERLIN system onto other Army platforms within the formation. The work will be accomplished through competition using an Other Transaction Authority (OTA) utilizing the Countering Weapons of Mass Destruction (CWMD) OTA.</p> <p>NON TRADITIONAL AGENT DEFENSE (NTA DEFENSE)</p> <p>The NTA Defense program will use a variety of acquisition approaches to survey, develop, assess, and rapidly field technologies to inform and fill NTA gaps. The program will utilize an existing Multiple Award Indefinite Delivery Indefinite Quantify Task Order Contract to provide technical support to studies and assessments of performance against emerging threats. For Program of Record (PoR) systems currently in development that will be assessed for performance against NTAs, those PoR's existing contracts will be modified to incorporate development engineering and test support for additional NTA capability. The NTA Defense program will utilize OTAs for system development and prototyping activities and Government Agencies and Federally Funded Research and Development Centers to provide development, testing and technical support.</p> <p>ADVANCED AND EMERGING THREAT DEFENSE (AET DEFENSE)</p> <p>The AET Defense program will use a variety of acquisition approaches to survey, develop, assess, and rapidly field technologies to inform and fill advanced and emerging threat gaps. The program will utilize an existing Multiple Award Indefinite Delivery Indefinite Quantify Task Order Contract to provide technical support to studies and assessments of performance against emerging threats. For Program of Record (PoR) systems currently in development that will be assessed for performance against emerging threats, those PoR's existing contracts will be modified to incorporate development engineering and test support for emerging threat capability. The AET Defense program will utilize OTAs for system development and prototyping activities and Government Agencies and Federally Funded Research and Development Centers to provide development, testing and technical support. BA5 activities focus on engineering and manufacturing of technologies that have demonstrated TRL 6 or higher.</p> <p>REACTIVE CHEMISTRY ORTHOGONAL SURFACE AND ENVIRONMENTAL THREAT TICKET ARRAY (ROSETTA)</p> <p>ROSETTA will use a streamlined approach to rapidly field multiple modernizations of currently fielded components of the M256 kit via engineering change proposals (ECPs). This approach is based on technology that will transition from Science and Technology Efforts and/or commercial off the shelf (COTS) products to the M256 kit. These efforts will utilize multiple contract vehicles including Countering Weapons of Mass Destruction (CWMD) OTA and JERDAP in order to streamline the acquisition of the products. The ROSETTA funding completed the acquisition of the M8 component to the M256 kit and will support the acquisition of a PBA ticket, the M256 vapor unmasking tool, and the other NTAs and TICs. These products will be transitioned to TACOM for production and sustainment.</p>		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) CA5 / Contamination Avoidance (SDD)
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
AVCAD - HW S - P&D Contract- Chemring	C/CPIF	Chemring Detection Systems : Inc., Charlotte, NC	1.719	5.724	Oct 2019	6.104	Jun 2021	5.750	Nov 2021	0.000		5.750	0.000	19.297	0.000
AVCAD - HW S - P&D Contract- Smiths Detection	C/CPIF	Smiths Detection : Edgewood, MD	4.801	8.358	Oct 2019	9.185	Jun 2021	5.750	Nov 2021	0.000		5.750	0.000	28.094	0.000
AVCAD - HW P&D - Government Product Development Team Labor (core, matrix & contract services)	MIPR	Various : Various	1.657	0.511		2.054	Nov 2020	1.303	Nov 2021	0.000		1.303	0.000	5.525	0.000
MPCAD - PM/MS S - Government Product Development Team Labor	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	1.686	1.987	Jan 2020	2.289	Nov 2020	1.329	Nov 2021	0.000		1.329	0.000	7.291	0.000
MPCAD - HW S - EMD Contract - FLIR	C/CPFF	FLIR Systems : Inc., West Lafayette, IN	4.678	9.974	Mar 2020	7.868	Dec 2020	1.487	Dec 2021	0.000		1.487	0.000	24.007	0.000
MPCAD - HW S - EMD Contract - Sig Sci	C/CPFF	Signature Science : Austin, TX	11.995	11.876	Mar 2020	8.443	Dec 2020	1.487	Dec 2021	0.000		1.487	0.000	33.801	0.000
MPCAD - HW C - Contractor Product Development Team Labor	C/FFP	Kalman & Company Inc. : Virginia Beach, VA	0.000	0.208	Nov 2019	0.200	Feb 2021	0.200	Dec 2021	0.000		0.200	0.000	0.608	0.000
CSIRP - HW C - Chem Sensor Design	Various	Various : Various	0.000	0.000		1.050	Apr 2021	8.100	Nov 2021	0.000		8.100	0.000	9.150	0.000
CSIRP - SW C - Sensor Integration	C/CPFF	Charles Stark Draper Laboratories : Inc., Cambridge, MA	0.000	0.000		2.100	Mar 2021	0.000		0.000		0.000	0.000	2.100	0.000
CSIRP - HW C - UAS Manufacturing and design	MIPR	Various : Various	0.000	0.000		0.760	Apr 2021	0.000	Nov 2021	0.000		0.000	0.000	0.760	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) CA5 / Contamination Avoidance (SDD)
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CSIRP - SW C - UAS and Sensor Manufacturing and Design	C/CPFF	T2S Solutions (T2S : LLC), Belcamp, MD	0.000	0.000		1.225	Mar 2021	0.000		0.000		0.000	0.000	1.225	0.000
CSIRP - HW C - HW C RN Sensor Prototype and Integration	C/FFP	Radiation Monitoring Devices : Inc, Boston, MA	0.000	0.000		0.730	Apr 2021	0.000		0.000		0.000	0.000	0.730	0.000
CSIRP - HW C - Government Product Development Team Labor	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	0.000	0.000		1.335	Mar 2021	1.901	Nov 2021	0.000		1.901	0.000	3.236	0.000
CSIRP - HW C - Chemical sensor Prototype and Integration	C/FFP	Intelligent Optical Systems (IOS) : Torrance, CA	0.000	0.000		1.040	Mar 2021	1.000	Nov 2021	0.000		1.000	0.000	2.040	0.000
CSIRP - HW C - Contractor Product Development Team Labor	C/FFP	Patricio Enterprises : Inc., Woodbridge, VA	0.000	0.000		0.016	Apr 2021	0.000		0.000		0.000	0.000	0.016	0.000
EMBD - HW S - Product Development Support	MIPR	Various : Various	2.957	1.227	Mar 2020	0.000		0.000		0.000		0.000	0.000	4.184	0.000
EMBD - HW S - Contractor Product Development Team labor	C/FFP	Patricio Enterprises : Inc., Woodbridge, VA	0.216	0.478	Feb 2020	0.000		0.000		0.000		0.000	0.000	0.694	0.000
EMBD - HW C - Prototype Development	FFRDC	MA Institute of Tech - Lincoln Labs (MIT-LL) : Lexington, MA	2.980	0.150	Feb 2020	0.000		0.000		0.000		0.000	0.000	3.130	0.000
EMBD - HW S - Prototype Development and Manufacturing	C/CPIF	Chemring Detection Systems : Inc., Charlotte, NC	13.397	3.959	Feb 2020	0.000		0.000		0.000		0.000	0.000	17.356	0.000
JBTDS - HW C - LRIP Contract Award	C/CPIF	Chemring Sensors & Electronic Systems : Charlotte, NC	0.000	0.000		0.000		0.423	Jun 2022	0.000		0.423	0.000	0.423	0.000

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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
JBTDS - Product Development	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	0.594	0.353	Nov 2019	0.200	Jan 2021	0.206	Jan 2022	0.000		0.206	0.000	1.353	0.000
JBTDS - HW SB - Prototype Development	C/CPFF	ATI Solutions : Inc., Tysons Corner, VA	3.500	0.246	Nov 2019	0.000		0.000		0.000		0.000	0.000	3.746	0.000
JBTDS - HW GFPR - LRIP Test Hardware	C/CPFF	Army Contracting Command : Natick, MA	0.000	0.000		0.000		0.654	Jun 2022	0.000		0.654	0.000	0.654	0.000
JBTDS - HW - EMD Contract Award	C/CPIF	Chemring Detection Systems : Inc., Charlotte, NC	31.614	3.340	Nov 2019	1.337	Feb 2021	0.000		0.000		0.000	0.000	36.291	0.000
JBTDS - Cotractor Product Development Team labor	C/FFP	Patricio Enterprises : Inc., Woodbridge, VA	1.452	0.132	Feb 2020	0.299	Feb 2021	0.000		0.000		0.000	0.000	1.883	0.000
JBTDS - Government Product Development Team Labor	MIPR	Various : Various	22.313	2.886	Nov 2019	2.966	Nov 2020	1.197	Nov 2021	0.000		1.197	0.000	29.362	0.000
JNBCRS 1 - SW C Integration	C/FFP	FLIR Systems Inc. : Elkridge, MD	7.957	11.318	Nov 2019	14.549	Nov 2020	0.000		0.000		0.000	0.000	33.824	0.000
JNBCRS 1 - HW C - Chemical Surface Detector Development	C/CPFF	Various : Various	0.000	1.932	Jul 2020	1.600	Nov 2020	0.000		0.000		0.000	0.000	3.532	0.000
JNBCRS 1 - HW C - Government Product Development Team Labor	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	2.496	1.324	Nov 2019	1.835	Nov 2020	0.000		0.000		0.000	0.000	5.655	0.000

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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
JNBCRS 1 - HW-Sensor Suite Development	Various	Various : Various	7.845	0.000		0.606	Nov 2020	0.000		0.000		0.000	0.000	8.451	0.000
JNBCRS 1 - HW C - Contractor Team Labor	C/FFP	Various : Various	0.000	1.101	Feb 2020	0.704	Feb 2021	0.000		0.000		0.000	0.000	1.805	0.000
JNBCRS 1 - HW C - UAV CBRN Sensor Development	C/CPFF	Various : Various	0.000	2.900	Feb 2020	0.000		0.000		0.000		0.000	0.000	2.900	0.000
NBCRV SSU - Contractor Team Labor	C/FFP	Various : Various	0.000	0.000		0.000		0.260	Feb 2022	0.000		0.260	0.000	0.260	0.000
NBCRV SSU - Chemical Surface Detector Development	C/CPFF	TBD : N/A	0.000	0.000		0.000		1.000	Feb 2022	0.000		1.000	0.000	1.000	0.000
NBCRV SSU - Integration	C/FFP	FLIR Systems Inc. : Elkridge, MD	0.000	0.000		0.000		6.991	Nov 2021	0.000		6.991	0.000	6.991	0.000
NBCRV SSU - Government Product Development Team Labor	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	0.000	0.000		0.000		0.951	Nov 2021	0.000		0.951	0.000	0.951	0.000
MMPRDS - HW C - Government SE Product Development Team Labor	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	0.000	0.800	Nov 2019	0.000		0.000		0.000		0.000	0.000	0.800	0.000
MMPRDS - HW S - Product Development	Various	Various : Various	0.000	0.762	May 2020	0.000		0.000		0.000		0.000	0.000	0.762	0.000
MMPRDS - HW C MERLIN System Refinement	C/CPFF	H3D INC : Ann Arbor, MI	0.793	1.792	Nov 2019	0.000		0.000		0.000		0.000	0.000	2.585	0.000

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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
MMPRDS - HW C - VIPER System Refinement	C/CPFF	Spectral Labs Inc. : San Diego, CA	0.750	1.178	Nov 2019	0.000		0.000		0.000		0.000	0.000	1.928	0.000
MERLIN - HW C - Army Platform Integration Kit Development	C/CPFF	TBD : N/A	0.000	0.000		0.784	Nov 2020	0.000		0.000		0.000	0.000	0.784	0.000
MERLIN - HW C - Government Product Development Team Labor	MIPR	CCDC CBC : Aberdeen Proving Ground, MD	0.000	0.000		0.330	Nov 2020	0.000		0.000		0.000	0.000	0.330	0.000
NTA DEFENSE - HW C - Systems Prototyping & Development	C/FFP	ATI Solutions : Inc., Tysons Corner, VA	0.000	1.362	Feb 2020	0.000		0.000		0.000		0.000	0.000	1.362	0.000
NTA DEFENSE - HW C - Systems Prototyping & Development #2	C/CPFF	Various : Various	0.000	0.815	Mar 2020	0.671	Dec 2020	0.000		0.000		0.000	0.000	1.486	0.000
AET DEFENSE - SW C - Prototyping and Modification	Various	Various : Various	0.000	0.000		0.000		0.931	Jan 2022	0.000		0.931	0.000	0.931	0.000
AET DEFENSE - HW S - System Prototyping and Modification	Various	Various : Various	0.000	0.000		0.000		0.178	Dec 2021	0.000		0.178	0.000	0.178	0.000
AET DEFENSE - HW S - Emerging threat detection/ decontamination/protection capability engineering development	Various	Various : Various	0.000	0.000		0.000		0.191	Dec 2021	0.000		0.191	0.000	0.191	0.000
ROSETTA - HW C - Product Development	C/FFP	ATI Solutions : Inc., Tysons Corner, VA	1.512	1.224	Jul 2020	1.278	Jul 2021	0.000		0.000		0.000	0.000	4.014	0.000
ROSETTA - HW C - Government Product Development Core Team Labor	MIPR	JPM CBRN Sensors : JPEO-CBRND, Aberdeen Proving Ground, MD	0.000	0.277	Feb 2020	0.300	Nov 2021	0.054	Nov 2022	0.000		0.054	0.000	0.631	0.000
ROSETTA - HW C - Government Product	MIPR	U.S. Army Combat Capabilities Development	0.128	0.597	Feb 2020	0.937	Nov 2021	0.680	Nov 2022	0.000		0.680	0.000	2.342	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Development Team Matrix Labor		Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD													
ROSETTA - HW C - Contractor Product Development Team Labor	C/CPFF	Battelle Memorial Institute : Columbus, OH	0.000	0.000		0.075	Dec 2020	0.000		0.000		0.000	0.000	0.075	0.000
Subtotal			127.040	78.791		72.870		42.023		0.000		42.023	0.000	320.724	N/A

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
AVCAD - ES C - ALD support (Logistics & Packaging)	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	0.000	0.212	Dec 2019	0.000		0.000		0.000		0.000	0.000	0.212	0.000
AVCAD - Non-test OGA support	MIPR	Various : Various	0.000	0.000		2.164	Jan 2021	0.000		0.000		0.000	0.000	2.164	0.000
AVCAD - ES P&D - ALD, ISA & TACOM Support	MIPR	Various : Various	0.000	0.000		0.000		1.250	Nov 2021	0.000		1.250	0.000	1.250	0.000
CSIRP - ES C - Eng support	Various	Various : Various	0.000	0.000		0.406	Apr 2021	1.450	Nov 2021	0.000		1.450	0.000	1.856	0.000
EMBD - ES S - Test Planning Support	MIPR	Navy Operational Test and Eval Force (OPTEVFOR) : Norfolk, VA	0.389	0.342	Feb 2020	0.000		0.000		0.000		0.000	0.000	0.731	0.000
EMBD - ES C - Service Support	MIPR	Naval Surface Warfare Center	1.521	0.359	Feb 2020	0.000		0.000		0.000		0.000	0.000	1.880	0.000

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Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
		(NSWC) - Dahlgren Center : Dahlgren, VA													
EMBD - ES - OTA/OGA Service Representation	MIPR	Various : Various	0.000	0.636	Mar 2020	0.000		0.000		0.000		0.000	0.000	0.636	0.000
JBTDS - ES - Engineering Support	MIPR	Various : Various	0.000	1.166	Mar 2020	0.297	Nov 2020	0.494	Jun 2022	0.000		0.494	0.000	1.957	0.000
JBTDS - ES - Engineering Support #2	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	2.635	0.000		0.620	Jan 2021	0.000		0.000		0.000	0.000	3.255	0.000
JBTDS - ES - Biosensor Calibration Effort	MIPR	Naval Research Lab (NRL) : Washington, DC	2.781	0.078	Nov 2019	0.000	Mar 2021	0.000		0.000		0.000	0.000	2.859	0.000
JBTDS - ES - OTA/OGA Service Representation	MIPR	Various : Various	11.149	2.229	Nov 2019	1.071	Jan 2021	0.000		0.000		0.000	0.000	14.449	0.000
JNBCRS 1 - ES C - Stryker NBCRV Maintenance	Various	Various : Various	0.000	0.268	Dec 2019	0.200	Feb 2021	0.000		0.000		0.000	0.000	0.468	0.000
JNBCRS 1 - ES - Engineering Support	MIPR	Various : Various	2.445	0.373	Nov 2019	0.251	Nov 2020	0.000		0.000		0.000	0.000	3.069	0.000
JNBCRS 1 - ES C - Contract and Product Support	Various	Various : Various	0.000	1.068	Feb 2020	1.214	Dec 2020	0.000		0.000		0.000	0.000	2.282	0.000
JNBCRS 1 - ILS C - Logistics Support	C/FFP	Various : Various	0.000	1.893	Mar 2020	0.560	Nov 2020	0.000		0.000		0.000	0.000	2.453	0.000
NBCRV SSU - ES C - Contract and Product Support	Various	Various : Various	0.000	0.000		0.000		0.820	Nov 2021	0.000		0.820	0.000	0.820	0.000

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Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
NBCRV SSU - ES C - Stryker NBCRV Maintenance	Various	Various : Various	0.000	0.000		0.000		2.000	Nov 2021	0.000		2.000	0.000	2.000	0.000
NBCRV SSU - ILS C - Logistic Support	C/FFP	TBD : N/A	0.000	0.000		0.000		0.442	Nov 2021	0.000		0.442	0.000	0.442	0.000
NBCRV SSU - ES C - Engineering Support	MIPR	Various : Various	0.000	0.000		0.000		0.250	Nov 2021	0.000		0.250	0.000	0.250	0.000
MMPRDS - ILS C - Logistics Support	MIPR	U.S. Army Tank-automotive & Armaments Command (TACOM) : Warren, MI	0.000	0.271	Mar 2020	0.000		0.000		0.000		0.000	0.000	0.271	0.000
ROSETTA - ES C - Engineering and technical services for ROSETTA	MIPR	Various : Various	0.000	0.090	May 2020	0.975	Nov 2020	0.000		0.000		0.000	0.000	1.065	0.000
Subtotal			20.920	8.985		7.758		6.706		0.000		6.706	0.000	44.369	N/A

Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
AVCAD - DTE C and P&D	MIPR	Various : Various	0.764	3.226	Oct 2019	4.129	Apr 2021	1.775	Nov 2021	0.000		1.775	0.000	9.894	0.000
AVCAD - P&D - DT/OT Chem Chamber & Chemicals	MIPR	West Desert Test Center : Dugway, UT	0.000	0.000		0.000		3.300	Nov 2021	0.000		3.300	0.000	3.300	0.000
AVCAD - DTE C - DT/OT Chemical Chamber & Chemical Purchase for Chamber	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	0.000	3.330	Oct 2019	2.826	Mar 2021	0.000		0.000		0.000	0.000	6.156	0.000

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Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
MPCAD - DTE C - Various	MIPR	Various : Various	0.000	0.635	Dec 2019	2.677	Jan 2021	0.407	Jan 2022	0.000		0.407	0.000	3.719	0.000
MPCAD - DTE C - MPCAD support	MIPR	Aberdeen Test Center (ATC) : Aberdeen Proving Ground, MD	0.000	0.996	Nov 2019	1.268	Feb 2021	0.655	Nov 2021	0.000		0.655	0.000	2.919	0.000
MPCAD - DTE C - DT/OT Chemical Chamber Event	MIPR	West Desert Test Center : Dugway, UT	0.000	2.458	Nov 2019	3.892	Dec 2020	1.652	Jan 2022	0.000		1.652	0.000	8.002	0.000
MPCAD - DTE C - OT Limited Users Test	MIPR	Aberdeen Test Center (ATC) : Aberdeen Proving Ground, MD	0.000	0.000		1.671	Mar 2021	0.000		0.000		0.000	0.000	1.671	0.000
MPCAD - DTE C - Program Management Evaluation for Solid/Liquid Vapor Testing	MIPR	West Desert Test Center : Dugway, UT	0.736	0.099	Apr 2020	0.000		0.000		0.000		0.000	0.000	0.835	0.000
MPCAD - OTE S - Multi-Service Operational Test (OTC)	MIPR	Operational Test Command (OTC) : Ft. Hood, TX	0.000	0.000		1.150		1.321	Feb 2021	0.000		1.321	0.000	2.471	0.000
CSIRP - DTE C Prototype Testing and Evaluation	Various	TBD : N/A	0.000	0.000		0.337	May 2021	2.280	Nov 2021	0.000		2.280	0.000	2.617	0.000
CSIRP - DTE C - CSIRP Testing & Evaluation	MIPR	CCDC CBC : Aberdeen Proving Ground, MD	0.000	0.000		0.250	Apr 2021	0.000		0.000		0.000	0.000	0.250	0.000
CSIRP - DTE C - CSIRP JHU-APL	MIPR	Johns Hopkins University - Applied Physics Lab : Laurel, MD	0.000	0.000		0.400	Apr 2021	0.000		0.000		0.000	0.000	0.400	0.000
EMBD - DTE S	C/CPFF	Battelle Memorial Institute : Aberdeen, MD	0.000	0.640	Apr 2020	0.000		0.000		0.000		0.000	0.000	0.640	0.000
EMBD - DTE C	MIPR	U.S. Army Tank-automotive & Armaments Command	0.000	0.498	Feb 2020	0.000		0.000		0.000		0.000	0.000	0.498	0.000

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Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
		(TACOM) : Warren, MI													
EMBD - DTE S - DT/OT Live Agent Aerosol Testing	MIPR	Dugway Proving Ground (DPG) : Dugway, UT	0.000	0.661	Feb 2020	0.000		0.000		0.000		0.000	0.000	0.661	0.000
EMBD - DTE C - DT/OT - OA/CVPA/RAM	MIPR	Navy Operational Test and Eval Force (OPTEVFOR) : Norfolk, VA	0.030	0.296	Feb 2020	0.000		0.000		0.000		0.000	0.000	0.326	0.000
EMBD - OTE S - DT - MIL-STD	MIPR	Aberdeen Test Center (ATC) : Aberdeen Proving Ground, MD	0.000	0.276	Feb 2020	0.000		0.000		0.000		0.000	0.000	0.276	0.000
EMBD - DTE - Live Agent Testing	MIPR	Johns Hopkins University - Applied Physics Lab : Laurel, MD	0.843	0.193	Jan 2020	0.000		0.000		0.000		0.000	0.000	1.036	0.000
EMBD - DTE - Consumable Procurement	MIPR	JPM CBRN Medical : Ft. Detrick, MD	0.530	0.309	Dec 2019	0.000		0.000		0.000		0.000	0.000	0.839	0.000
EMBD - Various Testing Support -28th T&E, NTS	MIPR	Various : Various	0.259	0.702	Feb 2020	0.000		0.000		0.000		0.000	0.000	0.961	0.000
JBTDS - OTHT S - JHBI	C/CPFF	Biomeme : Philadelphia, PA	0.000	1.315	Apr 2020	0.314	Nov 2020	0.000		0.000		0.000	0.000	1.629	0.000
JBTDS - DTE SB - Identifier Live Agent Trials	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	0.000	0.000	Nov 2020	1.485	Nov 2020	0.452	Nov 2021	0.000		0.452	0.000	1.937	0.000
JBTDS - DTE - Developmental Testing	MIPR	U.S. Army Combat Capabilities Development Command	6.236	0.348	Nov 2019	1.096	Jan 2021	0.431	Nov 2022	0.000		0.431	4.740	12.851	0.000

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Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
		(DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD													
JBTDS - DTE - Testing	MIPR	Various : Various	0.380	0.000		0.310	Nov 2020	0.504	Nov 2022	0.000		0.504	0.000	1.194	0.000
JBTDS - DTE - ARCA Chamber and Record Test Support	C/FFP	Battelle Memorial Institute : Columbus, OH	0.877	0.287	Nov 2019	0.300	Jan 2021	0.284	Nov 2022	0.000		0.284	0.000	1.748	0.000
JBTDS - DTE - V&V of JBTDS Military Utility Model	FFRDC	Institute for Defense Analysis (IDA) : Alexandria, VA	0.000	0.200	Nov 2019	0.575	Nov 2020	0.000		0.000		0.000	0.000	0.775	0.000
JBTDS - OT - Operational Assessment	MIPR	Various : Various	0.592	0.000		1.107	Jan 2021	1.262	Nov 2022	0.000		1.262	0.000	2.961	0.000
JBTDS - JHU SOLITUDE	C/FFP	Johns Hopkins University - Applied Physics Lab : Laurel, MD	3.632	0.382	Apr 2020	0.000		0.000		0.000		0.000	0.000	4.014	0.000
JNBCRS 1 - DTE - Test and Evaluation	MIPR	Various : Various	4.023	1.790	Nov 2019	1.270	Nov 2020	0.000		0.000		0.000	0.000	7.083	0.000
NBCRV SSU - DTE C - Test and Evaluation	Various	TBD : N/A	0.000	0.000		0.000		5.000	Nov 2021	0.000		5.000	0.000	5.000	0.000
MMPRDS - DTE S - VIPER Production Qualification Testing	MIPR	White Sands Missile Range (WSMR) : Mesa, AZ	0.000	0.175	Jul 2020	0.000		0.000		0.000		0.000	0.000	0.175	0.000
NTA DEFENSE - DTE C - System Prototype Development	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	0.000	0.255	Mar 2020	1.000	Apr 2021	0.000		0.000		0.000	0.000	1.255	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

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Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
NTA DEFENSE - DTE C - Field-forward PBA Detection	Various	TBD : N/A	0.000	0.000		1.416	Nov 2020	0.000		0.000		0.000	0.000	1.416	0.000
NTA DEFENSE - DTE S - Capability Assessments	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	1.361	0.746	Dec 2019	0.000		0.000		0.000		0.000	0.000	2.107	0.000
AET DEFENSE - OTHT C - Product Demonstration Events for Users	MIPR	Various : Various	0.000	0.000		0.000		0.500	Feb 2022	0.000		0.500	0.000	0.500	0.000
AET DEFENSE - DTE S - Technology Assessments	Various	Various : Various	0.000	0.000		0.000		0.745	Dec 2021	0.000		0.745	0.000	0.745	0.000
ROSETTA - DTE C - Development Testing	MIPR	Various : Various	0.000	1.123	Oct 2019	2.391	Nov 2020	0.000		0.000		0.000	0.000	3.514	0.000
Subtotal			20.263	20.940		29.864		20.568		0.000		20.568	4.740	96.375	N/A

Remarks

EMBD: \$529k for misc organizations

Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
AVCAD - PM/MS S - Program Management Support	MIPR	Various : Various	1.239	2.073	Jan 2020	4.585	Jan 2021	3.441	Nov 2021	0.000		3.441	0.000	11.338	0.000
MPCAD - PM/MS S - Program Management Support	MIPR	Various : Various	2.119	5.052	Dec 2019	4.499	Dec 2020	2.216	Dec 2021	0.000		2.216	0.000	13.886	0.000

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Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CSIRP - PM/MS S Program Management Support	Various	Various : Various	0.000	0.000		1.602	Sep 2021	1.850	Nov 2021	0.000		1.850	0.000	3.452	0.000
EMBD - Program Management Support	MIPR	Various : Various	4.807	2.166	Nov 2019	0.000		0.000		0.000		0.000	0.000	6.973	0.000
JBTDS - PM/MS S - Program Management Support	MIPR	Various : Various	18.299	1.927	Nov 2019	2.085	Nov 2020	1.480	Nov 2021	0.000		1.480	0.000	23.791	0.000
JNBCRS 1 - PM/MS S - Program Management Support	MIPR	Various : Various	4.580	4.355	Nov 2019	4.073	Nov 2020	0.000		0.000		0.000	0.000	13.008	0.000
NBCRV SSU - PM/MS S - Program Management Support	MIPR	Various : Various	0.000	0.000		0.000		3.627	Jan 2022	0.000		3.627	0.000	3.627	0.000
MMPRDS - Program Management Support	MIPR	JPM CBRN Sensors : JPEO-CBRND, Aberdeen Proving Ground, MD	0.423	0.727	May 2020	0.000		0.000		0.000		0.000	0.000	1.150	0.000
MERLIN - PM/MS S - Program Management Support	MIPR	Various : Various	0.000	0.000		0.180	Nov 2020	0.000		0.000		0.000	0.000	0.180	0.000
NTA DEFENSE - PM/MS S - IPT Support/Program Management	MIPR	JPEO Chem : Bio, Rad, and Nuc Defense (JPEO-CBRND)	6.263	0.335	Dec 2019	0.592	Nov 2020	0.000		0.000		0.000	0.000	7.190	0.000
AET DEFENSE - PM/MS S - IPT Support/Program Management	MIPR	JPEO Chem : Bio, Rad, and Nuc Defense (JPEO-CBRND)	0.000	0.000		0.000		0.081	Dec 2021	0.000		0.081	0.000	0.081	0.000
ROSETTA - PM/MS S - Program Management Support	MIPR	Various : Various	0.000	0.298	Oct 2019	0.846	Oct 2020	0.303	Oct 2021	0.000		0.303	0.000	1.447	0.000

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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
EMBD - FRP Decision																												
EMBD - FRP Production																												
JBTDS - Developmental Testing																												
JBTDS - PQT																												
JBTDS - Milestone C																												
JBTDS - LRIP Contract Award																												
JBTDS - LRIP Production																												
JBTDS - PVT																												
JBTDS - MOT&E																												
JBTDS - FRP Decision																												
JBTDS - FRP Award																												
JBTDS - IOC																												
JNBCRS 1 - Design and Fabrication Phase 2																												
JNBCRS 1 - Joint Warfighter Assessment 2020																												
JNBCRS 1 - Component Test																												
JNBCRS 1 - System Level Test 1																												
NBCRV SSU - Modification Work Order Executing IPR																												
NBCRV SSU - Production/Fielding																												
MMPRDS - MERLIN (Standoff Detection) Production Ready Test Assets																												
MMPRDS - Testing MERLIN (Standoff Detection)																												
MMPRDS - MERLIN (Standoff Detection) Production																												
MMPRDS - VIPER (Point Detection) Production Ready Test Assets																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) CA5 / Contamination Avoidance (SDD)

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
AVCAD - EMD Contract	1	2020	2	2022
AVCAD - MS C	2	2021	2	2021
AVCAD - LRIP	3	2022	3	2023
AVCAD - FRP Decision	4	2023	4	2023
AVCAD - IOC	4	2026	4	2026
MPCAD - EMD Contract	1	2020	3	2022
MPCAD - MS C	3	2022	3	2022
MPCAD - LRIP	3	2022	1	2025
MPCAD - FRP	2	2025	4	2026
CSIRP - Test and Evaluation of Prototypes - Prototyping Plan #1	2	2020	3	2022
CSIRP - Transition Decision - Prototyping Plan #1	3	2022	3	2022
CSIRP - Request for White Papers - Prototyping Plan #2	4	2021	1	2022
CSIRP - OTA Award and Execution for Prototyping Plan #2	3	2022	3	2025
CSIRP - Test and Evaluation of Prototypes - Prototyping Plan #2	3	2023	3	2025
CSIRP - Transition Decision - Prototyping Plan #2	3	2025	3	2025
EMBD - Production Quality Test (PQT)	1	2020	3	2020
EMBD - Operational Assessment	2	2020	2	2020
EMBD - MS C	3	2020	3	2020
EMBD - LRIP Contract Award	3	2020	3	2020
EMBD - OT&E	3	2020	4	2020
EMBD - FRP Decision	2	2021	3	2021
EMBD - FRP Production	2	2021	4	2026

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) CA5 / Contamination Avoidance (SDD)
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Events	Start		End	
	Quarter	Year	Quarter	Year
JBTDS - Developmental Testing	1	2020	4	2020
JBTDS - PQT	4	2020	4	2021
JBTDS - Milestone C	4	2022	4	2022
JBTDS - LRIP Contract Award	3	2022	3	2022
JBTDS - LRIP Production	3	2022	3	2023
JBTDS - PVT	1	2023	3	2023
JBTDS - MOT&E	1	2023	2	2023
JBTDS - FRP Decision	1	2024	1	2024
JBTDS - FRP Award	1	2024	1	2024
JBTDS - IOC	1	2024	1	2024
JNBCRS 1 - Design and Fabrication Phase 2	1	2020	3	2021
JNBCRS 1 - Joint Warfighter Assessment 2020	3	2020	3	2020
JNBCRS 1 - Component Test	3	2021	3	2022
JNBCRS 1 - System Level Test 1	3	2021	3	2022
NBCRV SSU - Modification Work Order Executing IPR	2	2022	3	2022
NBCRV SSU - Production/Fielding	3	2022	4	2024
MMPRDS - MERLIN (Standoff Detection) Production Ready Test Assets	1	2020	2	2020
MMPRDS - Testing MERLIN (Standoff Detection)	1	2020	2	2020
MMPRDS - MERLIN (Standoff Detection) Production	3	2020	4	2020
MMPRDS - VIPER (Point Detection) Production Ready Test Assets	1	2020	1	2020
MMPRDS - VIPER (Point Detection) Testing	1	2020	2	2020
MMPRDS - VIPER (Point Detection)	3	2020	4	2020
MERLIN - Army Platform Integration	1	2021	4	2021
NTA DEFENSE - Capabilities Assessment	1	2020	4	2021
NTA DEFENSE - Strategic Coordination/Information Management	1	2020	4	2021

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) CA5 / Contamination Avoidance (SDD)
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Events	Start		End	
	Quarter	Year	Quarter	Year
NTA DEFENSE - Systems Prototyping and Development	1	2020	4	2021
AET DEFENSE - Technology Assessments	1	2022	4	2026
AET DEFENSE - Systems Engineering/Program Management	1	2022	4	2026
AET DEFENSE - System Development and Prototyping	1	2022	4	2026
ROSETTA - Prototype Development and Downselect (M8)	2	2020	4	2020
ROSETTA - Testing & Demonstrations (M8)	1	2021	2	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) CM5 / Homeland Defense (SDD)
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
CM5: <i>Homeland Defense (SDD)</i>	-	9.414	0.000	0.000	-	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

This project supports Engineering and Manufacturing Development of common analytical laboratory system capabilities to conduct on-site analysis of any unknown sample and test potential life-threatening substances.

The effort included in this project is:

- (1) Common Analytical Laboratory System capability (CALs)

The CALs program will provide common analytical capabilities packaged to meet the specific CONOPS and mission of the gaining unit to detect and identify Chemical Warfare Agents (CWAs), Toxic Industrial Chemicals (TICs), Toxic Industrial Materials (TIMs) and Biological Warfare Agents (BWAs). Users of the system will include the National Guard Bureau, the Army 20th Support Command, the Army Medical Laboratory, the Air Force, and the Navy. CALs is comprised of two variants, the Theater Validation Integrated System (TV-IS) variant which will be built for a longer duration mission and for semi-permanent applications, and the Field Confirmatory Analytical Capability Sets (FC-ACS) variant designed for shorter duration field confirmatory missions.

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

	FY 2020	FY 2021	FY 2022
Title: 1) CALS	9.414	-	-
Description: TV IS Developmental Testing and Support			
Accomplishments/Planned Programs Subtotals	9.414	-	-

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

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• JS0005: COMMON ANALYTICAL LABORATORY SYSTEM (CALs)	7.293	37.173	64.708	-	64.708	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

COMMON ANALYTICAL LABORATORY SYSTEM (CALs)

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program	Date: May 2021
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Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (EMD)</i>	Project (Number/Name) CM5 / <i>Homeland Defense (SDD)</i>
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The Common Analytical Laboratory System (CALs) will be developed leveraging both Commercial Off the Shelf (COTS) and Government Off the Shelf (GOTS) analytical components to support the identification of Chemical, Biological, Radiological and Nuclear (CBRN) agent materials in environmental samples. CALs is comprised of two program of records, the Theater Validation Integrated System (TV-IS) and the Field Confirmatory Analytical Capability Sets (FC-ACS), which will be fielded in accordance with mission need, to components of the Air Force, Army, Marines, Navy and National Guard Bureau requiring CBRN field confirmatory analytical detection capability. A theatre validation variant will be designed and built for a longer duration mission and for semi-permanent applications. An analytical capability suite variant will be designed for shorter duration field confirmatory missions. JPdM CBRNE A&RS awarded one contract during the EMD Phase. The contract was awarded to Battelle Memorial Institute (BMI) (prime) to develop, deliver, manage, and maintain a CALs Technical Data Package (TDP) throughout the EMD Phase. The TDP to be delivered to the Government at the end of the EMD Phase is to include all product data required by the Production Level specifications outlined in Military Standard (MIL-STD)-31000A, and will reflect the tested baseline configuration incorporating all approved changes. As part of the common acquisition strategy, CALs is incorporating the NGDS platform to meet this threshold requirement; specifically to identify various bacterial and viral agents in the CALs integrated systems. This platform provides the ability to analyze for bacterial and viral agents in various environmental, food, and water matrices (sample types).

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) CM5 / Homeland Defense (SDD)
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CALS - HW S - NGDS Tactical Variant Alpha Prototype	SS/CPFF	BioFire Dx : Salt Lake City, UT	1.855	0.439	Nov 2019	0.000		0.000		0.000		0.000	0.000	2.294	0.000
Subtotal			1.855	0.439		0.000		0.000		0.000		0.000	0.000	2.294	N/A

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CALS - ES S - Other Government Agencies Services	MIPR	Various : Various	1.183	0.164	Jan 2020	0.000		0.000		0.000		0.000	0.000	1.347	0.000
Subtotal			1.183	0.164		0.000		0.000		0.000		0.000	0.000	1.347	N/A

Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CALS - OTE S - Test Agency	MIPR	Army Test and Evaluation Command (ATEC) : Aberdeen Proving Ground, MD	0.000	1.158	Apr 2020	0.000		0.000		0.000		0.000	0.000	1.158	0.000
CALS - DTE S - PVT, NET, LOG DEMO, OT Support	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	0.000	4.650	Mar 2020	0.000		0.000		0.000		0.000	0.000	4.650	0.000

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) CM5 / Homeland Defense (SDD)

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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
CALS - Developmental Testing (DT) (TV IS)	■	■																										
CALS - Milestone C (TV IS) Decision				■																								
CALS - Production Verification Test (TV IS)				■																								
CALS - Operational Test (TV IS)								■																				
CALS - Logistics Demonstration (TV IS)								■																				
CALS - New Equipment Training (TV IS)								■																				

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (EMD)</i>	Project (Number/Name) CM5 / <i>Homeland Defense (SDD)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
CALS - Developmental Testing (DT) (TV IS)	1	2020	2	2020
CALS - Milestone C (TV IS) Decision	4	2020	4	2020
CALS - Production Verification Test (TV IS)	4	2020	4	2020
CALS - Operational Test (TV IS)	1	2021	1	2021
CALS - Logistics Demonstration (TV IS)	1	2021	1	2021
CALS - New Equipment Training (TV IS)	1	2021	1	2021

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) CO5 / Collective Protection (SDD)
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
CO5: <i>Collective Protection (SDD)</i>	-	7.138	7.885	3.028	-	3.028	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

This project supports Engineering and Manufacturing Development and Low Rate Initial Production of Joint Service Chemical, Biological, and Radiological (CBR) Collective Protection (CP) systems that are smaller, lighter, less costly to produce and maintain, and more logistically supportable. CP systems provide spaces safe from the effects of CBR contamination enabling mission accomplishment in CBR environments.

The systems included in this project are:

- (1) Chemical Biological Aircraft Survivability Barrier (CASB), and
- (2) Joint Expeditionary Collective Protection (JECPC) Family of Systems

The CASB program provides a lightweight, low-cost, expendable, negative-pressure enclosure that will protect the interior of DoD multi-Service aircraft assets (MH-47, CV22, MC-130) capable of airlifting/exfiltrating chemically or biologically contaminated personnel, equipment, and cargos while preserving the aircraft for continued unrestricted operations without the need for extensive decontamination.

The JECPC program provides the Joint Expeditionary Forces a collective protection capability that is lightweight, compact, modular, and affordable. JECPC is a family of systems, developed in two phases that will allow the application of CP to transportable soft-side shelters, enclosed spaces of opportunity and in remote austere locations as a standalone resource. Phase 1 includes standalone CP systems and kits that provide existing host platforms and structures with CBRN protection. Phase 2 includes kits that provide CBRN protection to other host platforms and structures that were not explicitly designed in Phase 1. JECPC will be capable of protecting personnel groups of varying size, unencumbered by Individual Protective Equipment (IPE), from the effects of CB agents, Toxic Industrial Materials (TIMs), radiological particles, heat, dust, and sand. The employment of JECPC will reduce the need for personnel and equipment decontamination and is a strategic deterrence against state adversaries and non-state actors from using weapons of mass destruction. In FY22 the JECPC program finalizes logistics products and program acquisition documentation in support of a Full Rate Production decision.

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

	FY 2020	FY 2021	FY 2022
Title: 1) Chemical and Biological Aircraft Survivability Barrier (CASB)	0.827	-	-
Description: CASB prototype development and testing through the EMD Phase.			
Title: 2) JECPC	6.311	7.885	3.028
Description: Phase 2 system Development and Demonstration Events			

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) CO5 / Collective Protection (SDD)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>FY 2021 Plans: Complete DT testing and reporting. Complete LRIP manufacturing for OT (Qty 2 - Tent Kit Single Skin, Qty 3 - Tent Kit 1, Qty 1 - Tent Kit 3). Conduct MOT&E, Logistics Demonstration and TM verification events. Finalize technical data, logistics products and update/draft program acquisition documentation.</p> <p>FY 2022 Plans: Complete Technical Manual verification event. Finalize logistics products and finalize program acquisition documentation in support of a Full Rate Production decision.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program/project transitioned to Production and Deployment Phase.</p>			
Accomplishments/Planned Programs Subtotals	7.138	7.885	3.028

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• JP1111: JOINT EXPEDITIONARY COLLECTIVE PROTECTION (JECP)	17.193	14.496	22.719	-	22.719	-	-	-	-	-	-

Remarks

D. Acquisition Strategy
CHEMICAL BIOLOGICAL AIRCRAFT SURVIVABILITY BARRIER (CASB)

The Chemical Biological Aircraft Survivability Barrier (CASB) overall strategy is to utilize primary materials (air filtration and flexible barrier material) currently in use by other programs in the CB defense portfolio. CASB reviewed existing materials and technology as well as designs, configurations, and test data from legacy systems developed for ColPro applications. Using this information, systems are being developed to meet the broader range of airframes and airframe specific requirements, chemical biological protection, and logistic supportability that are now required. Based on commonality between the requirements of the CASB and the requirements of similar programs (i.e. Joint Expeditionary Collective Protection, Transport Isolation System, and Aeromedical Biological Containment System), CASB initiated at MS B EMD phase to meet these expanded requirements within the various airframes. CASB is leveraging an Indefinite Delivery/Indefinite Quantity contract to pursue a Commercial-of-the-Shelf (COTS) development strategy using full and open competition for awards following MS C. During the EMD phase, CASB awarded a Cost Plus Incentive Fee (CPIF) delivery order for the development and delivery of prototypes for airworthiness certification within two years.

JOINT EXPEDITIONARY COLLECTIVE PROTECTION (JECP)

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (EMD)</i>	Project (Number/Name) CO5 / <i>Collective Protection (SDD)</i>

JECP Family of Systems (FoS) (Phase 1 and Phase 2) involves multiple contract types throughout the Engineering and Manufacturing Development (EMD) and Production and Deployment Phases of the program. Having achieved a Full Rate Production (FRP) decision for Phase 1 Systems in December 2016, the program exercised Fixed Price Incentive (FPI) production options in FY17 & FY18 through the now expired contract with Leidos in support of Initial Operational Capability (IOC). A competitive build-to print follow-on production delivery order contract was awarded June 2019 to Production Products Manufacturing and will support the remaining production of Phase 1 Systems to meet Full Operational Capability (FOC). Phase 2 systems will be developed as engineering changes to the Phase 1 systems under a separate competitive delivery order awarded March 2019 to Leidos and undergo limited developmental and operational testing in pursuit of a FRP decision. Production options are included in the delivery order to meet FOC for Phase 2 systems. Additionally, BA7 funding will develop incremental improvements to fielded JECP FoS. BA7 efforts include a range of improvements intended to enhance filtration protection, provide a field leakage test capability and update various fielded Environmental Control Unit (ECU) interface types for use with collective protection. These efforts involve development of designs and prototyping under the Other Transaction Authority (OTA) through the Countering Weapons Mass Destruction (CWMD) Consortium contract as well as exploitation of commercial off-the-shelf items.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) CO5 / Collective Protection (SDD)
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
JECP - HW S - Phase 2 System Product Development/Phase 2 Prototype Manufacturing	C/FPIF	Leidos : Abingdon, MD	3.351	3.381	Nov 2019	2.052	Oct 2020	0.808	Nov 2021	0.000		0.808	0.000	9.592	0.000
Subtotal			3.351	3.381		2.052		0.808		0.000		0.808	0.000	9.592	N/A

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CASB - ES S - IPT and Technical Support	MIPR	Various : Various	1.365	0.252	Jan 2020	0.000		0.000		0.000		0.000	0.000	1.617	0.000
JECP - ES S/ILS S - Engineering, Logistics, Technical, IPT Support	MIPR	Various : Various	2.886	0.557	Nov 2019	3.359	Nov 2020	1.407	Nov 2021	0.000		1.407	0.000	8.209	0.000
Subtotal			4.251	0.809		3.359		1.407		0.000		1.407	0.000	9.826	N/A

Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CASB - OTE S - Operational Testing	MIPR	Various : Various	0.315	0.470	Apr 2020	0.000		0.000		0.000		0.000	0.000	0.785	0.000
JECP - OTHS SB - Test & Evaluation IPT/OTE S - Operational Testing/DTE S - Phase 2 Developmental testing	MIPR	Various : Various	9.466	1.533	Nov 2019	1.292	Oct 2020	0.215	Nov 2021	0.000		0.215	0.000	12.506	0.000
Subtotal			9.781	2.003		1.292		0.215		0.000		0.215	0.000	13.291	N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (EMD)</i>	Project (Number/Name) CO5 / <i>Collective Protection (SDD)</i>

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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
CASB - Developmental Test and Evaluation	■																											
CASB - Operational Test	■	■																										
CASB - Milestone C		■																										
CASB - Production and Deployment		■	■	■	■	■	■	■																				
CASB - IOC							■																					
CASB - FOC											■																	
JECP - Phase 2 Development Testing (DT)	■	■	■	■	■	■	■	■																				
JECP - Phase 2 Operational Testing (OT)							■	■	■	■	■	■																
JECP - Phase 2 Full Rate Production											■																	
JECP - Phase 2 Initial Operational Capability (IOC)															■													

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) CO5 / Collective Protection (SDD)

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
CASB - Developmental Test and Evaluation	1	2020	1	2020
CASB - Operational Test	1	2020	2	2020
CASB - Milestone C	2	2020	2	2020
CASB - Production and Deployment	2	2020	4	2021
CASB - IOC	1	2021	1	2021
CASB - FOC	4	2021	4	2021
JECP - Phase 2 Development Testing (DT)	1	2020	2	2021
JECP - Phase 2 Operational Testing (OT)	3	2021	2	2022
JECP - Phase 2 Full Rate Production	4	2021	4	2021
JECP - Phase 2 Initial Operational Capability (IOC)	1	2023	1	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) DE5 / Decontamination (SDD)
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
DE5: Decontamination (SDD)	-	9.113	21.954	7.874	-	7.874	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

This project supports the development of Contamination Mitigation (ConMit) systems utilizing solutions that remove and/or detoxify contaminated material without damaging combat equipment, personnel, or the environment, helping sustain a resilient force posture, one of the efforts outlined in the National Defense Strategy. ConMit systems provide a force restoration capability for units that become contaminated. Development efforts will provide systems that reduce operational impact and logistics burden, reduce sustainment costs, increase safety, and minimize environmental effects associated with decontamination and contamination mitigation operations. Experimentation and demonstration will be used in this phase to reduce risk and inform supporting materiel solutions, Concept of Operations and Tactics, Techniques & Procedures.

Efforts included in this Project are:

- (1) Contaminated Human Remains System (CHRS)
- (2) Decontamination Family of Systems (DFoS) Contamination Indicator Decontamination Assurance System (CIDAS)
- (3) DFoS CIDAS Blister
- (4) Forward Area Mobility Spray - System (FAMS-S)
- (5) Joint Biological Agent Decontamination System (JBADS)
- (6) Joint Biological Agent Decontamination System Lite (JBADS Lite) (Congressional Interest Item)
- (7) Major Defense Acquisition Program (MDAP), and
- (8) Mass Personnel Decontamination (MPD)

The CHRS program will provide a Contaminated Human Remains Transfer Case (CHRT) packaging solution to safely return chemical, biological, or radiological contaminated human remains to the Continental United States. The CHRT is a containment system that will protect personnel from the hazards associated with transporting human remains that are potentially contaminated with chemical, biological or radiological agents and Toxic Industrial Materials (TIM) without posing additional risk to the handlers or the environment in accordance with federal and international transportation standards. The CHRS program will address a capability gap identified within both the Contaminated Mitigation (ConMit) Initial Capabilities Document (ICD), dated March 2011, and the Mortuary Affairs ICD, dated October 2008

Decontamination Family of Systems (DFoS) Contamination Indicator Decontamination Assurance System (CIDAS) is a contamination indicator and decontamination assurance technology. The indicator will be sprayed on tactical vehicles, aircraft, ships, crew-served weapons, and individual weapons that may have been exposed to traditional and non-traditional chemical contamination. DFoS CIDAS is a new capability for the Joint Forces that will reduce the logistics burden of decontamination by indicating presence and location of traditional (Nerve and Blister) and non-traditional chemical agents on militarily relevant surfaces pre- and post-decontamination. This helps sustain a resilient force posture, making the Joint Force more adaptable against the uncertainty in a changing global strategic environment, an effort listed in the

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National Defense Strategy under building a more lethal force. It will consist of an indicator and an applicator, with three applicator configurations -- small-scale, tactical large scale, and reusable large scale applicators -- and three indicator formulations -- nerve training, nerve and blister indicators.

Starting in FY21, the DFoS CIDAS program is being broken into separate CIDAS Nerve and CIDAS Blister programs as the capabilities are intended to fulfill distinct solutions to meet Warfighter needs. The CIDAS Nerve program will address the visual disclosure of traditional and non-traditional nerve agents while the CIDAS Blister program addresses traditional blister agents, two separate threat scenarios that require different materiel solutions, modernizing a key capability to help build a more lethal force, as outlined in the National Defense Strategy. In FY22 the DFoS CIDAS Blister program will complete Sustainment Cost Reduction efforts with Prime Contractor to reduce the sustainment unit cost, award contract option, and continue developmental testing (DT)/operational testing (OT) in support of Milestone (MS) C/ FRP.

FAMS-S will provide Special Operations Forces (SOF) and SOF Task Forces (SOTFs) a man-portable and mobile platform capable of rapidly decontaminating chemical and biological (CB) agents from the exterior of aircraft, helicopters, boats, vehicles, or support equipment to a level that is clean enough for re-use without the need for additional CB protective equipment. This will maximize tactical flexibility and fighting strength while minimizing the logistical burden and the cost of conducting Countering Weapons of Mass Destruction (CWMD) and CB operations. Up to three FAMS-S system variants are envisioned, to include a Man-Portable configuration that will provide the SOF tactical forces to advance decontamination technology to meet the operational tenants of decontamination.

The Joint Biological Agent Decontamination System (JBADS) will provide the capability to conduct biological agent decontamination of the interior and exterior of aircraft. There is currently no capability to decontaminate both the inside and outside of aircraft. Additionally, this design incorporates a chemical liner for potential chemical agent decontamination ability. The JBADS capability set will include a decontamination delivery system using hot-humid air, shelter to encapsulate an airframe, an environmental control and monitoring system(s), and other ancillary components. It will provide the capability to decontaminate biologically contaminated airframes to safe levels, allow more rapid return to service and provides a key cornerstone to future decontamination capability. The JBADS focus is on the biological agent decontamination of the C-130 aircraft and future efforts may address chemical and biological decontamination of other airframes and vehicles.

The JBADS Lite (Congressional Interest Item) effort will research and analyze, in coordination with the Department of Homeland Security, how JBADS decontamination technology could be utilized in the pandemic preparedness of civilian transportation systems. The JBADS Lite was created in response to the Coronavirus Disease 2019 (COVID-19) global pandemic. The JBADS Lite uses Biothermal Decontamination which is hot, humid air to decontaminate the interior of aircraft.

The MDAP Chemical Biological Radiological and Nuclear (CBRN) Survivability Initiative ensures weapon system programs at all Acquisition Category (ACAT) levels, as well as non-DoD agency programs such as those programs at the Department of Homeland Security (DHS), meet their CBRN defense requirements. This effort facilitates and coordinates the research, development, test and evaluation, procurement, delivery, and life cycle sustainment of affordable CBRN defense materiel solutions for each program's documented CBRN requirements.

The Mass Personnel Decontamination (MPD) program will develop an array of rugged and reliable best-of-breed hardware in a manageably sized, easy-to-erect, modular system that can be quickly tailored to different mass casualty events in order to support decontamination of ambulatory and non-ambulatory patients, and allow for the processing of contaminated human remains. The program addresses capability gaps identified within the Consequence Management ICD dated 14 October

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2010, the ConMit ICD dated 1 March 2011, and the Mortuary Affairs Operations ICD dated October 2008, modernizing a key capability under the National Defense Strategy's line of effort of building a more lethal force. The MPD program funding ends in FY21 and all program contract, test, and acquisition documentation will be archived and the Joint Requirements Office will enter the Draft Capability Development Document into Knowledge Management/Decision Support tool for archiving. The MPD program funding ends in FY21 and all program contract, test, and acquisition documentation will be archived and the Joint Requirements Office will enter the Draft Capability Development Document into Knowledge Management/Decision Support tool for archiving.

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Title: 1) Contaminated Human Remains System (CHRS)</p> <p>Description: Contaminated Human Remains Transfer Case (CHRT) Development and Support</p>	2.074	-	-
<p>Title: 2) DFoS CIDAS</p> <p>Description: Blister (Small and Large Kits)</p>	2.018	-	-
<p>Title: 3) DFoS CIDAS</p> <p>Description: Large Scale Applicators (LSA) and Nerve</p>	2.455	-	-
<p>Title: 4) DFoS CIDAS BLISTER</p> <p>Description: Blister Indicator Kits and Large Scale Applicators</p> <p>FY 2021 Plans: Continue Sustainment Cost Reduction effort with Prime contractor to reduce the sustainment unit cost of the blister indicator by qualifying alternate sources of raw materials and changing manufacturing processes to increase efficiencies. Award option on Blister contract to procure 70 Small Scale Applicator (SSA) Blister Kits, 50 Large Scale Applicator (LSA) Blister Kits, 218 Confidence Check Cards (CCC) and associated Contract Data Requirements Lists (CDRLs) to initiate Developmental Testing (KPP) (i.e. Level of Indication, Individual Protective Equipment (IPE), Equipment Compatibility, and User Demonstration) in support of Milestone (MS) C/Full Rate Production (FRP).</p> <p>FY 2022 Plans: Complete Sustainment Cost Reduction efforts with Prime Contractor. Award contract with option with Prime Contractor to acquire 225 Small Scale Applicator (SSA) Blister and 75 Large Scale Kit Blister (LSK-B) production representative kits to continue Developmental Testing (DT), and plan for Logistics Demonstration and Operational Testing (OT) in support of MS C/FRP.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Decrease due to change in program/project technical parameters.</p>	-	5.467	2.840
<p>Title: 5) Forward Area Mobility Spray - System</p>	-	1.828	2.743

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Description: Prototype Development</p> <p>FY 2021 Plans: Award system development contract to begin prototype build, and initiate early developmental and operational test planning for integration suitability and interoperability effectiveness.</p> <p>FY 2022 Plans: Award follow-on development contract for improved prototype variants; conduct developmental and operational testing on 30 backpack variant prototypes to measure decontamination levels, user suitability and system interoperability effectiveness.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to change in program/project technical parameters. Program completing prototype refinement and entering developmental and operational testing phase in FY22.</p>			
<p>Title: 6) Joint Biological Agent Decontamination System (JBADS)</p> <p>Description: Development and Testing</p> <p>FY 2021 Plans: Initiate/Complete Initial Operational Test and Evaluation (IOT&E). Complete Future Capabilities Analysis.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program/project transitioned to Production and Deployment Phase.</p>	1.560	4.799	-
<p>Title: 7) Major Defense Acquisition Program (MDAP)</p> <p>Description: CBRN Survivability Support</p> <p>FY 2021 Plans: Continue to ensure CBRN survivability requirements are met for MDAP's by cross-walking requirements documents with program execution plans. Attend meetings to address integration needs and present CBRN system and hardware options. Provide subject matter expertise in the execution of CBRN survivability requirements for both materiel and non-material solutions. Review and assist in document preparation for milestones and programs reviews. Conduct CBRN survivability compliance reviews for Optionally Manned Fighting Vehicle, Robotic Combat Vehicle, Future Long Range Assault Aircraft, Future Attack Reconnaissance Aircraft, Synthetic Training Environment, Precision Navigation and Timing, multiple Soldier Lethality programs, and other CBRN survivability system integration in preparation for various program acquisition milestones, design reviews and low rate initial production reviews.</p> <p>FY 2022 Plans:</p>	1.006	1.035	2.291

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
Continue to ensure CBRN survivability requirements are met for MDAP's by cross-walking requirements documents with program execution plans. Attend meetings to address integration needs and present CBRN system and hardware options. Provide subject matter expertise in the execution of CBRN survivability requirements for both materiel and non-materiel solutions. Review and assist in document preparation for milestones and programs reviews. Conduct CBRN survivability compliance reviews for Optionally Manned Fighting Vehicle, Robotic Combat Vehicle, Future Long Range Assault Aircraft, Future Attack Reconnaissance Aircraft, Littoral Combat Ship, European Reassurance Initiative, and other CBRN survivability system integration in preparation for various program acquisition milestones, system and subsystem test events, design reviews and low rate initial production reviews. FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to change in program/project technical parameters. Increase is due to additional prototyping efforts within the MDAP programs.			
Title: 8) Mass Personnel Decontamination (MPD) Description: Engineering and Manufacturing Development (EMD) activities and Product Development FY 2021 Plans: Award contract for DT systems and conduct DT. FY 2021 to FY 2022 Increase/Decrease Statement: Program/project is entering completion and all activities will be closed.	-	3.825	-
Accomplishments/Planned Programs Subtotals	9.113	16.954	7.874

	FY 2020	FY 2021
Congressional Add: 1) Decontamination Technologies - Development and Testing FY 2021 Plans: Commence research and analysis into how JBADS decontamination technology could aid in pandemic preparedness of civilian transportation systems.	-	5.000
Congressional Adds Subtotals	-	5.000

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2020	FY 2021	FY 2022	FY 2022	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
			Base	OCO	Total						
• JD0050: DECONTAMINATION FAMILY OF SYSTEMS (DFoS)	14.932	10.804	4.166	-	4.166	-	-	-	-	-	-

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

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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Remarks

D. Acquisition Strategy

CONTAMINATED HUMAN REMAINS SYSTEM (CHRS)

The CHRS program will leverage previous efforts under a Joint Urgent Operational Needs Statement (JUONS) which have accelerated the CHRT project. Additional minor design modifications, developmental and operational testing is part of the overall acquisition strategy. Product development consists of the design and prototyping of a CHRT. The contracting strategy will use the Countering Weapons of Mass Destruction Other Transaction Agreement (CWMD OTA) to procure prototype units, followed by Developmental Testing (DT). Following DT completion, an In-Process Review will be conducted. A Logistics Demonstration (LD) and Operational Testing (OT) will be conducted. An Operational Test Agency (OTA) Evaluation Report (OER) will be written, and technical reviews will be conducted, in preparation for a Milestone C/Full Rate Production decision.

DFoS CONTAMINATION INDICATOR DECONTAMINATION ASSURANCE SYSTEM (DFoS CIDAS)

The DFoS CIDAS program will follow an evolutionary acquisition strategy in consonance with user developed capability documents. Following MS A in 2011, the program office collaborated with external efforts, including the Hazard Mitigation, Materiel and Equipment Restoration (HaMMER) Advanced Technology Development (ATD) Operational Demonstration and Extended User Evaluations, and conducted technology demonstrations on candidate indicator and applicator technologies to mitigate risk and identify affordable mature technologies that meet requirements. The DFoS CIDAS program determined the need for and initiated Government designed reusable and tactical large scale applicators to provide affordable solutions to meet specific User requirements. Following MS B in 2015, the program used full and open competition to award a performance based indefinite quantity contract with fixed price incentive successive target contract line items, with options for Low Rate Initial Production (LRIP) and Full Rate Production (FRP) for nerve indicator and small scale applicator systems. The program will integrate the Contractor and Government designed indicator and applicators and conduct developmental and operational testing.

DFoS CONTAMINATION INDICATOR DECON ASSURANCE SPRAY BLISTER (DFoS CIDAS BLISTER)

The DFoS CIDAS Blister program will follow an evolutionary acquisition strategy. The program office coordinated with Science and Technology efforts to identify blister technologies that met Service requirements. After further development, in 4QFY19 a sole-source performance based indefinite delivery indefinite quantity contract was awarded to develop blister indicator and small scale applicator systems with options for production. The program will leverage the contract to procure blister indicator kits and conduct test and evaluation events for the EMD phase in preparation of MS C/FRP.

FORWARD AREA MOBILITY SPRAY SYSTEM (FAMS-S)

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The FAMS-S will be developed using an incremental acquisition strategy to advance decontamination technology for Special Operations Force (SOF) application to tactical and strategic platforms. FAMS-S will reduce technological risk by reviewing existing materials and technologies as well as designs, configurations, and test data from mature legacy and commercial decontamination systems. In accordance with the Capability Development Document (CDD), the PMO will provide New Equipment Training (NET) and fielding to Army Special Operations Command (USASOC), Marine Corps Special Operations Command (MARSOC), Naval Special Warfare Command (NSWC), and Air Force Special Operations Command (AFSOC) to meet IOC/FOC. The program office will work with the Users to develop a more mature fielding as we get closer to that stage of the program.

JOINT BIOLOGICAL AGENT DECONTAMINATION SYSTEM (JBADS)

The JBADS acquisition approach is to leverage information and technology from the JBADS Joint Capability Technology Demonstration (JCTD) to support entry into the Engineering and Manufacturing Development (EMD) phase of the acquisition cycle. Following testing, the JBADS will transition to Full Rate Production (FRP). The JBADS will utilize Commercial-off-the-Shelf components for the shelter, the decontamination delivery system, the environmental control and monitoring system(s), and other ancillary components with the award of a competitive delivery order to produce, operate, and sustain the system. The program as a whole utilizes the evolutionary acquisition approach for future increments that may expand JBADS capabilities to include other platforms (aircraft and vehicles) as requirements dictate. The Future Capabilities Analysis will conduct studies, analyses, and prototyping based on the current JBADS concept to improve its readiness to meet potential future requirements with minimal impact to the JBADS program.

MAJOR DEFENSE ACQUISITION PROGRAM (MDAP)

The MDAP program provides assistance to non-CBD programs with meeting and or optimizing their Chemical, Biological, Radiological, and Nuclear (CBRN) survivability and force protection capabilities. The MDAP also provides systems engineering analyses to develop CBRN specific operational and technical requirements, identifies performance gaps between existing materiel and technical requirements, develops cost and schedule estimates, conducts preliminary CBRN T&E and logistics planning, develops CBRN defense architectures products, and performs trade space analyses for a number of non-CBD programs.

MASS PERSONNEL DECON (MPD)

The MPD program will develop the equipment, processes and procedures for DoD-affiliated personnel contaminated by chemical, biological, and radiological agents to achieve ambulatory and non-ambulatory throughput requirements as dictated by the needs of the Services, while considering various mission scenarios. As part of the acquisition strategy, key product developmental efforts the program achieved MS A in February 2020, and includes efforts for the reduction of current MPD System costs by assessing existing Mass Casualty Decontamination (MCD) equipment and processes as well as new technology through the use of Requests For Information (RFI's), Market Research Analyses and Technology Demonstrations. Data collected from prior equipment demonstrations as well as fieldings of commercial MCD systems in support of two validated Operational Needs Statements will inform the program as well. A competitive/sole source contract for prototyping and production units will be awarded, followed by Milestone B. Results of Prototyping will inform developmental and operational testing effort, followed by Milestone C/Full Rate Production Approval. These efforts will additionally support the development of hazardous waste disposal and integration with a Contaminated Human Remains capability. The

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MPD program funding ends in FY21 and all program contract, test, and acquisition documentation will be archived and the Joint Requirements Office will enter the Draft Capability Development Document into Knowledge Management/Decision Support tool for archiving.

CONGRESSIONAL INTEREST ITEMS

DECONTAMINATION TECHNOLOGIES:

The Joint Biological Agent Decontamination System (JBADS) Lite project will research and analyze how JBADS Lite could aid in the pandemic preparedness of civilian transportation systems in coordination with the Department of Homeland Security (DHS). Using existing contract vehicles, this effort will research, analyze, and test prototypes to aid in decontamination of other platforms with DHS to aid in civilian transportation pandemic preparedness.

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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CHRS - HW C - Advanced Design & Manufacturing Support	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	0.000	0.062	Feb 2020	0.000		0.000		0.000		0.000	0.000	0.062	0.000
DFoS CIDAS - HW S - SSA/LSA - Blister/Nerve	SS/FPIF	FLIR Systems : Inc., Stillwater, OK	0.847	1.831	Jan 2020	0.000		0.000		0.000		0.000	0.000	2.678	0.000
DFoS CIDAS BLISTER - HW S - Small Scale Applicators	SS/FPIF	FLIR Systems : Inc., Stillwater, OK	0.000	0.000		2.259	Dec 2020	1.000	Dec 2021	0.000		1.000	0.000	3.259	0.000
FAMS-S - HW S - System Development and Prototype Refinement	C/CPIF	TBD : N/A	0.000	0.000		1.100	Aug 2021	1.372	Jan 2022	0.000		1.372	0.000	2.472	0.000
MPD - HW S - Developmental Testing Assets	C/FFP	TBD : N/A	0.000	0.000		1.526	Dec 2020	0.000		0.000		0.000	0.000	1.526	0.000
CONG - HW S - JBADS Lite - Prototype Development & Testing	Various	TBD : N/A	0.000	0.000		3.750	Apr 2021	0.000		0.000		0.000	0.000	3.750	0.000
Subtotal			0.847	1.893		8.635		2.372		0.000		2.372	0.000	13.747	N/A

Remarks
CONG: Includes development, prototyping and testing to support pandemic preparedness of civilian transportation systems.

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CHRS - TD/D S - IPT CHRT Support and Readiness Assessments	MIPR	Various : Various	0.000	0.726	Nov 2019	0.000		0.000		0.000		0.000	0.000	0.726	0.000

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Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
DFoS CIDAS - TD/D S - Logistics, Engineering, and IPT Support	MIPR	Various : Various	4.913	0.257	Nov 2019	0.000		0.000		0.000		0.000	0.000	5.170	0.000
DFoS CIDAS BLISTER - TD/D S - IPT and Technical Support	MIPR	Various : Various	0.000	0.000		1.760	Dec 2020	0.585	Dec 2021	0.000		0.585	0.000	2.345	0.000
FAMS-S - ES S - Systems Engineer/Technical SME Support	MIPR	Various : Various	0.000	0.000		0.472	Mar 2021	0.686	Jan 2022	0.000		0.686	0.000	1.158	0.000
JBADS - TD/D S - Logistics, Engineering, and IPT Support	MIPR	Various : Various	4.454	0.000		0.597	Dec 2020	0.000		0.000		0.000	0.000	5.051	0.000
MDAP - TD/D SB - IPT and Technical Support	MIPR	Various : Various	0.801	0.808	Nov 2019	0.831	Nov 2020	2.081	Nov 2021	0.000		2.081	0.000	4.521	0.000
MPD - ES SB S - Logistics, Engineering, and IPT Support	Various	Various : Various	0.000	0.000		0.417	Jan 2021	0.000		0.000		0.000	0.000	0.417	0.000
Subtotal			10.168	1.791		4.077		3.352		0.000		3.352	0.000	19.388	N/A

Remarks
 CONG: Tech Scouting and Analysis to include prototyping and testing to support pandemic preparedness of civilian transportation systems.

Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CHRS - DTE S IPT Test & Evaluation Reporting	Various	Various : Various	0.000	0.718	Feb 2020	0.000		0.000		0.000		0.000	0.000	0.718	0.000
DFoS CIDAS - OTHT S - Live Agent / Lab, Developmental, and Operational Testing	Various	Various : Various	7.243	1.713	Nov 2019	0.000		0.000		0.000		0.000	0.000	8.956	0.000

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Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
DFoS CIDAS BLISTER - OTHT S - DT/OT	MIPR	Various : Various	0.000	0.000		0.628	Dec 2020	0.829	Dec 2021	0.000		0.829	0.000	1.457	0.000
FAMS-S - DTE SB - Decon Solution Analysis	Various	TBD : N/A	0.000	0.000		0.000		0.356	Feb 2022	0.000		0.356	0.000	0.356	0.000
JBADS - OTE S - Initial Operational Test and Evaluation	C/CPIF	AeroClave : LLC, Winter Park, FL	0.000	0.000		3.483	Dec 2020	0.000		0.000		0.000	0.000	3.483	0.000
JBADS - Future Capability Analysis/MIL-STD 810-G Test Planning/Testing/ other T&E activities	Various	Various : Various	1.157	1.542	Dec 2019	0.000		0.000		0.000		0.000	0.000	2.699	0.000
MPD - DTE SB - Developmental Testing	Various	TBD : N/A	0.000	0.000		1.080	Mar 2021	0.000		0.000		0.000	0.000	1.080	0.000
CONG - OTHT S - JBADS Lite - Analysis and Test Support	Various	TBD : N/A	0.000	0.000		1.250	Apr 2021	0.000		0.000		0.000	0.000	1.250	0.000
Subtotal			8.400	3.973		6.441		1.185		0.000		1.185	0.000	19.999	N/A

Remarks
CONG: Support for JBADS Lite test events.

Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CHRS - PM/MS C - Program Management and Technical Support	MIPR	Various : Various	0.000	0.568	Nov 2019	0.000		0.000		0.000		0.000	0.000	0.568	0.000
DFoS CIDAS - PM/MS S - Program Management Support	MIPR	Various : Various	3.063	0.672	Nov 2019	0.000		0.000		0.000		0.000	0.000	3.735	0.000

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) DE5 / Decontamination (SDD)

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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
CHRS - Developmental Test (DT)	██████																											
CHRS - MS C- CHRT					██																							
CHRS - Full Rate Production (FRP) - CHRT					██																							
CHRS - Initial Operational Capability (IOC) - CHRT											██																	
CHRS - First Article Test/Production Re-certification Testing							██																					
CHRS - Full Operational Capability (FOC) - CHRT															██													
DFoS - CIDAS Nerve Milestone C				██																								
DFoS - CIDAS Nerve Full Rate Production (FRP)				██																								
DFoS CIDAS BLISTER - DT/OT IP Equipment Testing							██																					
DFoS CIDAS BLISTER - DT/OT Shelf Life Scoping							██																					
DFoS CIDAS BLISTER - Milestone C																								██				
DFoS CIDAS BLISTER - Full Rate Production (FRP)																██												
DFoS CIDAS BLISTER - Full Operational Capability (FOC)																								██				
FAMS-S - System Development and Prototype Refinement								██																				
FAMS-S - DT/OT											██																	
FAMS-S - MS C												██																
FAMS-S - Low Rate Initial Production															██													
FAMS-S - Full Rate Production																												██

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) DE5 / Decontamination (SDD)
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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
FAMS-S - IOC																												
JBADS - Contractor Specification Testing	■																											
JBADS - First System Build	■	■	■																									
JBADS - Initial Operational Test and Evaluation (IOT&E)								■	■	■																		
JBADS - Full Rate Production (FRP)																												
JBADS - Initial Operational Capability (IOC)																												
JBADS - Milestone C																												
JBADS - Full Operational Capability																												
MDAP - Armored Multi-Purpose Vehicle (AMPV) LRIP	■	■	■	■	■	■	■	■	■																			
MDAP - European Reassurance Initiative (ERI) CBRN equipment	■	■																										
MDAP - Armored Multi-Purpose Vehicle (AMPV) FRP								■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
MDAP - Optionally Manned Fighting Vehicle (OMFV) RFP 1	■	■																										
MDAP - Optionally Manned Fighting Vehicle (OMFV) RP Contract		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
MDAP - Optionally Manned Fighting Vehicle (OMFV) RFP 2																												
MDAP - Optionally Manned Fighting Vehicle (OMFV) LRIP																												
MDAP - Robotic Combat Vehicle Experimental Prototype Build	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
MDAP - Future Long Range Assault Aircraft (FLRAA)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) DE5 / Decontamination (SDD)
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
CHRS - Developmental Test (DT)	1	2020	3	2020
CHRS - MS C- CHRT	1	2021	1	2021
CHRS - Full Rate Production (FRP) - CHRT	1	2021	1	2021
CHRS - Initial Operational Capability (IOC) - CHRT	1	2022	1	2022
CHRS - First Article Test/Production Re-certification Testing	2	2021	3	2021
CHRS - Full Operational Capability (FOC) - CHRT	2	2023	2	2023
DFoS - CIDAS Nerve Milestone C	4	2020	4	2020
DFoS - CIDAS Nerve Full Rate Production (FRP)	4	2020	4	2020
DFoS CIDAS BLISTER - DT/OT IP Equipment Testing	3	2021	3	2021
DFoS CIDAS BLISTER - DT/OT Shelf Life Scoping	3	2021	1	2022
DFoS CIDAS BLISTER - Milestone C	3	2025	3	2025
DFoS CIDAS BLISTER - Full Rate Production (FRP)	1	2024	1	2024
DFoS CIDAS BLISTER - Full Operational Capability (FOC)	3	2025	3	2025
FAMS-S - System Development and Prototype Refinement	4	2021	3	2022
FAMS-S - DT/OT	2	2022	2	2023
FAMS-S - MS C	3	2023	3	2023
FAMS-S - Low Rate Initial Production	3	2023	1	2024
FAMS-S - Full Rate Production	2	2024	4	2026
FAMS-S - IOC	4	2024	4	2024
JBADS - Contractor Specification Testing	1	2020	1	2020
JBADS - First System Build	1	2020	3	2020
JBADS - Initial Operational Test and Evaluation (IOT&E)	3	2021	1	2022

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) DE5 / Decontamination (SDD)
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Events	Start		End	
	Quarter	Year	Quarter	Year
JBADS - Full Rate Production (FRP)	3	2022	3	2022
JBADS - Initial Operational Capability (IOC)	3	2022	3	2022
JBADS - Milestone C	3	2022	3	2022
JBADS - Full Operational Capability	4	2023	4	2023
MDAP - Armored Multi-Purpose Vehicle (AMPV) LRIP	1	2020	4	2021
MDAP - European Reassurance Initiative (ERI) CBRN equipment	1	2020	2	2020
MDAP - Armored Multi-Purpose Vehicle (AMPV) FRP	3	2021	4	2023
MDAP - Optionally Manned Fighting Vehicle (OMFV) RFP 1	1	2020	2	2020
MDAP - Optionally Manned Fighting Vehicle (OMFV) RP Contract	2	2020	2	2022
MDAP - Optionally Manned Fighting Vehicle (OMFV) RFP 2	2	2022	3	2023
MDAP - Optionally Manned Fighting Vehicle (OMFV) LRIP	3	2023	2	2026
MDAP - Robotic Combat Vehicle Experimental Prototype Build	1	2020	3	2023
MDAP - Future Long Range Assault Aircraft (FLRAA)	1	2020	4	2026
MDAP - Future Attack Reconnaissance Aircraft (FARA)	1	2020	4	2026
MPD - MS A	2	2020	2	2020
MPD - Prototype Testing	3	2020	1	2021
MPD - Contract Option	2	2021	2	2021
MPD - Development Test (DT)	3	2021	1	2022
CONG - JBADS Lite - Development and Testing	2	2021	4	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) IP5 / Individual Protection (SDD)
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
IP5: Individual Protection (SDD)	-	12.179	12.960	18.941	-	18.941	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

This project provides Engineering & Manufacturing Development Phase and Low Rate Initial Production (EMD/LRIP) for individual protection equipment, with the goal of providing equipment that allows the individual Soldier, Sailor, Airman, or Marine to operate in a contaminated Nuclear, Biological and Chemical (NBC) environment with little or no degradation of his/her performance.

Efforts included in this project are:

- (1) Joint Service Aircrew Mask for Strategic Aircraft (JSAM SA)
- (2) Special Purpose Unit Rapid Capability Development and Deployment (SPU RCDD)
- (3) Uniform Integrated Protective Ensemble Family of Systems (UIPE FoS)
- (4) UIPE FoS General Purpose (GP)
- (5) UIPE FoS Air, and
- (6) UIPE FoS Gloves

JSAM SA will provide individual respiratory, ocular, and percutaneous protection of chemical and biological warfare agents, and select toxic industrial chemicals for USAF (E-3, E-8, C-135s, C-17, C-145, C-146, C130s, C-5), Aeromedical personnel (C-130s, KC-10, U-18, CV-22, KC-135, C-12s, KC-46), USN (P-8, E-6, C-40, C12, C-20), USMC (C-9, C-12, C-20, UC-35), and USA (RC-7, C-12s, C-20, C-26, UC-35, C-37) strategic aircrew. The mask components will be optimized to minimize their impact on the wearer's performance to continue lethality in a chemical biological (CB) environment and maximize its ability to interface with aircrew protective clothing. JSAM SA will provide pressure breathing for altitude for aircraft that do not require pressure breathing for gravity. JSAM SA will integrate with aircraft subsystems which include aviation life support equipment, aircrew flight equipment, aircraft seating, portable aircrew systems, communications systems, and aircraft oxygen systems. In FY22 the JSAM SA program will continue Operational Testing, Integration Testing and Safe-to-Fly on various Service aircraft.

SPU RCDD facilitates rapid response to near-term and emergent chemical-biological defensive capability requirements from elements of the Joint Special Operations Command (JSOC), select elements from across the Special Operations Force (SOF) Enterprise such as Combatant Commanders Response Forces (CRFs) and other Joint Force enabling units such as the 20th Chemical, Biological, Radiological, Nuclear and Explosives Command. SPU RCDD mitigates risk across the Chemical Biological Defense Program (CBDP) by creating a portfolio of operationally-relevant CB capabilities that can be quickly transitioned to needed elements and formations of the joint force, in whole or part, in response to the articulated, emergent capability needs of the geographic combatant commanders. These objectives are met by the early transitioning of promising science and technologies (S&T) from the Joint Science and Technology Office (JSTO) and the Defense Advanced Research Projects Agency (DARPA) among others; the focused conduct of combat evaluations and mission-oriented operational assessments to assess technological and mission suitability; and the active leveraging of existing Commercial-Off-The-Shelf (COTS) products along with novel redesign approaches to optimize existing solutions to new challenges supported by "buy-try-decide-acquire" acquisition strategies. Projects being initiated or continued in FY22 include 1) Low Temperature Mass Spectroscopy

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program	Date: May 2021
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Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) IP5 / Individual Protection (SDD)
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and Hyper Spectral imaging detection systems that provides users increased detection capability and orthogonal technologies for field confirmation, 2) Optimized CBRN Hydration resupply system that provides the user the ability to refill their own personal hydration system in a contaminated environment, 3) Modular and micro Powered Air Purifying Respirators (PAPR) that provides the user an improved form-fit over the existing C420 PAPR configuration, a smaller size and weight than the C420, and extend the filter and battery life beyond current capability so users may continue operating in a CB-contaminated environment unencumbered, and 4) CBRND protective equipment in response to new and emerging threats and opportunities. In FY22 SPU RCDD initiates efforts such as respiratory breathing systems, biological identification, and modernization of protective Chemical and Biological ensembles that have gone through requirements validation, and continues product enhancement development and technology upgrades on currently fielded SOF equipment to counter emerging threats, conduct limited user evaluations and operational assessment.

The UIPE FoS is a family of systems that provides the broad spectrum of users with individual percutaneous protective equipment allowing the ability to operate in a contaminated environment with no or minimal degradation in performance. UIPE FoS provides protection from operationally relevant traditional and non-traditional CBRN threats likely to be encountered during joint force operations. In FY21, UIPE FoS is separated into UIPE FoS GP, UIPE FoS Air and UIPE FoS Gloves.

UIPE FoS GP provides a family of systems that will give the Warfighter percutaneous protection from operationally relevant traditional, non-traditional, and advanced CBRN/Toxic Industrial Material (TIM) threats likely to be encountered during Joint Force operations. The Tactical All-Hazards Threat Protective Ensemble (TATPE) will be a subset to the UIPE FoS GP and capitalize on the protection factor of commercial Level A with design modifications to align with the necessary operational requirements. This suit serves as an additional tool in the arsenal until technology matures to the point of delivering a similar capability applied against the range of military operations in all environments under all conditions. In FY22, UIPE FoS GP program will complete Developmental/Operational Testing (DT/OT), conduct Operational Assessment (OA), and perform Surveillance Testing.

The UIPE FoS Air program provides the Warfighter percutaneous protection from operationally relevant traditional and non-traditional Chemical, Biological, Radiological, Nuclear (CBRN) threats for tactical/ejection seat, Rotary Wing, and non-ejection Fixed Wing platforms supporting the United States Air Force (USAF), United States Navy (USN), and United States Marine Corps (USMC). The UIPE FoS Air is composed of two variants - the UIPE FoS Air Chemical, Biological, Radiological Layer (CBRL) for USAF tactical/ejection fixed wing platforms and the two piece undergarment (2PUG) for the remaining USAF and USN/USMC tactical/ejection seat, Rotary Wing, and non-ejection Fixed Wing platforms. In FY22 the UIPE FoS Air program will complete system level development testing, begin integration testing as well as begin DT/OT to include flight testing.

UIPE FoS Gloves provides percutaneous protection to the hand and wrist interface of the warfighter against traditional and non-traditional CBRN threats. UIPE FoS Gloves will provide improved comfort, tactility and dexterity and for certain mission profiles enhanced touch screen and flame resistant capability. In FY22 the UIPE FoS Gloves program will finalize prototype development and testing, and initiate DT/OT on mature prototypes.

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

	FY 2020	FY 2021	FY 2022
Title: 1) Joint Service Aircrew Mask for Strategic Aircraft (JSAM SA)	1.103	1.145	1.153
Description: Operational Testing and Evaluation (OT&E)			
FY 2021 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) IP5 / Individual Protection (SDD)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
<p>Continue OT, Integration Testing and Safe-to-Fly on various Service aircraft. Continue updates to the TM to include specialized procedures for the various aircraft based on testing results. Continue engineering studies to assess communication system adaptors and oxygen system adaptors for remaining aircraft.</p> <p>FY 2022 Plans: Continue OT, Integration Testing and Safe-to-Fly on various Service aircraft. Continue updates to the Technical Manual to include specialized procedures for the various aircraft based on testing results. Continue engineering studies to assess communication system adaptors and oxygen system adaptors for remaining aircraft.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.</p>				
<p>Title: 2) Special Purpose Unit Rapid Capability Development & Deployment (SPU RCDD)</p> <p>Description: Development of specialized equipment for agent specific threats.</p> <p>FY 2021 Plans: Continue developing, prototyping, and maturing CBRND technologies to rapidly equip users with capabilities in response to new and emerging threats and opportunities.</p> <p>FY 2022 Plans: Initiate efforts such as respiratory breathing systems, biological identification, modernization of protective Chemical and Biological ensembles that have gone through requirements validation and continue developing, prototyping, and maturing CBD technologies to rapidly equip users with capabilities in response to new and emerging threats and opportunities, building on the advancements in decontamination, respiratory / ocular, and other defensive technologies demonstrated by prototypes. Conduct limited user evaluations / operational assessments.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.</p>		3.152	4.537	4.581
<p>Title: 3) Uniform Integrated Protective Ensemble (UIPE) Family of Systems (FoS)</p> <p>Description: Engineering and Manufacturing Development (EMD)</p>		5.224	-	-
<p>Title: 4) UIPE FoS - TATPE</p> <p>Description: System Development and Demonstration/Engineering and Manufacturing Development of Tactical All-Hazards Threat Protective Ensemble (TATPE)</p>		2.700	-	-
<p>Title: 5) UIPE FoS General Purpose (GP)</p>		-	4.328	8.167

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Description: Development of the next generation protective ensembles.</p> <p>FY 2021 Plans: Achieve Milestone B; conduct a Manufacturing Readiness Assessment(MRA); and begin Developmental/Operational Testing (DT/OT).</p> <p>FY 2022 Plans: Complete Developmental/Operational Testing (DT/OT), Conduct Operational Assessment (OA), Perform Surveillance Testing, and Engineering/Technical Integrated Product Team (IPT) Support.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to change in program/project technical parameters.</p>			
<p>Title: 6) UIPE FoS GP - Tactical All-Hazards Threat Protective Ensemble (TATPE)</p> <p>Description: TATPE system development, developmental testing, and operational assessment.</p> <p>FY 2021 Plans: Complete EMD phase to include system level testing and user evaluations. Complete MS C documentation to include final assessment, analysis and system documentation. Mission area focus includes: Land, Sea, and Homeland Defense.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program/project transitioned to Production and Deployment Phase. TATPE is entering the Production and Deployment (P&D) phase in late FY21.</p>	-	2.950	-
<p>Title: 7) UIPE FoS Air</p> <p>Description: Development of the Two Piece Undergarment (2PUG)</p> <p>FY 2022 Plans: Complete system level development testing and Safe to Fly requirements and begin integration testing. Begin Developmental Testing /Operational Testing (DT/OT) to include flight testing.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to change in program/project schedule.</p>	-	-	3.858
<p>Title: 8) UIPE FoS Gloves</p> <p>Description: Development of the Next Generation Protective Glove</p>	-	-	1.182

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) IP5 / Individual Protection (SDD)
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>FY 2022 Plans: Finalize UIPE FoS Glove prototype development and testing for multiple mission profiles (General Purpose, Air and All Hazard). Conduct DT/OT events on mature prototypes.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program/project transitioned to Engineering and Manufacturing Development Phase. Transition to EMD phase as BA4 is reducing and BA5 is ramping up.</p>			
Accomplishments/Planned Programs Subtotals	12.179	12.960	18.941

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

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• J10002: JS AIRCREW MASK (JSAM)	53.839	67.950	42.059	-	42.059	-	-	-	-	-	-
• MA0401: CBRN UNIFORM INTEGRATED PROTECTION ENSEMBLE (UIPE)	9.984	0.000	0.000	-	0.000	-	-	-	-	-	-

Remarks

D. Acquisition Strategy
JOINT SERVICE AIRCREW MASK STRATEGIC AIRCRAFT (JSAM SA)

The contract strategy consists of two sole-source contracts with Avon Protection Systems, the manufacturer of the fielded M53 mask. The first contract, which was awarded on 31 July 2013, covers all activities during the Engineering and Manufacturing Development (EMD) phase to include all LRIP builds. The second contract, which was awarded on 4 January 2019 to Avon Protection Systems, will cover the activities during the Production and Deployment (PD) phase including all Full Rate Production (FRP) builds for the Services.

SPU RAPID CAPABILITY DEVELOPMENT AND DEPLOYMENT (SPU RCDD)

Non-traditional projects will be executed for capabilities identified by Joint Special Operations Command (JSOC), select elements from across the Special Operations Forces (SOF) Enterprise, and other Joint Force enabling units. The SPU RCDD BA5 acquisition strategy for developmental efforts will allow rapid prototyping and testing of mission critical capabilities needed to enhance mission success. The SPU RCDD BA7 modernization effort will use technical and functional evaluations of currently-fielded items to introduce and incorporate operationally-relevant system developments. Both efforts will be accomplished by awarding an agreement through

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

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the Countering Weapons of Mass Destruction Other Transaction Authority (CWMD OTA) for the procurement of test assets. An OTA contracting approach will be used to procure test prototypes and test articles of possible solutions. The OTA consists of a consortium of all potential industry, research institutions, and non-traditional government that could be potential solvers for the program. Procurement will be through either the OTAs, a Small Business Innovative Research contract, or a more traditional contracting vehicle.

CBRN UNIFORM INTEGRATED PROTECTION ENSEMBLE FAMILY OF SYSTEMS (UIPE FOS)

The UIPE FoS program will conduct market research through both Requests For Information (RFIs) and a call for White Papers through an Other Transaction Authority (OTA) contracting approach. Candidate technologies will follow the same acquisition strategy employed for the suit: Early User Tests/Wear events and material and system level testing to identify available capabilities followed by a Trade Space Analysis to determine the most suitable glove(s). The UIPE FoS GP program will monitor S&T activities for possible technology transitions.

In FY21, UIPE FoS transitions to UIPE FoS GP, UIPE FoS Air and UIPE FoS Gloves. In order to reflect the structure of the program, UIPE FoS will meet Mission Area needs, not individual Service needs. The four Mission Areas are: Land (i.e. GP), Air, Sea, and All Hazards. Each of the Mission Areas has unique mission requirements that the UIPE FoS GP, Air and Gloves solutions will seek to fulfill.

UNIFORM INTEGRATED PROTECTIVE ENSEMBLE GENERAL PURPOSE (UIPE FOS GP)

UIPE FoS GP used an Other Transaction Authority (OTA) and Government designed prototypes produced in conjunction with an Industry Partner to acquire prototypes for early user testing. Warfighter feedback, trade space analysis, and chemical testing resulted in three government designed candidates being down selected in 3QFY20. These three candidates are designed to minimize operational burden and provide improved form, fit, function, and integration with the current Warfighter kits compared to legacy systems.

UNIFORM INTEGRATED PROTECTION ENSEMBLE FOS AIR (UIPE FOS AIR)

The UIPE Air utilizes a streamlined acquisition strategy that identifies mature technology and capitalizes on work accomplished by the USAF IAE and UIPE FOS General Purpose programs. The UIPE FoS Air will utilize an Milestone A-C acquisition strategy that will accelerate fielding to the Warfighter. The contract strategy leverages the USAF IAE SBIR Phase III contract to procure UIPE Air CBRL. The UIPE Air 2PUG will be procured utilizing a Government design.

UNIFORM INTEGRATED PROTECTIVE ENSEMBLE FOS GLOVES (UIPE FOS GLOVES)

The UIPE FoS program will conduct market research through both Requests For Information (RFIs) and a call for White Papers through an Other Transaction Authority (OTA) contracting approach. Candidate technologies will undergo Early User Tests/Wear events and material and system level testing to identify available capabilities followed by a Trade Space Analysis to determine the most suitable solution(s).

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) IP5 / Individual Protection (SDD)
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
SPU RCDD - HW C - Prototype Procurement	Various	Various : Various	0.000	2.335	Feb 2020	2.107	Mar 2021	2.140	Dec 2021	0.000		2.140	0.000	6.582	0.000
SPU RCDD - HW C - SEDS Prototype	C/FFP	Battelle Memorial Institute : Columbus, OH	0.000	0.000		0.110	Dec 2020	0.000		0.000		0.000	0.000	0.110	0.000
SPU RCDD - HW C - CBRN Hydration Development	C/FFP	D. Wheatley Enterprises Inc. : Belcamp, MD	0.000	0.000		0.399	Nov 2020	0.000		0.000		0.000	0.000	0.399	0.000
SPU RCDD - HW C - Assault Respirator	C/FFP	MRIGlobal : Kansas City, MO	0.000	0.000		0.570	Nov 2020	0.000		0.000		0.000	0.000	0.570	0.000
UIPE FOS - HW S - UIPE FoS Prototype Development	Various	Various : Various	0.000	1.421	Nov 2019	0.000		0.000		0.000		0.000	0.000	1.421	0.000
UIPE FOS - HW S - TATPE system development, fabrication, and swatch and system level technical testing	C/CPFF	Battelle Memorial Institute : Columbus, OH	0.621	0.940	Nov 2019	0.000		0.000		0.000		0.000	0.000	1.561	0.000
UIPE FOS GP - HW C - Prototype Development	MIPR	TBD : N/A	0.000	0.000		0.025	Dec 2020	1.000	Nov 2021	0.000		1.000	0.000	1.025	0.000
UIPE FOS GP - HW S - TATPE System Development	C/CPFF	Battelle Memorial Institute : Columbus, OH	0.000	0.000		2.050	Feb 2021	0.000		0.000		0.000	0.000	2.050	0.000
UIPE FOS AIR - HW C - Prototype Development (2PUG)	Various	Various : Various	0.000	0.000		0.000		0.406	Nov 2021	0.000		0.406	0.000	0.406	0.000
UIPE FOS GLOVES - HW C - Prototype Manufacturing, Prototype Demonstration and Down-select	MIPR	Various : Various	0.000	0.000		0.000		0.300	Nov 2021	0.000		0.300	0.000	0.300	0.000
Subtotal			0.621	4.696		5.261		3.846		0.000		3.846	0.000	14.424	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) IP5 / Individual Protection (SDD)
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Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
JSAM SA - TD/D S - Logistics, Engineering, and IPT Support	MIPR	Various : Various	0.790	0.036	Feb 2020	0.200	Dec 2020	0.206	Dec 2021	0.000		0.206	0.000	1.232	0.000
SPU RCDD - ES C - Engineering Support	Various	Various : Various	0.000	0.000		0.672	Dec 2020	0.186	Dec 2021	0.000		0.186	0.000	0.858	0.000
SPU RCDD - TD/D C - Technical Support	Various	Various : Various	0.000	0.196	Feb 2020	0.000		0.000		0.000		0.000	0.000	0.196	0.000
UIPE FOS - ES S - Logistics, Engineering and IPT Support	Various	Various : Various	1.889	2.232	Nov 2019	0.000		0.000		0.000		0.000	0.000	4.121	0.000
UIPE FOS - ES S - TATPE Integrated Product Team (IPT) Program, Engineering and Technical Support	MIPR	Various : Various	0.279	0.685	Nov 2019	0.000		0.000		0.000		0.000	0.000	0.964	0.000
UIPE FOS GP - ES S - TATPE Engineering & Technical IPT Support / SME Support	Various	Various : Various	0.000	0.000		0.300	Oct 2020	0.000		0.000		0.000	0.000	0.300	0.000
UIPE FOS GP - ES C - Engineering & Technical IPT Support / SME Support	Various	Various : Various	0.000	0.000		1.713	Dec 2020	1.052	Nov 2021	0.000		1.052	0.000	2.765	0.000
UIPE FOS AIR - ES C - Engineering and IPT Support	Various	Various : Various	0.000	0.000		0.000		0.500	Nov 2021	0.000		0.500	0.000	0.500	0.000
UIPE FOS GLOVES - ES C - Engineering, Logistics, Technical, IPT Support	MIPR	Various : Various	0.000	0.000		0.000		0.357	Nov 2021	0.000		0.357	0.000	0.357	0.000
Subtotal			2.958	3.149		2.885		2.301		0.000		2.301	0.000	11.293	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) IP5 / Individual Protection (SDD)
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Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
JSAM SA - DTE S - DT/OT	MIPR	Various : Various	2.706	0.717	Nov 2019	0.774	Dec 2020	0.775	Dec 2021	0.000		0.775	0.000	4.972	0.000
SPU RCDD - OTE S - Operational Assessment	MIPR	National Assessment Group : Kirkland, NM	0.000	0.000		0.000		0.500	Dec 2021	0.000		0.500	0.000	0.500	0.000
SPU RCDD - DTE C - Test and Evaluation	Various	Various : Various	0.000	0.000		0.100	Mar 2021	0.000		0.000		0.000	0.000	0.100	0.000
SPU RCDD - DTE C - Testing and Evaluation	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	0.000	0.218	Feb 2020	0.000		0.515	Dec 2021	0.000		0.515	0.000	0.733	0.000
SPU RCDD - DTE C - Test and Evaluation #2	C/FFP	Battelle Memorial Institute : Columbus, OH	0.000	0.153	Apr 2020	0.000		0.000		0.000		0.000	0.000	0.153	0.000
UIPE FOS - DTE S - System Level Testing	Various	Various : Various	3.155	0.446	Nov 2019	0.000		0.000		0.000		0.000	0.000	3.601	0.000
UIPE FOS - OTHT S - TATPE Testing for chemical warfare agent and toxic industrial chemical swatch level testing	MIPR	CCDC CBC : Aberdeen Proving Ground, MD	0.200	1.075	Apr 2020	0.000		0.000		0.000		0.000	0.000	1.275	0.000
UIPE FOS GP - DTE C - DT/OT	Various	Various : Various	0.000	0.000		1.499	Dec 2020	3.365	Nov 2021	0.000		3.365	0.000	4.864	0.000
UIPE FOS GP - DTE S - TATPE Technical Testing	Various	Various : Various	0.000	0.000		0.200	Nov 2020	0.000		0.000		0.000	0.000	0.200	0.000
UIPE FOS GP - OTE S - TATPE User Evaluation	Various	Various : Various	0.000	0.000		0.400	Dec 2020	0.000		0.000		0.000	0.000	0.400	0.000
UIPE FOS GP - DTE C - Surveillance Testing	MIPR	Defense Technical Information Center (DTIC) : Fort Belvoir, VA	0.000	0.000		0.000		1.525	Nov 2021	0.000		1.525	0.000	1.525	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) IP5 / Individual Protection (SDD)
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Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
UIPE FOS AIR - DTE C - System Level Testing	Various	Various : Various	0.000	0.000		0.000		2.374	Nov 2021	0.000		2.374	0.000	2.374	0.000
UIPE FOS GLOVES - DTE C - Early User Testing, Developmental Testing	MIPR	Various : Various	0.000	0.000		0.000		0.348	Nov 2021	0.000		0.348	0.000	0.348	0.000
Subtotal			6.061	2.609		2.973		9.402		0.000		9.402	0.000	21.045	N/A

Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
JSAM SA - PM/MS S - Program Management Support	MIPR	Various : Various	1.414	0.350	Feb 2020	0.171	Dec 2020	0.172	Dec 2021	0.000		0.172	0.000	2.107	0.000
SPU RCDD - PM/MS C - Program Management Support	Various	Various : Various	0.000	0.250	Feb 2020	0.579	Nov 2020	1.240	Nov 2021	0.000		1.240	0.000	2.069	0.000
UIPE FOS - MS S - PM/SME Program Management Support	MIPR	Various : Various	0.808	1.125	Nov 2019	0.000		0.000		0.000		0.000	0.000	1.933	0.000
UIPE FOS GP - PM/MS C - Program Management Support	Various	Various : Various	0.000	0.000		1.091	Dec 2020	1.225	Nov 2021	0.000		1.225	0.000	2.316	0.000
UIPE FOS AIR - PM/MS C - Program Management Services	MIPR	Various : Various	0.000	0.000		0.000		0.578	Nov 2021	0.000		0.578	0.000	0.578	0.000
UIPE FOS GLOVES - PM/MS C - Program Management Support	Various	Various : Various	0.000	0.000		0.000		0.177	Dec 2021	0.000		0.177	0.000	0.177	0.000
Subtotal			2.222	1.725		1.841		3.392		0.000		3.392	0.000	9.180	N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) IP5 / Individual Protection (SDD)
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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
UIPE FOS GP - Make or Buy Decision							■																					
UIPE FOS GP - Critical Design Review (CDR)							■																					
UIPE FOS GP - Operational Assessment										■																		
UIPE FOS GP - Joint Independent Logistics Assessment (JILA)												■																
UIPE FOS GP - Capability Development Document (CDD) Update												■																
UIPE FOS GP - Milestone C															■													
UIPE FOS GP - FRP																			■									
UIPE FOS GP - Initial Operational Capability (IOC)																												■
UIPE FOS GP - TATPE User Evaluation							■																					
UIPE FOS GP - TATPE Technical Testing							■																					
UIPE FOS GP - TATPE Milestone C											■																	
UIPE FOS GP - TATPE IOC															■													
UIPE FOS GP - TATPE FOC																												■
UIPE FOS AIR - CBRL Full Rate Production (FRP) USAF							■																					
UIPE FOS AIR - Developmental/Operational (DT/OT) Testing											■																	
UIPE FOS AIR - Safe to Fly Certification															■													
UIPE FOS AIR - 2PUG Full Rate Production (FRP)																												■
UIPE FOS AIR - 2 PUG Initial Operational Capability (IOC)																												■
UIPE FOS GLOVES - Draft CDD							■																					
UIPE FOS GLOVES - Prototype Development																												■

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) IP5 / Individual Protection (SDD)
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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
UIPE FOS GLOVES - Milestone A								■																				
UIPE FOS GLOVES - Early User, material and system level testing											■																	
UIPE FOS GLOVES - DT											■	■																
UIPE FOS GLOVES - Milestone B															■													
UIPE FOS GLOVES - OT															■	■												
UIPE FOS GLOVES - Milestone C																											■	
UIPE FOS GLOVES - Trade Space Analysis Decision											■																	

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) IP5 / Individual Protection (SDD)
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
JSAM SA - DT/OT (Capability, Integration, Airworthiness Certification)	1	2020	4	2023
JSAM SA - Initial Operational Capability (IOC)	2	2021	2	2021
JSAM SA - Full Operational Capability (FOC)	4	2024	4	2024
SPU RCDD - Development Efforts	1	2020	4	2026
UIPE FOS - Air System Testing	1	2020	1	2020
UIPE FOS - Air Material Testing	1	2020	4	2020
UIPE FOS - Air Design Reviews	1	2020	3	2020
UIPE FOS - Air LRIP/USAF Fielding Decision	2	2020	2	2020
UIPE FOS - Air RFP	3	2020	3	2020
UIPE FOS - Air MRA	4	2020	4	2020
UIPE FOS - Air MS C	4	2020	4	2020
UIPE FOS - Air Operational Test Agency Evaluation Report (OER)	4	2020	4	2020
UIPE FOS - TATPE DT/OT	1	2020	1	2021
UIPE FOS - TATPE Milestone B	2	2020	2	2020
UIPE FOS - TATPE User Evaluation	4	2020	1	2021
UIPE FOS - TATPE Technical Testing	4	2020	1	2021
UIPE FOS GP - Capability Development Document (CDD)	1	2021	1	2021
UIPE FOS GP - Milestone B	2	2021	2	2021
UIPE FOS GP - Test & Evaluation Master Plan (TEMP) Update	2	2021	2	2021
UIPE FOS GP - DT/OT	2	2021	3	2022
UIPE FOS GP - Manufacturing Readiness Assessment (MRA)	3	2021	3	2021
UIPE FOS GP - Make or Buy Decision	3	2021	3	2021

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) IP5 / Individual Protection (SDD)
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Events	Start		End	
	Quarter	Year	Quarter	Year
UIPE FOS GP - Critical Design Review (CDR)	3	2021	3	2021
UIPE FOS GP - Operational Assessment	1	2022	1	2022
UIPE FOS GP - Joint Independent Logistics Assessment (JILA)	3	2022	3	2022
UIPE FOS GP - Capability Development Document (CDD) Update	4	2022	4	2022
UIPE FOS GP - Milestone C	3	2023	3	2023
UIPE FOS GP - FRP	1	2024	1	2024
UIPE FOS GP - Initial Operational Capability (IOC)	4	2025	4	2026
UIPE FOS GP - TATPE User Evaluation	1	2021	2	2021
UIPE FOS GP - TATPE Technical Testing	1	2021	2	2021
UIPE FOS GP - TATPE Milestone C	1	2022	1	2022
UIPE FOS GP - TATPE IOC	1	2023	1	2023
UIPE FOS GP - TATPE FOC	4	2024	4	2024
UIPE FOS AIR - CBRL Full Rate Production (FRP) USAF	4	2020	4	2020
UIPE FOS AIR - Developmental/Operational (DT/OT) Testing	1	2022	2	2022
UIPE FOS AIR - Safe to Fly Certification	1	2022	4	2022
UIPE FOS AIR - 2PUG Full Rate Production (FRP)	2	2023	2	2023
UIPE FOS AIR - 2 PUG Initial Operational Capability (IOC)	4	2023	4	2023
UIPE FOS GLOVES - Draft CDD	1	2021	1	2021
UIPE FOS GLOVES - Prototype Development	1	2021	4	2022
UIPE FOS GLOVES - Milestone A	4	2021	4	2021
UIPE FOS GLOVES - Early User, material and system level testing	1	2022	1	2022
UIPE FOS GLOVES - DT	2	2022	4	2022
UIPE FOS GLOVES - Milestone B	2	2023	2	2023
UIPE FOS GLOVES - OT	1	2023	1	2024
UIPE FOS GLOVES - Milestone C	3	2024	3	2024

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program			Date: May 2021	
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Events	Start		End	
	Quarter	Year	Quarter	Year
UIPE FOS GLOVES - Trade Space Analysis Decision	2	2022	2	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) IS5 / Information Systems (SDD)
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
IS5: Information Systems (SDD)	-	20.723	6.019	0.000	-	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

This Project provides for Advanced Component Development and Prototypes (ACD&P) responsible for providing the information architecture and applications for shaping the battlespace against the Chemical, Biological, Radiological and Nuclear (CBRN) threat. Experimentation and demonstration will be used in this phase to reduce risk and inform supporting materiel solutions, CONOPS and TTPs.

Efforts included in this project are:

- (1) Global Biosurveillance Portal (G-BSP),
- (2) Joint Effects Model 2 (JEM 2),
- (3) Joint Warning and Reporting Network 2 (JWARN 2),
- (4) Software Support Activity (SSA), and
- (5) CBRN Information System (CBRN IS).

The G-BSP program provides a web-based enterprise environment that facilitates collaboration, communication, and information sharing in support of the detection, management, and mitigation of man-made and naturally occurring biological events. G-BSP Provides a central access point for biosurveillance information and situational awareness for DoD, interagency and allied partners supporting the early identification and response to biological events. G-BSP provides an integrated suite of web-based components designed to support public health officers, environmental officers, clinicians, physicians, and CBRN personnel as they maintain their situational awareness of local, regional, and global biological threats to the force. G-BSP does not duplicate existing DoD capabilities, but rather leverages existing tools and technologies to provide users across multiple organizations and disciplines with a centralized "one-stop shop" for all of their biosurveillance resources. The G-BSP will transition to USSOCOM for sustainment in FY23.

The JEM 2 program provides a software application that provides the Department of Defense (DoD) with the only operationally tested and accredited tool to model and simulate the effects of CBRN weapon strikes and incidents that is approved for use by operational warfighters. JEM 2 applies advanced physics using weather, terrain, and agent characteristics to predict the time-phased impact of CBRN and Toxic Industrial Chemical/Material (TIC/TIM). JEM 2 displays hazard information on the Common Operational Picture (COP) and allows commanders to assess risk and take steps to mitigate the effects of Weapons of Mass Destruction (WMD) on operational forces. The JEM 2 program was directed to complete development and enter sustainment 2 years early by the FY19 Defense Wide Review. The JEM 2 program will complete development and will be moved into the BA7 MOD CBRN IS program (Project IS7) starting in FY22.

The JWARN 2 program provides a software application that provides the DoD with a warning and reporting system that enables an immediate and integrated response to threats of contamination by WMD, CBRN, and TIM incidents. JWARN 2 provides a digital display of CBRN reports on the COP, presented through Service-provided Command and Control systems resident at all echelons of command. Enhanced situational battlespace awareness provides Commanders the ability to support

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

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warfighter battle management and continuity of operations in a contaminated environment. The JWARN 2 program will be moved into the BA7 MOD CBRN IS program (Project IS7) starting in FY22.

The SSA program provides for enterprise services in the areas of software development, system/network architectures, cybersecurity, information assurance standards and policies and interoperability. The SSA emphasizes development of reference implementations to guide Government and industry system and software developers to ensure that their products meet risk management framework compliance and common interoperability standards such as the Integrated Sensor Architecture (ISA). SSA efforts will be moved into the BA7 MOD CBRN IS program (Project IS7) starting in FY22.

The CBRN IS program provides a collaborative Cloud hosted environment that allows users to collect and disseminate CBRN warning and reporting data, provide detailed CBRN hazard predictions, aid in decision support, and make relevant CBRN defense information available in near-real time. CBRN IS provides an environment that supports the implementation of Integrated Early Warning (IEW) capabilities that allow users to access netted sensor information, data fusion, disease modeling, biosurveillance data, source term estimation data, incident management tools, and planning and analysis capabilities. The CBRN IS enterprise makes CBRN decision aids readily accessible from any desktop through a web browser simplifying interoperability, reducing integration and deployment costs and increases cybersecurity protection. The CBRN IS program will be moved into the BA7 MOD CBRN IS program (Project IS7) starting in FY22.

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
Title: 1) Global Biosurveillance Portal (Global-BSP) Description: Product Development	2.949	-	-
Title: 2) Global-BSP Description: Developmental Test and Evaluation	0.295	-	-
Title: 3) Global-BSP Description: Program Management Support	0.466	-	-
Title: 4) Global-BSP Description: Operational Testing and Evaluation	0.655	-	-
Title: 5) Global-BSP Description: Training and Logistics Support	0.199	-	-
Title: 6) Joint Effects Model 2 (JEM 2) Description: Developmental Test and Evaluation	0.420	-	-
Title: 7) JEM 2	1.359	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
Description: Product Development			
Title: 8) JEM 2	0.521	-	-
Description: Program Management			
Title: 9) JEM 2	0.782	-	-
Description: Operational Test and Evaluation			
Title: 10) JEM 2	0.842	-	-
Description: Training and Logistics Support			
Title: 11) Joint Warning and Reporting Network 2 (JWARN 2)	0.834	-	-
Description: Management Support			
Title: 12) JWARN 2	4.828	-	-
Description: Product Development			
Title: 13) JWARN 2	0.567	-	-
Description: Developmental Test and Evaluation			
Title: 14) JWARN 2	0.850	-	-
Description: Operational Test and Evaluation			
Title: 15) JWARN 2	1.084	-	-
Description: Training and Logistics Support			
Title: 16) Software Support Activity (SSA)	0.064	-	-
Description: Policies, Standards and Guidelines			
Title: 17) SSA	0.075	-	-
Description: Integrated Architecture			

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Title: 18) SSA</p> <p>Description: Enterprise Support and Services</p> <p>FY 2021 Plans: Support the CBRND enterprise through continuous engagement to assist with the development of acquisition products during the Engineering and Manufacturing Development and Low Rate Initial Production (EMD/LRIP) phase to reduce risk; assist with technology transitions, and logistics; plan and execute new equipment training, and program management. Provide subject matter expertise in the areas of software development, network architecture, cybersecurity, technology transition, and information assurance standards and policies.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program/project funding transferred to another funding line. Program funding transferred to BA7 in the MOD CBRN IS portfolio beginning in FY22.</p>	0.221	2.888	-
<p>Title: 19) SSA</p> <p>Description: Chemical, Biological, Radiological, Nuclear (CBRN) Data Model</p>	0.411	-	-
<p>Title: 20) SSA</p> <p>Description: Cybersecurity / Information Assurance</p>	0.442	-	-
<p>Title: 21) SSA</p> <p>Description: Policy and Standards Repository</p>	0.127	-	-
<p>Title: 22) SSA</p> <p>Description: Technology Transition Support</p>	0.284	-	-
<p>Title: 23) Chemical Biological Radiological and Nuclear Information Systems (CBRN IS)</p> <p>Description: Technical Guidance</p>	0.217	-	-
<p>Title: 24) CBRN IS</p> <p>Description: Standardization</p>	0.523	-	-
<p>Title: 25) CBRN IS</p>	0.203	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
Description: Cybersecurity / Information Assurance			
Title: 26) CBRN IS	1.025	-	-
Description: Product Development			
Title: 27) CBRN IS	0.480	-	-
Description: Operational Assessments			
Title: 28) CBRN IS	-	3.131	-
Description: Product Development, Operational Assessments, Management, Engineering, and Cybersecurity Support			
FY 2021 Plans: Continue operational test and user feedback events to assess and validate capabilities prior to implementing in the production environment. Continue operational test and evaluations in order to meet Key Performance Parameters (KPP) and Key System Attributes (KSA). Provide management and system engineering oversight and integration of future capabilities and emerging requirements including advanced technology demonstrations (ATDs) and experimental capability demonstrations (ECDs). Ensure development and integration efforts are compliant and compatible with the Joint Information Environment (JIE) and Service common operational and common computing environments. Continue the implementation of ongoing cybersecurity requirements and policies and DoD information assurance vulnerability alerts (IAVAs) to mitigate system vulnerabilities. Continue adversarial and cooperative vulnerability testing.			
FY 2021 to FY 2022 Increase/Decrease Statement: Program/project funding transferred to another funding line. Program funding transferred to BA7 in the MOD CBRN IS portfolio beginning in FY22.			
Accomplishments/Planned Programs Subtotals	20.723	6.019	-

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• IS7: Information Systems (Op Sys Dev)	15.773	3.234	15.281	-	15.281	-	-	-	-	-	-
• G47101: JOINT WARNING & REPORTING NETWORK (JWARN)	0.942	0.000	0.000	-	0.000	-	-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

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

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• JC0208: JOINT EFFECTS MODEL (JEM)	1.189	0.000	0.000	-	0.000	-	-	-	-	-	-
• JS5230: MODERNIZATION CBRN INFORMATION SYSTEMS (MOD CBRN IS)	0.081	0.074	0.611	-	0.611	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

BIOSURVEILLANCE PORTAL (BSP)

The Global Biosurveillance Portal (G-BSP) program is using the SOFCIDS (Special Operations Capabilities Integration and Development System) requirements approach and the JROC IT Box acquisition construct which allows fielding of operational capabilities while continued R&D matures technology required for follow-on versions. IT Box enables programs to tailor the incrementally fielded software program model in the DODI 5000.02 to conduct multiple iterative fielding events in lieu of a single fielding event, and field products to the warfighter utilizing an incremental delivery approach. G-BSP will achieve Full Operational Capability in 2020. G-BSP will transition to Total Package Fielding in 2021-2022 prior to USSOCOM Sustainment beginning in FY23. In FY21 and beyond, the Defense-Wide Review (DWR) reduced this program for higher priorities.

JOINT EFFECTS MODEL (JEM)

JEM 2 acquisition utilizes Agile software development practices, employing the incrementally fielded software program model in the DODI 5000.02 to conduct multiple, more frequent fieldings in lieu of a single fielding event. As part of the strategy, an over-arching MS B was approved by the MDA. JEM Requirements Definition packages have been approved along with Capability Drops (CD) that define capability sets to be developed, tested, and fielded operationally. These CDs are additive in nature, increasing the total capability of JEM 2 that was originally scheduled to be completed in FY22. However, funding in FY21 and beyond was reduced through the Defense-Wide Review (DWR) and the program will be moved to sustainment in FY21 and managed through MOD CBRN IS beginning 1QFY22.

JOINT WARNING & REPORTING NETWORK (JWARN)

JWARN 2 acquisition utilizes Agile software development practices, employing the incrementally fielded software program model in the DODI 5000.02 to conduct multiple, more frequent fieldings in lieu of a single fielding event. As part of the strategy, an over-arching MS B and Build Decision for Requirements Definition Package 1 (RDP-1) were approved by the MDA in Q4 FY14. Subsequent RDPs have been approved along with Capability Drops (CD) that define capability sets to be developed, tested, and fielded operationally. These CDs are additive in nature, increasing the total capability of JWARN that was originally scheduled to be completed in FY22.

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However, funding in FY21 and beyond was reduced through the Defense-Wide Review (DWR) and the program will be moved to sustainment in FY21 and managed through SSA and MOD CBRN-IS beginning Q1FY22.

SOFTWARE SUPPORT ACTIVITY (SSA)

Software Support Activity (SSA) is a non-acquisition, service organization that provides professional subject matter expertise support throughout the CBDP Enterprise. These services are provided by government and contract personnel with expertise in software development, network architecture, cybersecurity, technology transitions, information assurance, and standards and policies compliance, and are provided throughout the lifecycle of programs within the CBDP portfolio. These efforts facilitate the efficient development, transition, fielding, modernization, and sustainment of interoperable and integrated CBRN capabilities. In FY22, SSA efforts will transition to Modernization CBRN Information Systems (MOD CBRN IS).

CBRN INFORMATION SYSTEMS

CBRN IS acquisition utilizes a Family-of-Systems (FoS) approach to align multiple capabilities to the CBRN-IS architecture and operational environment. CBRN IS leverages the concepts of CBRN Hazard Awareness and Understanding and DISA Enterprise Services to integrate current CBRN capabilities, and other information and intelligence services, applications, and systems to provide increased situational awareness and decision support to commanders for CBRN defense. The strategy supports the implementation of integrated early warning capabilities by incorporating mature science and technology products and emerging technologies from existing advanced technology demonstrations (ATD) and experimental capability demonstrations (ECD). CBRN IS utilizes the Agile software development process to provide for the spiral development and fielding of modular capability packages. CBRN IS will transition to MOD CBRN IS beginning 1QFY22.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
BSP - SW S - software -Global-BSP software development	MIPR	Johns Hopkins University - Applied Physics Lab : Laurel, MD	24.869	2.797	Dec 2019	0.000		0.000		0.000		0.000	0.000	27.666	0.000
JEM - SW SB -2 - Hazard Prediction Model Development and Integration	C/CPAF	General Dynamics Information Technologies : Fairfax, VA	15.326	1.880	Jan 2020	0.000		0.000		0.000		0.000	0.000	17.206	0.000
JWARN - 2- SW S - Soft Dev Follow-On	C/CPAF	DCS Corps : Alexandria, VA	3.100	4.828	Dec 2019	0.000		0.000		0.000		0.000	0.000	7.928	0.000
SSA - SW S - CBRN Data Model	C/CPAF	Various : Various	9.034	0.446	Feb 2020	0.778	Feb 2020	0.000		0.000		0.000	0.000	10.258	0.000
CBRN IS - SW S - software - integration with BSP, JEM, JWARN	MIPR	Various : Various	2.937	0.973	Dec 2019	1.339	Dec 2020	0.000		0.000		0.000	0.000	5.249	0.000
Subtotal			55.266	10.924		2.117		0.000		0.000		0.000	0.000	68.307	N/A

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
JEM - ILS C - Training and Logistics Support	Various	Various : Various	0.242	0.321	Dec 2019	0.000		0.000		0.000		0.000	0.000	0.563	0.000
JWARN - ILS C - Training and Logistics Support	Various	Various : Various	1.604	1.084	Apr 2020	0.000		0.000		0.000		0.000	0.000	2.688	0.000
SSA - ES S - Support Costs	MIPR	Space and Naval Warfare (SPAWAR) Systems Center : San Diego, CA	11.709	1.114	Feb 2020	2.000	Feb 2021	0.000		0.000		0.000	0.000	14.823	0.000
CBRN IS - ES S - Support Costs - Cybersecurity and IA updates, architecture documentation	MIPR	Space and Naval Warfare (SPAWAR) Systems Center : San Diego, CA	2.450	0.672	Dec 2019	0.715	Dec 2020	0.000		0.000		0.000	0.000	3.837	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

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Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			16.005	3.191		2.715		0.000		0.000		0.000	0.000	21.911	N/A

Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
BSP - DTE S - Software	MIPR	Various : Various	3.861	0.488	Dec 2019	0.000		0.000		0.000		0.000	0.000	4.349	0.000
BSP - OTE S - Software - MOT&E	MIPR	Various : Various	4.341	0.911	Dec 2019	0.000		0.000		0.000		0.000	0.000	5.252	0.000
JEM - Test & Evaluation	MIPR	Various : Various	4.233	1.202	Dec 2019	0.000		0.000		0.000		0.000	0.000	5.435	0.000
JWARN - 2- DTE S - Completed Development Test and Evaluation of JWARN 2 in support of JWARN 2 IOT&E	MIPR	Various : Various	1.805	0.567	Dec 2019	0.000		0.000		0.000		0.000	0.000	2.372	0.000
JWARN - 2 - OTE S - Multi-service Operational Test and Evaluation of JWARN 2 software	MIPR	Various : Various	3.699	0.850	Dec 2019	0.000		0.000		0.000		0.000	0.000	4.549	0.000
CBRN IS - OTE S - Operational Test - service-specific testing, joint test	MIPR	Various : Various	1.924	0.675	Dec 2019	0.786	Dec 2020	0.000		0.000		0.000	0.000	3.385	0.000
Subtotal			19.863	4.693		0.786		0.000		0.000		0.000	0.000	25.342	N/A

Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
BSP - PM/MS S - Program Management	Various	Various : Various	3.713	0.368	Dec 2019	0.000		0.000		0.000		0.000	0.000	4.081	0.000

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) IS5 / Information Systems (SDD)
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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
SSA - Develop and provide CBRN Data Model implementation guidance, including reference implementations																												
SSA - Provide CBRN Interface Standards, including reference implementations, e.g. Common CBRN Sensor Interface																												
CBRN IS - Product Development																												
CBRN IS - Operational Assessments																												
CBRN IS - Developmental Test																												
CBRN IS - Total Package Fielding																												
CBRN IS - Continuous Engineering																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
BSP - FOC	3	2021	3	2021
JEM Increment 2 - RDP 4 Approval	1	2021	1	2021
JEM Increment 2 - FD 4 USMC	3	2020	3	2020
JEM Increment 2 - Govt DT / OT / V&V	1	2020	4	2020
JWARN Increment 2 - Govt DT / OT / UFEs / OAs / FOTs	1	2020	4	2020
JWARN Increment 2 - Modernization and Update	1	2020	4	2020
JWARN Increment 2 - Product Development	1	2020	3	2020
SSA - Provide Information Assurance Site Compliance Testing	1	2020	4	2021
SSA - Provide Integration and Test, M&S, VV&A Certification and Accreditation	1	2020	4	2021
SSA - Provide Enterprise Architecture Products and Services	1	2020	4	2021
SSA - Provide Information Assurance Certification/Acceptance products/services, including compliance testing	1	2020	4	2021
SSA - Provide Modeling, Simulation, VV&A, Integration/Test support and interoperability demonstrations.	1	2020	4	2021
SSA - Provide Net-Centric Assessment and assist programs with implementation of policy	1	2020	4	2021
SSA - Sustain Common Components products, process and services	1	2020	4	2021
SSA - Develop and provide CBRN Data Model implementation guidance, including reference implementations	1	2020	4	2021
SSA - Provide CBRN Interface Standards, including reference implementations, e.g. Common CBRN Sensor Interface	1	2020	4	2021
CBRN IS - Product Development	1	2020	4	2021
CBRN IS - Operational Assessments	1	2020	4	2021

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

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Events	Start		End	
	Quarter	Year	Quarter	Year
CBRN IS - Developmental Test	1	2020	4	2021
CBRN IS - Total Package Fielding	1	2020	4	2021
CBRN IS - Continuous Engineering	1	2021	4	2021

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program										Date: May 2021		
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
MB5: Medical Biological Defense (SDD)	-	170.345	117.956	137.348	-	137.348	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project supports Engineering and Manufacturing Development and Low Rate Initial Production (EMD/LRIP) of medical countermeasures, development of reagents, assays, diagnostic equipment, biosurveillance and supporting efforts.

Efforts included in this project are:

- (1) Coronavirus Disease Point of Care Diagnostics (COVID POC DX)
- (2) Coronavirus Disease Repurposed Therapeutics (COVID TX)
- (3) Antiviral Therapeutics Program (AV TX)
- (4) Botulinum Monoclonal Antibodies (BOT MAB)
- (5) Countering Emerging Threats Rapid Acquisition and Investigation of Drugs for Repurposing (CET RAIDR)
- (6) Chem Bio Incident Preparedness and Response - Advanced Development and Manufacturing (CBIPR - ADM)
- (7) Countermeasures for Multi-Drug Resistance-Bacterial (CMDR-B)
- (8) Defense Biological Products Assurance Program (DBPAP)
- (9) Joint Mobile Emerging Disease Intervention Clinical Capability (JMEDICC)
- (10) Medical Countermeasure Platform Technologies (MCMPT)
- (11) Next Generation Diagnostic System 2 (NGDS 2)
- (12) NGDS 2 Chemical Diagnostic (NGDS 2 CHEMDX)
- (13) NGDS 2 Man Portable Diagnostic System (NGDS 2 MPDS)
- (14) Botulinum Vaccine (VAC BOT)
- (15) Plague Vaccine (VAC PLG)
- (16) Botulinum and Plague Vaccine Storage and Stability Testing (Congressional Interest Item - CONG)
- (17) Antiviral Prophylaxis Studies (Congressional Interest Item - CONG)
- (18) Special Immunizations Program (VAC SIP)

The COVID POC DX program is utilizing Coronavirus Aid, Relief, and Economic Security (CARES) Act funds to evaluate Commercial-Off-The-Shelf (COTS) POC devices for diagnosing COVID-19 at DoD locations that could benefit from reduced logistical burden of more complex diagnostic devices. The evaluation of these devices will enable moving testing capability closer to the patient in order to more efficiently and quickly identify the infected, implement treatment decisions and break

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the chains of disease transmission through non-pharmaceutical interventions. With this effort the CBDP is generating critical enabling data that will inform diagnostic use cases to refine testing strategies for the DoD to more efficiently address COVID response.

The COVID TX program is utilizing CARES Act funds to support the development of Food and Drug Administration (FDA) approved therapeutics for the treatment of COVID-19.

The AV TX program will develop and deliver FDA approved antiviral therapeutics for the warfighter. Based on the current gap in defense to the warfighter, the initial therapeutic candidate is now for a treatment against the Marburg virus in lieu of Ebola Zaire to follow for approval of a PanFilo therapeutic. Other pathogens on the biological warfare threat lists, including viruses of interest from Filoviridae, Arenaviridae, Bunyaviridae, and Flaviviridae, are targets of future interest. Developed broad spectrum antiviral therapeutics will be employed after suspected or confirmed exposure to the relevant threat agents and AVTX Medical Countermeasures (MCMs) will ameliorate the effect of threat agents to the warfighter. In the event of a natural occurring outbreak, antiviral therapeutics can be provided to ensure freedom of operation. In FY22 AV TX in the Engineering Manufacturing Design (EMD) phase will initiate efficacy studies with Non-Human Primates (NHPs) infected with Marburg virus towards animal rule FDA approval.

The BOT MAB program will provide an anti-botulinum neurotoxin monoclonal antibody (mAB) cocktail that protects the warfighter against exposure to BOT A&B serotypes. It will provide prophylaxis and therapy for Warfighter exposure to aerosolized botulinum neurotoxin serotypes A and B and is intended for intramuscular route of administration. This capability is complementary to botulinum vaccine and therapeutics and will provide a continuum of protection against botulinum toxins. BoNT Advanced Development and Manufacturing of Antibody Technology (ADAMANT) leverages the advanced platform technology developed within the DoD's Advanced Development Manufacturing (ADM) facility that was initiated by the Medical Countermeasure Platform Technologies (MCMPT). In FY22 BOT MAB continues Botulinum monoclonal antibody platform development with manufacturing runs to produce product for pivotal animal studies and phase 2/3 clinical studies.

The CET RAIDR program will develop repurposed drugs as medical countermeasures towards known, potential, and unknown and emerging threats, bridging the gap from when a threat is identified until targeted countermeasures such as vaccines are available. CET RAIDR will leverage lessons learned in Coronavirus Aid, Relief, and Economic Security (CARES) Act funded efforts under COVID TX and address advanced development portion of Science and Technology (S&T) efforts from Defense Threat Reduction Agency (DTRA) Joint Science and Technology Office (JSTO) Development of Medical Countermeasures Against Novel Entities (DOMANE) and Layered Integrated Medical Countermeasures Intervention Technologies (LIMIT) programs for new and emerging threats. In FY22, CET RAIDR continues nonclinical studies and Phase 2 and 3 trials, and on-going COVID activities to conduct advanced development of repurposed drugs.

The CBIPR-ADM program is the capability building effort at the DoD ADM to establish and enhance proven biopharmaceutical and vaccine manufacturing technologies and accelerate the delivery of medical countermeasures as part of a medical integrated layered defense. The CBIPR-ADM enables an increased level of preparedness and responsiveness (i.e. operational readiness) to rapidly counter current and emerging biological threats including pandemic response. By establishing and enhancing these new proven MCM manufacturing technologies, the DoD ADM accelerates rapid development of MCMs at all stages of development. The MCMs impacted by these efforts include: Vaccines for Viral and Bacterial Agents and Toxins, monoclonal antibodies for prophylactic and/or therapeutic indications, and antibody conjugates for use across all agent classes. In FY22 CBIPR-ADM continues activities to maintain the DoD ADM's capabilities in a state of readiness to support Medical Countermeasure (MCM) development and manufacturing.

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The CMDR-B program develops Medical Countermeasures (MCM) for Service members to protect against Multiple Drug Resistance (MDR) bacteria, including Biological Warfare Agents (BWAs) and organisms that are genetically modified to be MDR and resulting bio-toxins. The resulting product(s) will be US Food and Drug Administration (FDA)-approved to prevent or minimize effects of MDR bacterial exposures. The candidates are transitional product from S&T that showed efficacy against plague, anthrax, and other BW agents. The regulatory approach of the program is to pursue development of products to FDA approval under the Animal Rule. The program conducted animal studies to confirm efficacy for plague and melioidosis. In FY20 Pharmacokinetic study on non-human primates Good Laboratory Practice (GLP) study report was completed for the plague indication and results were analyzed against threat indication. In FY21 and beyond, the Defense-Wide Review reduced this program for higher priorities. Execution of program closeout in FY20.

The DBPAP program facilitates new technology transition to advanced development, efficient production, and timely distribution. DBPAP consists of a Critical Assays and Reagents team, which serves as the principal resource for biological assays and reagents, and the Targeted Acquisition of Reference Materials Augmenting Capabilities (TARMAC) team, which generates data on biodefense pathogens to inform product development. DBPAP establishes a core research and development capability by developing biological threat agent reference materials (strains, antigens, antibodies and nucleic acids) and detection/diagnostic assays for biothreat agent detection. These reagents/assays are leveraged across multiple programs to meet the requirements of the Warfighter and Joint biological defense systems and support the biological defense community. Through the TARMAC initiative, the DBPAP will use a systematic approach to the introduction of new materials and information into MCM development. This includes advanced platform technologies within the DoD's ADM facility. In FY22 DBPAP continues development/expansion of biological threat agents reference materials to known and emerging threats.

The JMEDICC program is a collaboration between United States and Ugandan research and outbreak response entities intended to enable clinical trials for filovirus (Ebola and Marburg) therapeutics during an outbreak. The JMEDICC effort provides a platform of advanced supportive care, scientific rigor, laboratory and logistical capacity, mobility, and rapid response to test new therapeutics or MCM in a filovirus outbreak setting. The JMEDICC effort is a project whose resulting capability offers a mechanism to greatly accelerate the development of life-saving products for future outbreaks. The performer received approval of an emergency access protocol for the use of the Remdesivir drug in the country of Uganda.

The MCMPT program establishes enabling technologies and pre positioning platform systems at the DoD's Advanced Development Manufacturing (ADM) facility using standardized discovery, design, manufacturing, and testing processes to reduce the medical countermeasure (MCM) development risks. Efforts will center on leveraging the ADM's facility and developing robust manufacturing processes. MCMPT will leverage platform technologies to streamline and accelerate the MCM delivery to the Force by reducing developmental risk. A subset of these technologies will be adapted to deliver a rapid response capability to novel and emerging threats. Through the Advanced Development and Manufacturing Antibody Technologies (ADAMANT) and Rapid Response platforms, MCMPT will deliver an enduring capability from which future candidates can be manufactured. The Agile Medical Paradigm (AMP) is the CBDP's strategic framework to accelerate the delivery of MCMs. To achieve this goal the DoD is establishing a medical countermeasures platform technology (MCMPT) capability.

The NGDS program is a family of systems providing increments of diagnostic capabilities over time that address varied chemical, biological and radiological (CBR) threats across the different echelons of the Combat Health Support System. The mission of the NGDS is to provide CBR threat and infectious disease identification and FDA-cleared diagnostics to inform individual patient treatment and CBR situational awareness and disease surveillance. NGDS 2 will provide additional capability for

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diagnosis of CBR-induced diseases, suitable for use in far forward environments, by developing lightweight, portable, and simple-to-use instruments and test kits. In FY21 NGDS Increment 2 transitions into two programs of record; NGDS 2 MPDS Program and NGDS 2 CHEMDX Program.

The NGDS 2 CHEMDX program will provide a rapid, hand-held, point-of-care device. It utilizes an electrochemical assay for the quantitative detection of acetyl cholinesterase (AChE) activity in finger stick and venous whole blood samples of individuals suspected of being exposed to cholinesterase inhibiting substances, such as nerve agents. NGDS 2 CHEMDX diagnostic capabilities will be employed in Army, Air Force, Navy, Marines and SOCOM (Roles 1-3), with applicability to routine healthcare at higher echelons. NGDS 2 CHEMDX test results are to be used to aid in the diagnosis of cholinesterase inhibition in an individual suspected of having exposure to NTAs and his/her treatment decision with an Antidote Treatment Nerve Agent, Autoinjector (ATNAA): self-aid; buddy aid; combat lifesaver; or medic. In FY22 NGDS 2 CHEMDX continues Engineering & Manufacturing Development.

The NGDS 2 MPDS program will provide a simple-to-use, portable diagnostic device capability that can be used in far-forward and austere battlefield environments to assist in the diagnosis of infectious diseases and biological warfare agents in symptomatic individuals. The MPDS will enable earlier patient diagnosis by its placement on the battlefield. Concepts of Employment support use by small teams and medical providers at Role 1 and Role 2 echelons of care. Earlier diagnosis of infectious diseases improves decision support for treatment and evacuation, improves command situational awareness, and mitigates the effects of exposure to unknown infectious disease and biological agents. In FY22 NGDS 2 MPDS concludes hardware, software, assay development, and two clinical trials; continues development of third assay panel; and management of hardware and software configurations.

The DoD provides for the development of vaccines that are directed against validated biological warfare (BW) weapons to include bacteria, viruses, and toxins of biological origin. Effective medical countermeasures are urgently needed to negate the threat of these BW agents. Vaccines have been identified as the most efficient countermeasure against the validated threat of BW weapons. Products under development in this budget item include Recombinant Botulinum A/B (VAC BOT) and Plague (VAC PLG) vaccines. Efforts to be conducted during the Engineering Manufacturing Development (EMD) Phase include the development of large scale manufacturing process and validation of that process, nonclinical studies, demonstration of manufacturing consistency, and expanded clinical human safety studies. The results of these efforts, and those conducted during the EMD phase, will be used to submit a Biologics License Application (BLA) to the FDA for product licensure. To evaluate vaccine effectiveness, pivotal animal studies will be conducted concurrently with the Phase 3 clinical trial to satisfy the requirements of the FDA's "Animal Rule".

Congressional Interest Item - The Botulinum and Plague Vaccine Storage and Stability Testing (VSST) program utilizes Congressional directed funding for the Botulinum and Plague vaccines. DoD has the mission to maintain the existing vaccine material in Good Manufacturing Practice (GMP) storage and to conduct the periodic potency and stability testing of these materials to support submissions to the FDA and potential future emergency response. In FY21, VSST continues storage, distribution, and stability testing of VAC BOT and VAC PLG materials, and initiates a Phase 2 clinical trial evaluating the use of a biological response modifier (BRM) co-administered with the VAC PLG drug product to identify avenues for faster onset and longer duration of protection.

Congressional Interest Item - The Antiviral Prophylaxis Studies program will manage the development of TPOXX as Post-Exposure Prophylaxis (PEP) for Smallpox. TPOXX is only approved as treatment for clinically evident smallpox, which is usually diagnosed 12 to 14 days post-exposure, but as late as 17 days post-exposure. The warfighter is therefore exposed to a "window of vulnerability" in the progression of smallpox for which no treatment options are approved by the FDA. This effort will

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complete all required nonclinical and clinical studies necessary to submit a supplemental New Drug Application (sNDA) or New Drug Application (NDA) seeking approval of TPOXX as a post-exposure prophylaxis. The funding supports a regulatory pathway to provide a Post-Exposure Prophylactic to close the "window of vulnerability" by providing a treatment option for smallpox after vaccination ceases to be effective and prior to clinically evident disease.

The SIP continually manages, updates, and executes the INDs of selected prophylaxis, treatments and diagnostics development products which provide additional protection to individuals that are at high risk of exposure to CBRN agents. These vaccines will be used to provide additional levels of protection to laboratory workers conducting research. DoD has the mission to maintain IND vaccines in Good Manufacturing Practice (GMP) storage and to conduct the periodic potency and stability testing of these materials to support submissions to the FDA. In FY22 SIP continues storage, distribution, potency testing, and biosurety compliance activities.

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
Title: 1) CARES Act - Diagnostics & Medical Research: COVID POC DX Description: Device Evaluation and User Demonstration	4.500	-	-
Title: 2) CARES Act - Diagnostics/ Medical Research: COVID TX Description: Qualification of a Second Manufacturing Line	4.365	-	-
Title: 3) CARES Act - Diagnostics/ Medical Research: COVID TX Description: Phase 2 Clinical Trials	31.235	-	-
Title: 4) Antiviral Therapeutics Program (AV TX) Description: Enabling Technologies FY 2021 Plans: Complete efficacy studies with Non-Human Primates infected with Ebola virus. Start efficacy studies with Non-Human Primates infected with Marburg virus. FY 2022 Plans: Continue efficacy studies with Non-Human Primates infected with Marburg virus. FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to accelerated development effort.	7.095	11.831	14.476
Title: 5) Botulinum Monoclonal Antibodies (BOT MAB) Description: Clinical and Nonclinical Studies FY 2022 Plans:	-	-	27.723

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
Continue nonhuman primate pivotal animal studies and phase 2/3 clinical studies. FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to change in program/project schedule.				
Title: 6) Botulinum Monoclonal Antibodies (BOT MAB) Description: Manufacturing FY 2021 Plans: Initiate small scale manufacturing and cell banking activities to support large scale manufacturing runs. FY 2022 Plans: Continue Botulinum monoclonal antibody platform development with manufacturing runs to produce product for pivotal animal studies and phase 2/3 clinical studies. FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to change in program/project schedule. Production of manufacturing runs increase cost in FY22.		-	21.211	33.000
Title: 7) Countering Emerging Threats Rapid Acquisition and Investigation of Drugs for Repurposing (CET RAIDR) Description: Non-clinical and Clinical Studies FY 2022 Plans: Continue nonclinical studies and Phase 2 and 3 trials, as needed, in support of requesting pre-Emergency Use Authorizations (pre-EUA). FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to change in program/project technical parameters.		-	-	8.000
Title: 8) Internal COVID - CET RAIDR Description: Pandemic Preparedness FY 2022 Plans: Continues on-going COVID activities to conduct advanced development of repurposed drugs. These resources support development of repurposing reports (including animal T&E studies) and pre-Emergency Use Authorization (EUA) submissions for two therapeutics each year. These efforts will address known and potential threats to prepare DoD for response to biological threats. FY 2021 to FY 2022 Increase/Decrease Statement:		-	-	12.000

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
Increase due to accelerated development effort. Supports COVID-19/pandemic response efforts.				
Title: 9) Chem Bio Incident Preparedness and Response - Adv Dev Mfg (CBIPR - ADM) Description: ADM Infrastructure FY 2021 Plans: Continue activities to maintain the DoD ADM's capabilities in a state of readiness to support Medical Countermeasure (MCM) development and manufacturing. FY 2022 Plans: Continue activities to maintain the DoD ADM's capabilities in a state of readiness to support Medical Countermeasure (MCM) development and manufacturing. FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.		10.000	10.157	10.363
Title: 10) Countermeasures for Multi-Drug Resistance-Bacterial (CMDR-B) Description: Program Closeout		2.802	-	-
Title: 11) Defense Biological Products Assurance Program (DBPAP) Description: Development FY 2021 Plans: Continue development/expansion of biological threat agents reference materials to known and emerging threats. Continue development of assays and nucleic acid based genomic assays to support fielded and developmental systems. Continue QA/QC testing to encompass the transition and fielding of biological detection assays. Continue to maintain yearly accreditation audits such as ISO 9001, 17025, and Guide 34 certifications. Continue quality actions throughout to maintain the quality managed systems. Continue development of prototypes/information for strains contained in Unified Culture Collection. Supports establishment of a Common Reference Repository - a single source for well-characterized, traceable test articles and vital information for biological defense, effective verification of proficiency testing, improved acquisition of emerging technologies, all at a decreased cost for the individual organizations. FY 2022 Plans: Continue development/expansion of biological threat agents reference materials to known and emerging threats. Continue development of assays and nucleic acid based genomic assays to support fielded and developmental systems. Continue QA/QC testing to encompass the transition and fielding of biological detection assays. Continue to maintain yearly accreditation		6.568	8.872	8.043

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
audits such as ISO 9001, 17025, and Guide 34 certifications. Continue quality actions throughout to maintain the quality managed systems. Continue development of prototypes/information for strains contained in Unified Culture Collection. Supports establishment of a Common Reference Repository - a single source for well-characterized, traceable test articles and vital information for biological defense, effective verification of proficiency testing, improved acquisition of emerging technologies, all at a decreased cost for the individual organizations. FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.				
Title: 12) Joint Mobile Emerging Disease Intervention Clinical Capability (JMEDICC) Description: Enabling Technologies		3.322	-	-
Title: 13) Medical Countermeasure Platform Technologies (MCMPT) Description: Advanced Development and Manufacturing Antibody Technologies (ADAMANT) BOT A/B		1.021	-	-
Title: 14) Next Generation Diagnostic System 2 (NGDS 2) Description: Man Portable Diagnostic System (MPDS)		19.691	-	-
Title: 15) NGDS 2 Chemical Diagnostic (NGDS 2 CHEMDX) Description: Chemical Diagnostic System (CHEMDX) FY 2021 Plans: Begin Engineering & Manufacturing Development for the Chemical Diagnostic System. FY 2022 Plans: Continue Engineering & Manufacturing Development and initiate clinical trials for NGDS 2 ChemDx System. FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.		-	1.733	2.006
Title: 16) NGDS 2 Chemical Diagnostic (NGDS 2 CHEMDX) Description: Chemical Diagnostic System (CHEMDX) FY 2021 Plans:		-	0.356	2.923

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
Conduct program management and government test activities for NGDS 2 CHEMDX. FY 2022 Plans: Conduct program management and government test activities for NGDS 2 CHEMDX. FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments. Program transitions from BA4 to BA5 in 3QFY21 at Milestone B				
Title: 17) NGDS 2 MPDS Description: Man Portable Diagnostic System (MPDS) Product Development FY 2021 Plans: Conduct Hardware, software and assay development; system integration, and two clinical trials. FY 2022 Plans: Conclude hardware, software, assay development, and two clinical trials; continue development of third assay panel, and; management of hardware and software configurations. FY 2021 to FY 2022 Increase/Decrease Statement: Program/project transitioned to Production and Deployment Phase.		-	20.283	8.308
Title: 18) NGDS 2 MPDS Description: Man Portable Diagnostic System (MPDS) Program Management and Support FY 2021 Plans: Conduct program management, developmental testing, and operational assessments. FY 2022 Plans: Conduct program management. Complete developmental testing and operational assessments. FY 2021 to FY 2022 Increase/Decrease Statement: Program/project transitioned to Production and Deployment Phase.		-	9.141	3.875
Title: 19) VAC BOT - Recombinant Botulinum Vaccine Description: Manufacturing/Closeout Activities		39.649	-	-
Title: 20) VAC PLG - Plague Vaccine Description: Manufacturing		26.390	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
Title: 21) VAC SIP Description: Storage, Distribution, Potency Testing FY 2021 Plans: Continue storage, distribution, potency testing, and biosurety compliance activities in support of the Special Immunization Program. FY 2022 Plans: Continue storage, distribution, potency testing, and biosurety compliance activities in support of the Special Immunization Program. FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to change in program/project technical parameters.	2.707	2.876	6.631
Accomplishments/Planned Programs Subtotals	159.345	86.460	137.348

	FY 2020	FY 2021
Congressional Add: 1) Antiviral Prophylaxis Studies FY 2020 Accomplishments: Completed placebo manufacturing, non-clinical testing, and started protocol development for Phase II and Phase III trials. FY 2021 Plans: Complete protocol development and execute Phase II and Phase III trials.	11.000	4.500
Congressional Add: 2) Recombinant Botulinum and Plague Vaccines - Storage FY 2021 Plans: Botulinum and Plague vaccines and associated critical reagents will be stored to ensure there is a stock of material available to the Warfighter in an emergency.	-	1.040
Congressional Add: 3) Recombinant Botulinum and Plague Vaccines - Adaptive Clinical Trial FY 2021 Plans: Conduct adaptive clinical trial to test for improved efficacy and reduced immunization time for the Warfighter is achieved by utilizing a Biological Response Modulator (BRM) with the current Plague vaccine. The intent of new BRMs is to reduce needle in arm count and time for full immunity, allowing for faster recovery and deployment of the warfighter.	-	21.456
Congressional Add: 4) Recombinant Botulinum and Plague Vaccines - Stability Testing	-	4.500

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	FY 2020	FY 2021
FY 2021 Plans: Conduct stability testing of the VAC BOT and VAC PLG to ensure the drug product is safe and usable for the warfighter in case of an emergency use situation. Initial testing to begin on contract award and maintain appropriate time points.		
Congressional Adds Subtotals	11.000	31.496

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

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• MB7: Medical Biological Defense (Op Sys Dev)	2.663	2.308	3.833	-	3.833	-	-	-	-	-	-
• JM8788: NEXT GENERATION DIAGNOSTICS SYSTEM (NGDS)	1.418	0.970	1.290	-	1.290	-	-	-	-	-	-
• JX0005: DOD BIOLOGICAL VACCINE PROCUREMENT (VACCINES)	0.173	5.500	0.000	-	0.000	-	-	-	-	-	-
• JX0210: DEFENSE BIOLOGICAL PRODUCTS ASSURANCE PROGRAM (DBPAP)	2.961	2.845	2.760	-	2.760	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

COVID POINT OF CARE DIAGNOSTICS (COVID POC DX)

The COVID POC DX program will procure and test candidate Point-of-Care (POC) diagnostic devices, to evaluate novel COVID-19 testing concepts of operation and use. Testing includes analytical performance testing to verify vendor claims, as well as end-user evaluations conducted by the U.S. Army Medical Department Board and the U.S. Naval Health Research Center. Following this initial test and evaluation, candidates that successfully demonstrate operational utility and receive Emergency-Use Authorization from the Food and Drug Administration, will be procured in quantities sufficient to support more extensive user demonstrations at Department of Defense Point-of-Care facilities.

COVID REPURPOSED THERAPIES (COVID TX)

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The COVID TX program will conduct Phase 2 clinical trials in FY20 and FY21 to test the efficacy of the Leukine (sargramostim, rhu-GM-CSF) in COVID-19 patients with acute hypoxemia to inform a request for Emergency Use Authorization (EUA) from the Food and Drug Administration (FDA). Qualification of a second manufacturing line for Drug Product Agreement awarded to performer for clinical trials, submission of EUA, and manufacturing expansion.

ANTI-VIRAL THERAPEUTICS (AV TX)

The Anti-viral Therapeutics (AVTX) program acquisition strategy supports the development of therapeutics through the Engineering, Manufacturing and Development (EMD) phase against the Ebola (Zaire), Marburg and Sudan bio warfare threats. The initial therapeutic candidate is now for a treatment against the Marburg virus in lieu of Ebola Zaire based on the current gap in defense to the warfighter. The overall regulatory approach of the program remains to pursue development of products to Food and Drug Administration (FDA) approval under the Animal Rule that was approved as the path, by the FDA in 1QFY19. The program completed a dose ranging study for the Ebola Zaire indication and initiated a Natural History Study for Marburg that is part of the holistic FDA regulatory approach for a final indication of a broad spectrum antiviral pan filo drug product. A natural history study for Marburg and Sudan and 3 pivotal animal studies per indication are required as part of the animal rule requirements for the FDA) approved plan. The acquisition strategy for Marburg and Sudan indications will have the performer submitting amended New Drug applications for the therapeutics during the EMD phase.

BOTULINUM MONOCLONAL ANTIBODIES (BOT MAB)

Initiated by the Medical Countermeasure Platform Technologies (MCMPT), the goal of Botulinum Monoclonal Antibodies (BOT MAB) advanced development effort is to counter exposure to BOT A & B toxins. The program is leveraging the advanced platform technology developed within the DoD's Advanced Development Manufacturing (ADM) facility that was initiated by the Medical Countermeasure Platform Technologies (MCMPT). The BOT MAB will be a monoclonal antibody cocktail that protects the warfighter against exposure to BOT A&B serotypes.

COUNTERING EMERGING THREATS RAPID ACQUISITION AND INVESTIGATION OF DRUGS FOR REPURPOSING (CET RAIDR)

The Countering Emerging Threats - Rapid Acquisition and Investigation of Drugs for Repurposing (CET RAIDR) program will leverage lessons learned from the COVID-19 response to conduct nonclinical studies and Phase 2 and 3 trials in support of requesting pre-Emergency Use Authorizations (pre-EUA). Repurposing reports will be issued to Combatant Commands to inform clinical practitioners, and Food and Drug Administration (FDA) approvals for those efforts initiated under the Coronavirus Disease Repurposed Therapeutics (COVID TX) program, as well as products that transition from Science and Technology (S&T) efforts for new and emerging threats.

CHEM BIO INCIDENT PREPAREDNESS AND RESPONSE - ADM

A contract was awarded to Ology Bioservices on 20 March 2013 (then Nanotherapeutics, Inc.) to establish a Department of Defense (DoD) Advanced Development and Manufacturing (ADM) capability that can rapidly develop and manufacture MCMs from early stage development up through FDA licensure. The establishment of this capability consisted of designing, commissioning, and validating a biopharmaceutical facility (both its infrastructure and equipment) that is equipped with two (2)

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advanced development and manufacturing suites, which utilize flexible, agile, single-use (disposable), modular, and multi-product technologies that comply with GMPs and can operate at Biological Safety Level-3 (BSL-3). The capability was established on 31 March 2017.

Since its establishment, the DoD ADM has been sustained in a state of operational readiness so that it can continue to be an enduring domestic MCM manufacturing capability that provides the DoD with priority access. The original sustainment strategy consisted of directly funding all costs/activities (i.e. calibration, maintenance, etc.) via sustainment options on the original contract. The CBIPR funds were designated to support this critical DoD infrastructure. The CBIPR-ADM funding line supports the infrastructure by funding new capability-building efforts (such as manufacturing platforms using FDA known technologies) that will enable new additional MCM product development. This strategy will result in the self-sustainability of the DoD ADM by spreading the sustainment costs equally across all projects (including commercial clients), which mimics the standard practice across the contract development and manufacturing organization (CDMO) industry.

COUNTERMEASURES FOR DRUG RESISTANT BACTERIA (CMDR-B)

The CMDR-B program develops medical countermeasures (MCM) for Service members for protection against Multi-Drug Resistant (MDR) bacteria, including Biological Warfare Agents (BWAs) and organisms that are genetically modified to be MDR and resulting bio-toxins. The resulting product(s) will be US Food and Drug Administration (FDA)-approved to prevent or minimize effects of MDR bacterial exposures. The candidate is a transitional product from Science and Technology (S&T) that showed efficacy against plague, anthrax, and other BW agents. The regulatory approach of the program is to pursue development of products to FDA approval under the Animal Rule. The program will conduct non-human primate studies to confirm efficacy. The performer will develop and submit an initial fielding capability (IFC) package to FDA for emergency use to support the warfighter preparedness against MDR. The performer will submit Supplemental New Drug Application for the therapeutic during the Engineering and Manufacturing Development (EMD) Phase. In FY18 Pharmacokinetic study on non-human primates was completed for the plague indication and results were analyzed against threat indication. Continued coordination with FDA for supplemental indication of anthrax based on threat level to the warfighter. In FY21 and beyond, the Defense-Wide Review (DWR) reduced this program for higher priorities. Execution of program closeout in FY20.

DEFENSE BIOLOGICAL PRODUCTS ASSURANCE PROGRAM (DBPAP)

The Defense Biological Products Assurance Program's (DBPAP) strategy establishes a core research and development capability to develop biological threat agent reference materials (antigens, nucleic acids, and antibodies) as well as detection and diagnostic assays for bio-threat agent detection that shall be used across multiple detection and diagnostic platforms. In addition, this strategy includes a formal, validated advanced development process for transitioning new assays into production and subsequent integration with the appropriate detection/diagnostic platform. DBPAP provides a centralized management function for the establishment of a common repository of standardized biological materials to effectively support the Department of Defense (DoD)'s and the Department of Homeland Security's (DHS) mission of providing consistent capabilities and a capacity for customers to mitigate biological events.

JOINT MOBILE EMERGING DISEASE INTERVENTION CLINICAL CAPABILITY (JMEDICC)

The Joint Mobile Emerging Disease Intervention Clinical Capability (JMEDICC) is a collaboration between United States and Ugandan research and outbreak response entities. It currently is a joint effort with The United States Army Medical Research Institute of Infectious Diseases (USAMRIID) and The Naval Medical Research Center

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(NMRC) to enable clinical trials for filovirus (i.e., Ebola and Marburg) therapeutics during an outbreak. JMEDICC effort was funded by the Antiviral Therapeutics (AV TX) Program (MB5) in FY19. A new funding line was added in FY20 to support this effort. The JMEDICC effort is currently focused on filovirus, but is an adaptable capability that can incorporate multiple different medical countermeasures (MCM) in parallel and accommodate multiple site activities. This will maximize JMEDICC's current response capability and infrastructure by expanding as the endemic situation warrants. A cost sharing plan is currently being explored with other government and nongovernment agencies to determine interest and relevance levels. In FY21 and beyond, the Defense-Wide Review (DWR) reduced this program for higher priorities.

MCM PLATFORM TECHNOLOGIES (MCMPT)

The goal of the MCMPT is to rapidly counter a broad-spectrum of threat agents using standardized discovery, design, manufacturing, and testing processes to reduce the MCM development risks. Efforts will focus on establishing advanced platform technologies within the DoD's Advanced Development Manufacturing (ADM) facility and evaluating that capability through nonclinical and clinical testing. A subset of these technologies will be adapted to deliver a rapid response capability to novel and emerging threats. Once established, future programs will be able to leverage these platforms for the development of future medical countermeasures. It is anticipated that these efforts will leverage the Other Transactions Authority (OTA) through the medical OTA consortium.

NEXT GENERATION DIAGNOSTICS SYSTEM (NGDS)

The NGDS 1 program was a MS A to MS C - acquisition strategy, with MS C approval granted in Dec 2016. NGDS 1 replaces the legacy Joint Biological Agent Identification and Diagnostic System (JBAIDS). NGDS 1 Full Rate Production was approved in Aug 2018.

NGDS 2 will employ a family of systems approach to bridge identified capability gaps for man-portable diagnostics, immunoassay diagnostics, and chemical diagnostics systems. NGDS 2 continued the technology maturation and risk reduction of a man-portable diagnostic capability in FY18 and transitioned to engineering and manufacturing development phase in FY19. NGDS 2 initiated prototyping of a chemical diagnostic capability in FY18. Separate decisions will be utilized to proceed with further development and production for each capability, based on individual determinations of technology maturity to meet user requirements. Development efforts are cost-plus awards using Other Transactions Authority (OTA) agreements to take advantage of nontraditional Defense contractor offerings. NGDS 2 will transition into NGDS 2 CHEMDx and NGDS 2 MPDS starting in FY21.

NEXT GEN DIAG 2 CHEMICAL DIAGNOSTICS (NGDS 2 CHEMDX)

NGDS Increment 2 will employ a family of systems approach to bridge identified capability gaps for man-portable diagnostics, immunoassay diagnostics, and chemical diagnostics systems. NGDS 2 CHEMDX will provide a lightweight, portable, and simple-to-use diagnostic capability against chemical threat agents to end-users in non-laboratory, far-forward environments. NGDS 2 CHEMDX initiated prototyping in FY18 and will enter Engineering and Manufacturing Development in FY21. NGDS 2 CHEMDX is using an Other Transactions Authority (OTA) agreement to take advantage of nontraditional Defense contractor offerings. Starting in FY21, NGDS Increment 2 program of record transitions to NGDS 2 CHEMDX.

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NEXT GEN DIAG 2 MAN PORTABLE DIAGNOSTIC SYSTEM (NGDS 2 MPDS)

NGDS Increment 2 will employ a family of systems approach to bridge identified capability gaps for man-portable diagnostics, immunoassay diagnostics, and chemical diagnostics systems. NGDS 2 Man Portable Diagnostic System (MPDS) will complement NGDS Increment 1 by providing a lightweight, portable, and simple-to-use diagnostic capability to end-users in non-laboratory, far-forward environments. NGDS 2 MPDS concluded prototyping in FY19 and is continuing with engineering and manufacturing development. MPDS is using Other Transactions Authority (OTA) agreements to take advantage of nontraditional Defense contractor offerings. Starting in FY21, NGDS Increment 2 program of record transitions to NGDS 2 MPDS.

BOTULINUM VACCINE (VAC BOT)

The Prime System Contractor (Dynport Vaccine Company/DVC LLC, Frederick MD) will function as the FDA regulatory sponsor and will perform all ancillary, regulatory, quality assurance, and data management as required by the FDA. The current budget supports development through FDA licensure of a recombinant bivalent (A and B) botulinum vaccine. Other serotypes will be developed through an evolutionary approach, as funding becomes available. The Advanced Component Development and Prototypes (ACD&P) phase included the manufacture of candidate current Good Manufacturing Practices (cGMP) lots, animal safety testing, and initial clinical trials. During this phase, the vaccine was evaluated for safety and immunogenicity in a small human clinical trial (Phase 1). During the Engineering Manufacturing Development (EMD) Phase, the prime contractor stabilized the vaccine formulation, validated the manufacturing process and testing protocols, optimized the delivery systems and manufactured consistency lots. Phase 2 clinical trials were performed and provided additional safety data. The evaluation of efficacy in pivotal animal studies to satisfy Food and Drug Administration's (FDA) requirements for the Animal Rule has been completed. The remaining efforts to be conducted during the EMD phase include the Phase 3 clinical trial to demonstrate safety in an expanded volunteer population. In FY21 and beyond, the Defense-Wide Review (DWR) reduced the funding for the development of the VAC BOT vaccine. Close out efforts will be completed in FY21 and will include manufacturing three cGMP lots with the intent of using these lots in an EUA if pre-EUA submission is approved by the FDA.

PLAGUE VACCINE (VAC PLG)

The Advanced Component Development and Prototypes (ACD&P) phase included the manufacture of candidate current Good Manufacturing Practices (cGMP) lots, animal safety testing, and initial clinical trials. During this phase, the vaccine was evaluated for safety and immunogenicity in a small human clinical trial (Phase 1). In order to reduce technical program risk in the Plague vaccine program, the program office conducted competitive prototyping between a US vaccine candidate and a United Kingdom vaccine candidate. During the 2008 Resource Allocation Decision, the US Plague Vaccine candidate was selected for development through licensure under a Prime System Contract. The Prime System Contractor (Dynport Vaccine Company/DVC LLC, Frederick MD) currently functions as the Food and Drug Administration's (FDA) regulatory sponsor and performs all ancillary, regulatory, quality assurance, and data management as required by the FDA. A Project Arrangement is in place with the United Kingdom and Canada. During the Engineering Manufacturing Development (EMD) Phase, the prime contractor stabilized the vaccine formulation, validated the manufacturing process and testing protocols, optimized the delivery systems and manufactured consistency lots. Phase 2 clinical trials were performed and provided additional safety data. The remaining efforts to be conducted during the EMD phase include the Phase 3 clinical trial to demonstrate safety in an expanded volunteer population and evaluation of efficacy and duration of protection in pivotal animal studies to satisfy FDA requirements for the Animal Rule. In FY21 and beyond, the Defense-Wide Review (DWR) reduced the funding for the development of the VAC PLG vaccine. The VAC BOT and VAC PLG vaccine

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
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programs are no longer seeking FDA licensure due to the impacts of the Defense Wide Review in which funding has been removed for higher priority programs. Close out efforts will be completed in FY21 utilizing FY20 funds.

CONGRESSIONAL INTEREST ITEMS

CONGRESSIONAL INTEREST ITEM - Smallpox Antiviral Prophylaxis Studies

Assay development and validation for monkeypox performed in FY19 that informs approval from the FDA for post-exposure prophylaxis (PEP) indication for smallpox. Antiviral prophylaxis studies are being performed. Contract awarded to performer to complete animal rule studies for FDA approval.

CONGRESSIONAL INTEREST ITEM - Botulinum and Plague Vaccine Storage and Stability Testing (VSST)

Full and open competition for storage, stability and adaptive clinical trial contracts. This is to utilize the funding to its maximum potential and obtain best result and value for the warfighter. Contract award winners are required to maintain consistent and regular testing time points of the vaccine drug product to ensure safety and usability for the warfighter.

SPECIAL IMMUNIZATION PROGRAM (VAC SIP)

The SIP effort continually manages, updates, and executes the INDs of selected prophylaxis, treatments and diagnostics development products which provide additional protection to individuals that are at high risk of exposure to CBRN agents. Efforts span Good Manufacturing Practices (GMP), Good Laboratory Practices guidelines necessary to conduct storage and periodic potency testing, as well as clinical administration of products in accordance with the FDA regulated Investigational New Drug (IND) requirements. This Department of Defense program supports the Federal interagency with this effort, as well as academic and industry partners.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
COVID POC DX - HW S - Vendor A Systems for T&E and User Demonstration	C/FFP	TBD : N/A	0.000	0.921	Dec 2020	0.000		0.000		0.000		0.000	0.000	0.921	0.000
COVID POC DX - HW S - Vendor B Systems for T&E and User Demonstration	C/FFP	TBD : N/A	0.000	2.980	Feb 2021	0.000		0.000		0.000		0.000	0.000	2.980	0.000
COVID TX - Manufacturing Expansion	C/FFP	Partner Therapeutics : Lexington, MA	0.000	4.365	Jul 2020	0.000		0.000		0.000		0.000	0.000	4.365	0.000
COVID TX - Clinical Trials	C/FFP	Partner Therapeutics : Lexington, MA	0.000	31.235	Jul 2020	0.000		0.000		0.000		0.000	0.000	31.235	0.000
AV TX - Nonclinical Trials - OTA	C/FP	Gilead Sciences : San Francisco, CA	7.433	4.946	Nov 2019	8.000	Apr 2021	8.000	Nov 2021	0.000		8.000	0.000	28.379	0.000
DBPAP - HW C - Development of Select Biological Threat Agent Reference Materials and Assays	MIPR	Various : Various	3.488	1.400	Mar 2020	1.873	Mar 2021	1.698	Mar 2022	0.000		1.698	0.000	8.459	0.000
JMEDICC - OCONUS Clinical Capabilities - OTA	C/FP	Henry M. Jackson Foundation for the Advancement of Military Medicine : Bethesda, MD	0.000	2.695	Mar 2020	0.000		0.000		0.000		0.000	0.000	2.695	0.000
JMEDICC - Clinical Trial Conduct Support	MIPR	US Army Medical Research Institute of Infectious Disease (USAMRIID) : Fort Detrick, MD	0.000	0.380	Jul 2020	0.000		0.000		0.000		0.000	0.000	0.380	0.000
MCMPT - HW S - ADAMANT BOT A/B establishment	C/CPFF	Ology : Alachua, FL	13.503	0.997	Jan 2020	0.000		0.000		0.000		0.000	0.000	14.500	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
NGDS - HW C - Man Portable Diagnostic System	C/CPFF	Cepheid : Sunnyvale, CA	18.116	12.853	Dec 2019	0.000		0.000		0.000		0.000	0.000	30.969	0.000
NGDS 2 CHEMDX - HW C - Chemical Diagnostic System (CHEMDX)	C/CPFF	MRIGlobal : Palm Bay, FL	0.000	0.000		1.733	Jun 2021	2.209	Dec 2021	0.000		2.209	0.000	3.942	0.000
NGDS 2 MPDS - HW C - Man Portable Diagnostic System (MPDS)	C/CPFF	Cepheid : Sunnyvale, CA	0.000	0.000		20.258	Dec 2020	8.308	Dec 2021	0.000		8.308	0.000	28.566	0.000
VAC BOT - Manufacturing, Validation and Consistency Lot Production	C/CPAF	DynPort Vaccine Company (DVC) LLC. : Frederick, MD	99.452	28.771	Dec 2019	0.000		0.000		0.000		0.000	0.000	128.223	0.000
VAC PLG - HW S - Manufacturing, Validation, and Consistency Lot Production	C/CPAF	DynPort Vaccine Company (DVC) LLC. : Frederick, MD	56.852	16.983	Dec 2019	0.000		0.000		0.000		0.000	0.000	73.835	0.000
CONG - Antiviral Prophylaxis Studies-Clinical Trials - OTA	C/CPFF	SIGA Technologies : Inc., New York, NY	12.967	10.825	Jul 2020	4.500	Feb 2021	0.000		0.000		0.000	0.000	28.292	0.000
CONG - HW S - Manufacturing, Validation, and Consistency Lot Production	C/CPAF	TBD : N/A	0.000	0.000		26.996	Jun 2021	0.000		0.000		0.000	0.000	26.996	0.000
Subtotal			211.811	119.351		63.360		20.215		0.000		20.215	0.000	414.737	N/A

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CBIPR-ADM - Infrastructure	C/CPFF	Ology : Alachua, FL	0.000	8.383	Dec 2019	9.225	Dec 2020	9.416	Dec 2021	0.000		9.416	0.000	27.024	0.000
DBPAP - ES C - Select Biological Threat Agent	MIPR	Various : Various	3.540	1.356	Mar 2020	1.911	Mar 2021	1.732	Mar 2022	0.000		1.732	0.000	8.539	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

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Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Reference Material Support															
DBPAP - ES C - Select Biological Threat Agent Reference Material Regulatory/Quality Assurance (QA) Support	MIPR	Edgewood Chemical Biological Center (ECBC) : Aberdeen Proving Ground, MD	2.941	1.482	Mar 2020	1.927	Mar 2021	1.747	Mar 2022	0.000		1.747	0.000	8.097	0.000
NGDS - ES C - Studies and WIPT Support	C/CPFF	Johns Hopkins University - Applied Physics Lab : Laurel, MD	0.145	0.389	Feb 2020	0.000		0.000		0.000		0.000	0.000	0.534	0.000
VAC BOT - Regulatory Integration (Environmental and FDA Documentation) and Delivery System	C/CPAF	DynPort Vaccine Company (DVC) LLC. : Frederick, MD	38.334	1.310	Dec 2019	0.000		0.000		0.000		0.000	0.000	39.644	0.000
VAC SIP - Storage and Distribution of Vaccines	SS/FP	Fisher BioServices : Rockville, MD	2.227	0.488	Jan 2020	0.538	Jan 2021	0.593	Jan 2022	0.000		0.593	0.000	3.846	0.000
Subtotal			47.187	13.408		13.601		13.488		0.000		13.488	0.000	87.684	N/A

Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
COVID POC DX - DTE S - Analytical Performance Testing	Various	Various : Various	0.000	0.599	Oct 2020	0.000		0.000		0.000		0.000	0.000	0.599	0.000
BOT MAB - DTE C - BOT MONO	C/CPFF	Ology Bioservices : Inc., Alachua, FL	0.000	0.000		15.132	Dec 2020	45.723	Dec 2021	0.000		45.723	0.000	60.855	0.000
CET RAIDR - DTE C - Non-Clinical and Clinical Studies	Various	Various : Various	0.000	0.000		0.000		15.920	Dec 2021	0.000		15.920	0.000	15.920	0.000
NGDS - OTHT C - Test and evaluate interagency	MIPR	Various : Various	0.380	0.533	Jul 2020	0.000		0.000		0.000		0.000	0.000	0.913	0.000

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Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
NGDS 2 CHEMDX - DTE S - Chemical Diagnostic (CHEMDX) Testing	MIPR	Various : Various	0.000	0.000		0.126	Jun 2021	0.250	Dec 2021	0.000		0.250	0.000	0.376	0.000
NGDS 2 MPDS - OTHT S - BSL4 Testing	MIPR	Various : Various	0.000	0.000		0.365	Dec 2020	0.074	Dec 2021	0.000		0.074	0.000	0.439	0.000
NGDS 2 MPDS - DTE S - MPDS System Test & Evaluation	MIPR	Various : Various	0.000	0.000		0.889	Dec 2020	0.236	Dec 2021	0.000		0.236	0.000	1.125	0.000
VAC BOT - DTE C - Battelle	C/CPFF	Battelle Memorial Institute : Columbus, OH	1.480	1.046	Dec 2019	0.000		0.000		0.000		0.000	0.000	2.526	0.000
VAC PLG - DTE C - Clinical Trials/Non-Clinical Studies	C/CPAF	DynPort Vaccine Company (DVC) LLC. : Frederick, MD	95.734	4.367	Dec 2019	0.000		0.000		0.000		0.000	0.000	100.101	0.000
VAC SIP - OTHT C - Potency Testing of Vaccines	MIPR	US Army Medical Research Institute of Infectious Disease (USAMRIID) : Fort Detrick, MD	14.221	1.534	Jan 2020	1.746	Jan 2021	1.828	Jan 2022	0.000		1.828	0.000	19.329	0.000
VAC SIP - OTHT C - Potency Testing of Vaccines #2	C/CPFF	Battelle Memorial Institute : Columbus, OH	0.000	0.520	May 2020	0.592	Dec 2020	4.210	Jan 2022	0.000		4.210	0.000	5.322	0.000
VAC SIP - OTHT C - Potency Testing of Vaccines #3	C/CPFF	Johns Hopkins University - Applied Physics Lab : Laurel, MD	0.000	0.040	May 2020	0.000		0.000		0.000		0.000	0.000	0.040	0.000
Subtotal			111.815	8.639		18.850		68.241		0.000		68.241	0.000	207.545	N/A

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Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
AV TX - PM/MS S - Program Management (SETA)	C/FFP	Various : Various	0.000	0.000		1.263	Jan 2021	2.476	Dec 2021	0.000		2.476	0.000	3.739	0.000
AV TX - PM/MS - SB - Program Management	Various	JPEO Chem : Bio, Rad, and Nuc Defense (JPEO-CBRND)	8.983	0.514	Jan 2020	0.948	Jan 2021	1.500	Dec 2021	0.000		1.500	0.000	11.945	0.000
AV TX - PM/MS - SB - Management Support (Biological Therapeutics)	Various	JPM CBRN Medical : Ft. Detrick, MD	2.818	0.468	Jan 2020	0.000		0.000		0.000		0.000	0.000	3.286	0.000
AV TX - PM/MS - SB - Management Support	Various	JPM CBRN Medical : JPEO-CBRND, Fort Detrick, MD	3.438	1.167	Jan 2020	1.620	Jan 2021	2.500	Dec 2021	0.000		2.500	0.000	8.725	0.000
BOT MAB - PM/MS C - BOT MONO	Various	JPEO Chem : Bio, Rad, and Nuc Defense (JPEO-CBRND)	0.000	0.000		2.409	Dec 2020	2.500	Dec 2021	0.000		2.500	0.000	4.909	0.000
BOT MAB - PM/MS C - BOT MONO #2	Various	JPM CBRN Medical : Ft. Detrick, MD	0.000	0.000		1.468	Dec 2020	0.000		0.000		0.000	0.000	1.468	0.000
BOT MAB - PM/MS C - JpM Support	Various	JPM CBRN Medical : Ft. Detrick, MD	0.000	0.000		2.202	Dec 2020	12.500	Dec 2021	0.000		12.500	0.000	14.702	0.000
CET RAIDR - PM/MS S - Program Management (SETA)	C/FFP	Various : Various	0.000	0.000		0.000		0.500	Dec 2021	0.000		0.500	0.000	0.500	0.000
CET RAIDR - PM/MS SB - Program Management	Various	JPEO Chem : Bio, Rad, and Nuc Defense (JPEO-CBRND)	0.000	0.000		0.000		2.180	Dec 2021	0.000		2.180	0.000	2.180	0.000
CET RAIDR - PM/MS SB - Management Support	Various	JPM CBRN Medical : JPEO-CBRND, Fort Detrick, MD	0.000	0.000		0.000		1.400	Dec 2021	0.000		1.400	0.000	1.400	0.000
CBIPR-ADM - PM/MS C - Program Management Support	Various	JPEO Chem/Bio Defense (JPEO-	0.000	0.700	Dec 2019	0.000		0.000		0.000		0.000	0.000	0.700	0.000

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Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
		CBD) : Aberdeen Proving Ground, MD													
CBIPR-ADM - PM/MS C - Program Management Support #2	Various	JPM Medical Countermeasure Systems (JPM MCS) : Fort Belvoir, VA	0.000	0.917	Dec 2019	0.932	Dec 2020	0.947	Dec 2021	0.000		0.947	0.000	2.796	0.000
CMDR-B - PM/MS SB - Program Management (Biological Therapeutics)	Various	JPM CBRN Medical : JPEO-CBRND, Fort Detrick, MD	0.000	1.911	Jan 2020	0.000		0.000		0.000		0.000	0.000	1.911	0.000
CMDR-B - PM/MS S - Program Management (SETA)	C/FFP	Various : Various	0.000	0.891	Jan 2020	0.000		0.000		0.000		0.000	0.000	0.891	0.000
DBPAP - PM/MS C - Product Management Contractor Support	SS/FFP	Various : Various	1.972	0.860	Feb 2020	1.075	Feb 2021	0.975	Feb 2022	0.000		0.975	0.000	4.882	0.000
DBPAP - PM/MS C - Product Management Support	Various	JPL Enabling Biotechnologies : Fort Detrick, MD	4.528	1.470	Jan 2020	2.086	Jan 2021	1.891	Jan 2022	0.000		1.891	0.000	9.975	0.000
JMEDICC - PM/MS SB - Program Management (JPEO)	Various	JPEO Chem : Bio, Rad, and Nuc Defense (JPEO-CBRND)	0.000	0.247	Mar 2020	0.000		0.000		0.000		0.000	0.000	0.247	0.000
MCMPT - PM/MS C - Program Management	Various	JPEO Chem : Bio, Rad, and Nuc Defense (JPEO-CBRND)	0.273	0.024	Dec 2019	0.000		0.000		0.000		0.000	0.000	0.297	0.000
NGDS - PM/MS C - Program Management (Dx) Support	MIPR	CCDC CBC : Aberdeen Proving Ground, MD	0.230	0.695	Dec 2019	0.000		0.000		0.000		0.000	0.000	0.925	0.000
NGDS - PM/MS S - Program Management (Dx) Support	Various	JPM CBRN Medical : JPEO-CBRND, Fort Detrick, MD	3.851	1.000	Dec 2019	0.000		0.000		0.000		0.000	0.000	4.851	0.000

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Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
NGDS - PM/MS S - Program Management (JPEO) Support	Various	JPEO Chem/Bio Defense (JPEO-CBD) : Aberdeen Proving Ground, MD	8.885	0.950	Dec 2019	0.000		0.000		0.000		0.000	0.000	9.835	0.000
NGDS - PM/MS SB - Product Management Systems Support	Various	JPM CBRN Medical : JPEO-CBRND, Fort Detrick, MD	3.436	3.271	Dec 2019	0.000		0.000		0.000		0.000	0.000	6.707	0.000
NGDS 2 CHEMDX - PM/MS S - Program Management (SETA)	C/FFP	Various : Various	0.000	0.000		0.000		0.999	Dec 2021	0.000		0.999	0.000	0.999	0.000
NGDS 2 CHEMDX - PM/MS S - Product Management Support	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	0.000	0.000		0.000		0.213	Dec 2021	0.000		0.213	0.000	0.213	0.000
NGDS 2 CHEMDX - PM/MS S - Program Management Support	Various	JPM CBRN Medical : JPEO-CBRND, Fort Detrick, MD	0.000	0.000		0.000		0.050	Dec 2021	0.000		0.050	0.000	0.050	0.000
NGDS 2 CHEMDX - PM/MS S - Program Management	Various	JPEO Chem : Bio, Rad, and Nuc Defense (JPEO-CBRND)	0.000	0.000		0.230	Dec 2020	0.400	Dec 2021	0.000		0.400	0.000	0.630	0.000
NGDS 2 CHEMDX - PM/MS S - Program Management (CHEMDX)	Various	JPM CBRN Medical : JPEO-CBRND, Fort Detrick, MD	0.000	0.000		0.000		0.808	Dec 2021	0.000		0.808	0.000	0.808	0.000
NGDS 2 MPDS - PM/MS S - Program Management Support	Various	JPM CBRN Medical : JPEO-CBRND, Fort Detrick, MD	0.000	0.000		2.061	Dec 2020	0.853	Dec 2021	0.000		0.853	0.000	2.914	0.000
NGDS 2 MPDS - PM/MS S - Program Management	Various	JPEO Chem : Bio, Rad, and Nuc Defense (JPEO-CBRND)	0.000	0.000		2.700	Dec 2020	1.279	Dec 2021	0.000		1.279	0.000	3.979	0.000

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Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
NGDS 2 MPDS - PM/MS S - Program Management (MPDS)	Various	JPM CBRN Medical : JPEO-CBRND, Fort Detrick, MD	0.000	0.000		1.121	Dec 2020	0.736	Dec 2021	0.000		0.736	0.000	1.857	0.000
NGDS 2 MPDS - PM/MS S - Product Management Support	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	0.000	0.000		0.486	Dec 2020	0.213	Dec 2021	0.000		0.213	0.000	0.699	0.000
NGDS 2 MPDS - PM/MS S - Program Management (SETA)	C/FFP	Various : Various	0.000	0.000		1.544	Dec 2020	0.484	Dec 2021	0.000		0.484	0.000	2.028	0.000
VAC BOT - PM/MS C - JPEO CBRN	Various	JPEO Chem/Bio Defense (JPEO-CBD) : Aberdeen Proving Ground, MD	0.000	2.944	Dec 2019	0.000		0.000		0.000		0.000	0.000	2.944	0.000
VAC BOT - Program Management (JPM) Support	Various	JPM CBRN Medical : Ft. Detrick, MD	0.349	5.578	Dec 2019	0.000		0.000		0.000		0.000	0.000	5.927	0.000
VAC PLG - Program Management (JPM) Support	Various	JPM CBRN Medical : Ft. Detrick, MD	27.333	3.080	Dec 2019	0.000		0.000		0.000		0.000	0.000	30.413	0.000
VAC PLG - Program Management (JPEO) Support	Various	JPEO Chem : Bio, Rad, and Nuc Defense (JPEO-CBRND)	47.350	1.960	Dec 2019	0.000		0.000		0.000		0.000	0.000	49.310	0.000
CONG - PM/MS SB - Antiviral Prophylaxis Studies-Program Management	Various	JPM CBRN Medical : JPEO-CBRND, Fort Detrick, MD	0.220	0.175	Jan 2020	0.000		0.000		0.000		0.000	0.000	0.395	0.000
VAC SIP - PM/MS C - Program Management Support	MIPR	Edgewood Chemical Biological Center	3.036	0.125	Mar 2020	0.000	Mar 2021	0.000		0.000		0.000	0.000	3.161	0.000

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (EMD)</i>	Project (Number/Name) MB5 / <i>Medical Biological Defense (SDD)</i>
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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
CONG - VAC PLG Adaptive Clinical Trial																												
VAC SIP - Storage, distribution, potency testing, biosurety compliance activities																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) MB5 / Medical Biological Defense (SDD)

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
COVID POC DX - Device Evaluation & User Demo	4	2020	3	2021
COVID TX - Clinical Trials	4	2020	4	2021
COVID TX - Manufacturing Expansion	4	2020	2	2021
AV TX - Natural History Study (Marburg)	4	2020	1	2022
AV TX - Animal Efficacy Studies (Marburg)	4	2021	4	2023
AV TX - Milestone C (Marburg)	3	2023	3	2023
AV TX - FDA Licensure/Approval (Marburg)	2	2024	2	2024
BOT MAB - Clinical and Nonclinical	1	2021	3	2024
BOT MAB - Manufacturing	1	2021	3	2025
BOT MAB - BLA Submission	4	2025	4	2025
BOT MAB - MS C	4	2025	4	2025
CET RAIDR - NonClinical and Clinical Studies	1	2022	4	2026
CBIPR-ADM - MCM Enabling Manufacturing Technologies	1	2020	4	2026
CBIPR-ADM - MCM Development and Manufacturing Support	1	2020	4	2026
CMDR-B - Program Closeout Activities	1	2020	4	2020
DBPAP - Expand Select Biological Threat Agent Reference Material	1	2020	4	2026
DBPAP - Development and Implementation of Quality Initiatives	1	2020	4	2026
DBPAP - Optimization and Development of Nucleic Acid Assays	1	2020	4	2026
DBPAP - ISO Certification	1	2020	4	2026
DBPAP - PCR assay validation	1	2020	4	2026
DBPAP - Enabling early warning tools and information exchange	1	2020	4	2026
DBPAP - Surveillance capabilities	1	2020	4	2026

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (EMD)</i>	Project (Number/Name) MB5 / <i>Medical Biological Defense (SDD)</i>
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Events	Start		End	
	Quarter	Year	Quarter	Year
JMEDICC - OCONUS Clinical Capabilities	1	2020	4	2020
MCMPT - ADAMANT	1	2020	4	2020
NGDS Increment 2 - Man Portable Dx System EMD	1	2020	4	2020
NGDS 2 CHEMDX Increment 2 - CHEMDX MS B	3	2021	3	2021
NGDS 2 CHEMDX Increment 2 - CHEMDX EMD	3	2021	1	2024
NGDS 2 CHEMDX Increment 2 - CHEMDX MS C	2	2024	2	2024
NGDS 2 MPDS - Man Portable Dx System EMD	1	2020	1	2024
NGDS 2 MPDS - Man Portable Dx System (MPDS) MS C / LRIP	3	2022	3	2022
NGDS 2 MPDS - Man Portable Dx System (MPDS) FRP	1	2024	1	2024
VAC BOT - Manufacturing, Testing Efforts/Regulatory	1	2020	4	2020
VAC BOT - Activities to maintain VAC BOT vaccine lots for potential emergency use	3	2020	4	2021
VAC PLG - Manufacturing, Testing Efforts/Regulatory	1	2020	4	2020
VAC PLG - Activities to maintain VAC PLG vaccine lots for emergency use	3	2020	4	2021
CONG - SPX AV PEP Regulatory Submissions	1	2023	1	2023
CONG - VAC PLG Adaptive Clinical Trial	3	2021	2	2024
VAC SIP - Storage, distribution, potency testing, biosurety compliance activities	1	2020	4	2026

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program										Date: May 2021		
Appropriation/Budget Activity 0400 / 5					R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)				Project (Number/Name) MC5 / Medical Chemical Defense (SDD)			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
MC5: Medical Chemical Defense (SDD)	-	55.269	54.392	50.362	-	50.362	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project supports efforts in the Engineering and Manufacturing Development (EMD) phase of the acquisition strategy for prophylactic, pre-treatment, and therapeutic drugs and diagnostic medical devices for the protection, treatment, detection, and medical management of chemical warfare agent exposures. This project provides for the research and development of safety studies, manufacturing scale-up, process validation, drug interaction, performance test, and submission of the Food and Drug Administration (FDA) drug licensure application(s).

Efforts included in this project are:

- (1) Advanced Anticonvulsant System (AAS),
- (2) Alternative Autoinjector Manufacturer Capability (AUTOINJ),
- (3) Bioscavenger (BSCAV-P),
- (4) Improved Nerve Agent Treatment System (INATS),
- (5) Improved Nerve Agent Treatment System Centrally Acting (INATS CA), and
- (6) Rapid Opioid Countermeasure System (ROCS)

The AAS program provides for midazolam in an autoinjector for treatment of nerve agent induced seizures. Midazolam, injected intramuscularly, will treat traditional nerve agent and non-traditional agent-induced seizures and prevent subsequent neurological damage. Midazolam is more water-soluble than diazepam (the currently fielded medication to control nerve agent-induced seizures) and terminates nerve agent-induced seizures more quickly than diazepam. AAS will not eliminate the need for other protective and therapeutic systems. In FY22 AAS completes a Phase 1 clinical study from a new manufacturer and submits a New Drug Application (NDA).

The AUTOINJ program provides for FDA approved alternative source(s) for autoinjectors that deliver DoD nerve agent antidote and treatment capabilities to the warfighter; thereby mitigating capability fielding and operational readiness risks. This program augments legacy autoinjectors, ATNAA, 2-PAM, and Convulsant Antidote for Nerve Agents (CANAs) by providing alternative commercial sources which includes Dual Drug Delivery Device (D4), the Atropine Auto-Injector, and an anti-convulsant autoinjector. AUTOINJ (MC7) will transition to Modern Medical (MOD MED) MB7 in FY22.

The BSCAV-P program was intended to be a new capability for use as a prophylaxis against nerve agents. This program is pursuing closeout activities during FY20.

The INATS program provides an enhanced capability treatment regimen offering greater protection over a broader spectrum of toxic nerve agent threats. The development includes insertion of a Centrally Acting (CA) anticholinergic agent to the treatment regimen to increase survivability and decrease morbidity. Funding ends in FY20. Effort will continue in FY21 as INATS CA.

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) MC5 / Medical Chemical Defense (SDD)

INATS CA advanced development starts in FY21 as a continuation of INATS and provides a centrally-acting anticholinergic agent to increase survivability and decrease morbidity after exposure to toxic nerve agent threats. Scopolamine was selected for development after an extensive analysis of alternatives and review of data by the Science and Technology community. Added to the currently fielded system, the INATS CA program will improve overall medical outcomes and will be utilized as both a vial for use at definitive care and a stand-alone auto-injector for use in the field. In FY22, INATS CA continues autoinjector development and manufacturing activities of the drug product and autoinjector device, as well as continues non-clinical animal studies.

The ROCS program supports the discovery, characterization, development, and fielding of FDA-approved therapeutic Medical Countermeasures (MCMs) to protect the Joint Service warfighter against operational exposures to the opioid class of pharmaceutical-based agents (PBAs), a high priority. The first increment of the ROCS program will develop a naloxone autoinjector as a rescue treatment that will counteract the adverse effects from exposure to opioids. In FY22 ROCS completes manufacturing activities, including manufacturing of the drug product and autoinjector device, and completes regulatory activities such as preparation and submission of the New Drug Application (NDA) for approval.

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Title: 1) Advanced Anticonvulsant System (AAS)</p> <p>Description: New Drug Application (NDA) Resubmission Activities</p> <p>FY 2021 Plans: Continue NDA resubmission activities.</p> <p>FY 2022 Plans: Complete NDA submission activities. Complete Phase 1 clinical study and Submit NDA.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program/project transitioned to Production and Deployment Phase.</p>	-	4.048	3.229
<p>Title: 2) Alternative Autoinjector (AUTOINJ)</p> <p>Description: Development</p> <p>FY 2021 Plans: Continue prototype tooling.</p> <p>FY 2022 Plans: Complete prototype tooling for D4 and Alt-Diazepam, i.e., develop necessary equipment and tools to use in the process for manufacturing devices.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement:</p>	2.400	2.500	2.000

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) MC5 / Medical Chemical Defense (SDD)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
Program/project transitioned to Production and Deployment Phase.				
<p>Title: 3) Alternative Autoinjector (AUTOINJ)</p> <p>Description: Manufacturing</p> <p>FY 2021 Plans: Continue manufacturing for Dual Drug Delivery Device (D4) and alternative diazepam autoinjectors. Initiate engineering lots for D4 and alternative diazepam autoinjectors.</p> <p>FY 2022 Plans: Complete manufacturing & validation for dual drug chamber autoinjector. Continue engineering lots for D4. Continue manufacturing lots for Diazepam.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to change in program/project schedule.</p>		2.400	1.000	3.000
<p>Title: 4) AUTOINJ</p> <p>Description: Prototyping and Testing</p> <p>FY 2021 Plans: Continue stability studies for atropine. Continue functional testing and prototype development for D4 and alternative diazepam autoinjector.</p> <p>FY 2022 Plans: Complete stability studies for atropine. Complete functional testing for dual chamber auto injector. Complete prototype development of single autoinjector.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Decrease due to change in program/project schedule. Finalizing design of autoinjector.</p>		19.259	9.300	4.000
<p>Title: 5) AUTOINJ</p> <p>Description: FDA Coordination</p> <p>FY 2021 Plans: Continue FDA preparation, filing, and meetings for single and dual drug autoinjectors.</p> <p>FY 2022 Plans:</p>		2.068	1.200	1.000

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021			
Appropriation/Budget Activity 0400 / 5		R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) MC5 / Medical Chemical Defense (SDD)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022	
Complete FDA preparation, filing and meetings for single and dual drug autoinjectors. FY 2021 to FY 2022 Increase/Decrease Statement: Program/project transitioned to Production and Deployment Phase.					
Title: 6) AUTOINJ Description: Government Testing FY 2021 Plans: Continue human factors and environmental testing for D4 and alternative diazepam autoinjectors. FY 2022 Plans: Complete human factors and environmental testing for single and dual drug autoinjectors. FY 2021 to FY 2022 Increase/Decrease Statement: Decrease due to change in program/project schedule.		1.000	0.931	0.188	
Title: 7) Bioscavenger (BSCAV-P) Description: Closeout		0.500	-	-	
Title: 8) Improved Nerve Agent Treatment System (INATS) Description: Manufacturing & Non-Clinical & Clinical- Scopolamine; Closeout Oxime Activities		14.345	-	-	
Title: 9) INATS CA Description: Clinical FY 2021 Plans: Continue clinical human safety studies from INATS FY20. FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.		-	4.000	-	
Title: 10) Improved Nerve Agent Treatment System Centrally Acting (INATS CA) Description: Manufacturing/Auto-Injector FY 2021 Plans:		-	7.100	6.723	

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) MC5 / Medical Chemical Defense (SDD)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
Continue Auto-Injector Development and Manufacturing Activities from INATS FY20. FY 2022 Plans: Continue Auto-Injector Development and manufacturing activities of the drug product and autoinjector device. FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.				
Title: 11) INATS CA Description: Non-Clinical FY 2021 Plans: Continue Non-Clinical Animal Studies from INATS FY20. FY 2022 Plans: Continue Non-Clinical Animal Studies. FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.		-	15.896	18.842
Title: 12) Rapid Opioid Countermeasure System (ROCS) Description: Development		1.862	-	-
Title: 13) Rapid Opioid Countermeasure System (ROCS) Description: Manufacturing FY 2021 Plans: Continue manufacturing activities. FY 2022 Plans: Complete manufacturing activities, including manufacturing of the drug product and autoinjector device.		6.166	4.800	4.800
Title: 14) Rapid Opioid Countermeasure System (ROCS) Description: Clinical Studies FY 2021 Plans:		5.269	3.617	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) MC5 / Medical Chemical Defense (SDD)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
Complete Phase 1 human clinical studies.			
FY 2021 to FY 2022 Increase/Decrease Statement: Program/project is entering completion and all activities will be closed.			
Title: 15) Rapid Opioid Countermeasure System (ROCS) Description: FDA & Regulatory activities FY 2022 Plans: Initiate and complete regulatory activities such as writing and submitting the New Drug Application (NDA) for submission and approval. FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to accelerated development effort.	-	-	6.580
Accomplishments/Planned Programs Subtotals	55.269	54.392	50.362

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

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• JM6677: ADVANCED ANTICONVULSANT SYSTEM (AAS)	0.000	0.000	4.243	-	4.243	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

ADVANCED ANTICONVULSANT SYSTEM (AAS)

The Advanced Anticonvulsant System (AAS), consists of Midazolam in an autoinjector for treatment of seizures, to include those caused by nerve agent. A contractor shall be responsible for conducting activities associated with drug development in a manner consistent with eventual approval by the Food and Drug Administration (FDA). The contractor shall sponsor the drug to the FDA and hold all approvals and/or licenses. The Contractor will need to initiate and complete studies that comply with new FDA requirements for manufacturing and quality for autoinjector products, ultimately leading to FDA approval. Upon FDA approval, sufficient quantities of product to meet Initial Operational Capability (IOC) and Full Operational Capability (FOC) will be purchased. Subsequent purchases for product sustainment will be made by the Defense Logistics Agency. Post marketing commitments and requirements are anticipated as a result of the FDA approval and will be the responsibility of the contractor and the government

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program	Date: May 2021
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Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (EMD)</i>	Project (Number/Name) MC5 / <i>Medical Chemical Defense (SDD)</i>
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ALTERNATE AUTOINJECTOR MANUFACTURER CAPABILITY (AUTOINJ)

The Alternative Autoinjector Manufacturer Capability (AUTOINJ) will identify an alternative source(s) to develop and provide required FDA-approved autoinjector-delivered nerve agent antidote and treatment capabilities to the DoD.

The AUTOINJ effort leverages novel technologies and industrial base expansion in order to develop the autoinjector products. AUTOINJ uses contracts and Other Transactional Agreements (OTAs) in which the performer shall be responsible for conducting development and testing activities consistent with current Food and Drug Administration (FDA) regulations. The contractor shall sponsor the drug to the FDA and hold all approvals and/or licenses. Upon FDA approval, purchases for product sustainment will be made by the Defense Logistics Agency.

BIOSCAVENGER (BSCAV)

The Bioscavenger program employed a serial evaluation of candidates to achieve competitive prototyping in the Technology Maturation and Risk Reduction (TM&RR) phase, culminating in a down-select decision. The Bioscavenger program then issued a Request for Proposal (RFP) to select the best value for the government for a prophylaxis to support an initial limited user group. During the Engineering and Manufacturing Development (EMD) phase, the program continued to meet its performance objectives and produced a current Good Manufacturing Practice (cGMP) drug product for use in further development.

The program will end activities in FY20. In FY19, the program initiated termination of acquisition activities and program close out will be completed in FY20. The program will continue to work with the Joint Science & Technology Office in their efforts to advance potential candidates and will monitor Health and Human Service programs, international programs, and the commercial sector for potential materiel solutions for this capability gap.

IMPROVED NERVE AGENT TREATMENT SYSTEM (INATS)

The INATS program provides an enhanced capability treatment regimen offering greater protection over a broader spectrum of toxic nerve agent threats. The development includes insertion of a CA anticholinergic agent to the treatment regimen to increase survivability and decrease morbidity. Funding ends in FY20. Effort will continue in FY21 as INATS CA.

INATS and INATS CA (MC7) will support the modernization of Soman Nerve Agent Pretreatment Pyridostigmine (SNAPP) using contract actions to extend operational shelf-life and generate data to expand storage temperature conditions.

IMPROVED NERVE AGENT TREATMENT CENTRALLY ACTING (INATS CA)

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program	Date: May 2021
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Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)
0400 / 5	PE 0604384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (EMD)</i>	MC5 / <i>Medical Chemical Defense (SDD)</i>

The INATS CA program provides a centrally-acting anticholinergic agent to increase survivability and decrease morbidity after exposure to toxic nerve agent threats. Scopolamine was selected for development after an extensive analysis of alternatives and review of data by the Science and Technology community. Added to the currently fielded system, the INATS CA program will improve overall medical outcomes and will be utilized as both a vial for use at definitive care and a stand-alone auto-injector for use in the field.

RAPID OPIOID COUNTERMEASURE SYSTEM (ROCS)

Rapid Opioid Countermeasure System (ROCS) is a Joint ACAT III Medical Countermeasure (MCM) Middle Tier Acquisition Program of Record (POR) in the Prototype Phase of development. The ROCS program is using existing naloxone autoinjector capabilities identified from focused Market Research. ROCS is a Middle Tier Acquisition program. The development of the autoinjector is being conducted under Other Transaction Authority (OTA) agreement. Once FDA approval has been granted the program will transition from Rapid Prototyping to Rapid Fielding or a traditional production and fielding pathway.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) MC5 / Medical Chemical Defense (SDD)
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
AAS - SW S - NDA Submission Activities	C/CPFF	RAFA Laboratories : TBD	0.000	0.000		2.935	Oct 2020	2.782	Dec 2021	0.000		2.782	0.000	5.717	0.000
AUTOINJ - HW S - Dual Drug Delivery Device (D4) Prototype Development	C/CPFF	Emergent Biosolutions : Gaithersburg/ Rockville, MD	14.108	9.797	Nov 2019	6.438	Nov 2020	0.000		0.000		0.000	0.000	30.343	0.000
AUTOINJ - HW S - Diazepam Autoinjector	C/CPFF	Emergent Biosolutions : Gaithersburg/ Rockville, MD	0.301	10.510	Nov 2019	3.800	Nov 2020	3.451	Nov 2021	0.000		3.451	0.000	18.062	0.000
AUTOINJ - HW S - Dual Drug Delivery Device (D4) Prototype	C/CPFF	Emergent Biosolutions : Gaithersburg/ Rockville, MD	1.785	0.000		0.000		3.450	Dec 2021	0.000		3.450	0.000	5.235	0.000
AUTOINJ - HW C - Regulatory Support	C/CPFF	Ology : Alachua, FL	0.697	0.000		0.200	Nov 2020	0.150	Nov 2021	0.000		0.150	0.000	1.047	0.000
AUTOINJ - HW S - Device Inovation, (RAFA)	C/FFP	Various : Various	0.142	0.125	Feb 2020	0.000		0.000		0.000		0.000	0.000	0.267	0.000
INATS - HW C - Animal Efficacy Studies	C/CPFF	Battelle Memorial Institute : Columbus, OH	0.795	0.614	Jan 2020	0.000		0.000		0.000		0.000	0.000	1.409	0.000
INATS - HW C - Centrally-Acting Autoinjector Efforts	C/CPFF	Battelle Memorial Institute : Columbus, OH	0.000	5.407	Jan 2020	0.000		0.000		0.000		0.000	0.000	5.407	0.000
INATS - HW C - Large-Scale Manufacturing	C/CPFF	TBD : N/A	0.000	3.196	Jan 2020	0.000		0.000		0.000		0.000	0.000	3.196	0.000
INATS CA - HW C - Clinical	C/CPFF	Battelle Memorial Institute : Columbus, OH	0.000	0.000		4.000	Nov 2020	0.000		0.000		0.000	0.000	4.000	0.000
INATS CA - HW C - Manufacturing	C/FFP	Aktivax : Boulder, CO	0.000	0.000		6.500	Dec 2020	6.420	Dec 2021	0.000		6.420	0.000	12.920	0.000
INATS CA - HW C - Non-Clinical	C/CPFF	Battelle Memorial Institute : Columbus, OH	0.000	0.000		8.475	Nov 2020	13.230	Nov 2021	0.000		13.230	0.000	21.705	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) MC5 / Medical Chemical Defense (SDD)
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
ROCS - Initiate naloxone formulation studies	C/CPFF	kaleo : Richmond, VA	0.000	1.705	Nov 2019	0.000		0.000		0.000		0.000	0.000	1.705	0.000
ROCS - Manufacturing	C/CPFF	kaleo : Richmond, VA	0.000	4.979	Feb 2020	3.500	Dec 2020	3.500	Nov 2021	0.000		3.500	0.000	11.979	0.000
ROCS - Clinical Studies	C/CPFF	kaleo : Richmond, VA	0.000	4.150	Aug 2020	2.931	Dec 2020	0.000		0.000		0.000	0.000	7.081	0.000
ROCS - Regulatory	C/CPFF	kaleo : Richmond, VA	0.000	0.000		0.000		4.988	Oct 2021	0.000		4.988	0.000	4.988	0.000
Subtotal			17.828	40.483		38.779		37.971		0.000		37.971	0.000	135.061	N/A

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
AUTOINJ - Office of Regulated Activities (ORA)	MIPR	US Army Medical Research Material Command (USAMRMC) : Fort Detrick, MD	0.000	0.068	Feb 2020	0.000		0.000		0.000		0.000	0.000	0.068	0.000
BSCAV-P - ES C - CCDC	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	0.000	0.094	Nov 2019	0.000		0.000		0.000		0.000	0.000	0.094	0.000
INATS - ES C - Office of Regulated Activities Support - (ORA)	MIPR	US Army Medical Research Material Command (USAMRMC) : Fort Detrick, MD	0.645	0.552	Jan 2020	0.000		0.000		0.000		0.000	0.000	1.197	0.000
INATS - ES C - Device Testing	C/CPFF	Aktivax : Boulder, CO	0.000	0.185	Nov 2019	0.000		0.000		0.000		0.000	0.000	0.185	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) MC5 / Medical Chemical Defense (SDD)
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Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
INATS CA - ES C - Regulatory Support	MIPR	USAMRMC - Office of Regulated Activities (ORA) : Ft. Detrick, MD	0.000	0.000		0.500	Feb 2021	0.000		0.000		0.000	0.000	0.500	0.000
Subtotal			0.645	0.899		0.500		0.000		0.000		0.000	0.000	2.044	N/A

Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
AUTOINJ - MIL STD Testing	MIPR	US Army Medical Research Material Command (USAMRMC) : Fort Detrick, MD	0.000	0.196	Jan 2020	0.200	Nov 2020	0.200	Nov 2021	0.000		0.200	0.000	0.596	0.000
Subtotal			0.000	0.196		0.200		0.200		0.000		0.200	0.000	0.596	N/A

Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
AAS - Program Management	Various	JPEO Chem : Bio, Rad, and Nuc Defense (JPEO-CBRND)	0.370	0.000		0.293	Nov 2020	0.234	Nov 2021	0.000		0.234	0.000	0.897	0.000
AAS - Program Management Support	Various	JPM CBRN Medical : JPEO-CBRND, Fort Detrick, MD	2.580	0.000		0.631	Nov 2020	0.000		0.000		0.000	0.000	3.211	0.000
AAS - Program Management (SETA)	C/FFP	Various : Various	0.548	0.000		0.189	Nov 2020	0.213	Nov 2021	0.000		0.213	0.000	0.950	0.000
AUTOINJ - Program Management (JPEO)	Various	JPEO Chem : Bio, Rad, and Nuc	2.488	1.807	Dec 2019	1.082	Dec 2020	0.600	Dec 2021	0.000		0.600	0.000	5.977	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) MC5 / Medical Chemical Defense (SDD)
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Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
		Defense (JPEO-CBRND)													
AUTOINJ - Program Management (MCS) Support	Various	JPM CBRN Medical : Ft. Detrick, MD	0.594	1.574	Nov 2019	1.642	Nov 2020	0.975	Nov 2021	0.000		0.975	0.000	4.785	0.000
AUTOINJ - Program Management (CDP)	Various	JPM CBRN Medical : Ft. Detrick, MD	0.000	0.629	Nov 2019	0.000		0.272	Nov 2021	0.000		0.272	0.000	0.901	0.000
AUTOINJ - Program Management (OPETS)	C/FFP	Various : Various	0.639	2.421	Nov 2019	1.569	Nov 2020	1.090	Nov 2021	0.000		1.090	0.000	5.719	0.000
BSCAV-P - Program Management (CDP)	Various	JPM CBRN Medical : JPEO-CBRND, Fort Detrick, MD	0.655	0.406	Feb 2020	0.000		0.000		0.000		0.000	0.000	1.061	0.000
INATS - Program Management (SETA)	C/FFP	Various : Various	0.000	1.257	Nov 2019	0.000		0.000		0.000		0.000	0.000	1.257	0.000
INATS - Product Management (MCS) Support	Various	JPM CBRN Medical : JPEO-CBRND, Fort Detrick, MD	9.040	1.285	Dec 2019	0.000		0.000		0.000		0.000	0.000	10.325	0.000
INATS - Program Management	Various	JPM CBRN Medical : JPEO-CBRND, Fort Detrick, MD	0.000	0.375	Dec 2019	0.000		0.000		0.000		0.000	0.000	0.375	0.000
INATS - Program Management #2	Various	JPEO Chem : Bio, Rad, and Nuc Defense (JPEO-CBRND)	5.007	1.474	Mar 2020	0.000		0.000		0.000		0.000	0.000	6.481	0.000
INATS CA - Program Management	Various	JPEO Chem : Bio, Rad, and Nuc Defense (JPEO-CBRND)	0.000	0.000		1.957	Dec 2020	2.466	Dec 2021	0.000		2.466	0.000	4.423	0.000
INATS CA - Program Management (MCS) Support	Various	JPM CBRN Medical : JPEO-CBRND, Fort Detrick, MD	0.000	0.000		2.970	Dec 2020	1.520	Dec 2021	0.000		1.520	0.000	4.490	0.000
INATS CA - Program Management (CDP)	Various	JPM CBRN Medical : JPEO-CBRND, Fort Detrick, MD	0.000	0.000		0.951	Dec 2020	0.520	Dec 2021	0.000		0.520	0.000	1.471	0.000

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) MC5 / Medical Chemical Defense (SDD)
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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
BSCAV - Program Close Out Activities	██████████																											
AAS - NDA Resubmission Activities	██████████																											
AAS - Submission Activities					██████████																							
AAS - FDA Approval									████																			
AAS - FRP													████															
AAS - IOC													████															
AAS - FOC																					████							
AUTOINJ - Development	██████████				██████████																							
AUTOINJ - Manufacturing	██████████				██████████																							
AUTOINJ - Prototyping and Testing	██████████				██████████																							
AUTOINJ - FDA Coordination	██████████				██████████																							
AUTOINJ - Government Testing	██████████				██████████																							
AUTOINJ - Alt Midazolam Development													██████████															
AUTOINJ - Alt Midazolam Manufacturing													██████████				██████████											
AUTOINJ - Alt Midazolam Testing																	██████████				██████████							
AUTOINJ - Alt Midazolam FDA and Regulatory																					██████████							
INATS - Manufacturing (CA)	██████████																											
INATS - Milestone B (CA)					████																							
INATS - Non-Clinical Studies (CA)	██████████																											
INATS - Clinical Trials (CA)	██████████																											
INATS CA - Clinical Trials					██████████																							
INATS CA - Manufacturing/Auto-Injector					██████████				██████████				██████████				██████████											
INATS CA - Non-Clinical Studies					██████████				██████████																			
ROCS - Manufacturing Activities	██████████				██████████																							

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (EMD)</i>	Project (Number/Name) MC5 / <i>Medical Chemical Defense (SDD)</i>
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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
ROCS - Human Clinical Studies	[REDACTED]																											
ROCS - FDA	[REDACTED]																											

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) MC5 / Medical Chemical Defense (SDD)

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
BSCAV - Program Close Out Activities	1	2020	4	2020
AAS - NDA Resubmission Activities	1	2020	1	2021
AAS - Submission Activities	4	2020	3	2022
AAS - FDA Approval	4	2022	4	2022
AAS - FRP	3	2023	3	2023
AAS - IOC	4	2023	4	2023
AAS - FOC	4	2025	4	2025
AUTOINJ - Development	1	2020	1	2022
AUTOINJ - Manufacturing	1	2020	4	2022
AUTOINJ - Prototyping and Testing	1	2020	2	2023
AUTOINJ - FDA Coordination	1	2020	2	2023
AUTOINJ - Government Testing	1	2020	2	2022
AUTOINJ - Alt Midazolam Development	1	2023	4	2023
AUTOINJ - Alt Midazolam Manufacturing	4	2023	4	2025
AUTOINJ - Alt Midazolam Testing	2	2024	1	2026
AUTOINJ - Alt Midazolam FDA and Regulatory	1	2026	4	2026
INATS - Manufacturing (CA)	1	2020	4	2020
INATS - Milestone B (CA)	3	2020	3	2020
INATS - Non-Clinical Studies (CA)	1	2020	4	2020
INATS - Clinical Trials (CA)	1	2020	4	2020
INATS CA - Clinical Trials	1	2021	1	2022
INATS CA - Manufacturing/Auto-Injector	1	2021	2	2025

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (EMD)</i>	Project (Number/Name) MC5 / <i>Medical Chemical Defense (SDD)</i>
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Events	Start		End	
	Quarter	Year	Quarter	Year
INATS CA - Non-Clinical Studies	1	2021	4	2023
ROCS - Manufacturing Activities	1	2020	4	2022
ROCS - Human Clinical Studies	3	2020	4	2021
ROCS - FDA	1	2022	4	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) TE5 / Test & Evaluation (SDD)
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
TE5: Test & Evaluation (SDD)	-	7.523	6.352	0.000	-	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

This Project supports the Chemical Biological Material Assessment Infrastructure (CBMAI). CBMAI addresses test infrastructure needs with improvements, modifications, and/or new critical test capabilities for chemical, biological, and emerging threat products across the CBDP. The CBMAI provides test fixtures and methodology to support system development test and evaluation intended to meet a changing threat regardless of the test site/location.

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

	FY 2020	FY 2021	FY 2022
<p>Title: 1) CBMAI</p> <p>Description: CBMAI provides test infrastructure modification build and integration to address detection, protection, and decontamination requirements and milestone schedules. Provide analysis and testing of innovative technologies and rapid prototyping of equipment to expedite the infrastructure development process. Execution of infrastructure modifications and modernization efforts allow test facilities to expand productivity and reduce costs while providing critical test data.</p> <p>FY 2021 Plans: Complete the integration and validation of a data management system to allow the test community and users to easily change and configure equipment and securely share test data on outdoor test ranges. Continue the integration and validation of referee equipment to provide accurate protective ensemble performance data. Initiate additional upgrades to JABT, ASC, Staging Facility. Complete validation and accreditation of aerosol biological agent chamber.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program/project is entering completion and all activities will be closed.</p>	5.612	4.941	-
<p>Title: 2) CBMAI</p> <p>Description: Government Integrated Product Team program management and IPT Support to all CBDP programs and external partners.</p> <p>FY 2021 Plans: Continue Program Management including Government system engineering, program/financial management, costing, personnel support, travel and overhead.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement:</p>	1.911	1.411	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) TE5 / Test & Evaluation (SDD)
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
Program/project is entering completion and all activities will be closed.			
Accomplishments/Planned Programs Subtotals	7.523	6.352	-

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

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• TE7: Test & Evaluation (Op Sys Dev)	5.280	0.000	0.000	-	0.000	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

CHEMICAL BIOLOGICAL MATERIEL ASSESSMENT INFRASTRUCTURE (CBMAI)

CBMAI efforts are supported through competitive contract actions, academia, and other Government agencies. Infrastructure solutions will leverage commercially available systems to provide state-of-the-art capabilities that address current and future CBDP test and evaluation needs. The CBMAI program will be ending in FY21 as development efforts come to completion. Future test infrastructure needs, improvements, or modifications will be managed and funded by the supported programs of record beginning in FY22.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / CHEMICAL/BIOLOGICAL DEFENSE (EMD)	Project (Number/Name) TE5 / Test & Evaluation (SDD)
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CBMAI - HW C - OADMS-SCA-V	MIPR	CCDC AVIATION AND MISSILE CENTER : Huntsville, AL	0.000	0.000		0.045	Nov 2020	0.000		0.000		0.000	0.000	0.045	0.000
CBMAI - HW S - Upgrades, V&V, Transition	Various	Various : Various	0.433	1.000	Dec 2019	0.000		0.000		0.000		0.000	0.000	1.433	0.000
CBMAI - HW C - OADMS	MIPR	Army Materiel Systems Analysis Activity : Aberdeen Proving Ground, MD	0.000	0.000		0.066	Nov 2020	0.000		0.000		0.000	0.000	0.066	0.000
CBMAI - HW S - Open Architecture Data Management System (OADMS) Software Modifications	C/CPFF	Various : Various	2.871	1.100	Dec 2019	3.936	Mar 2021	0.000		0.000		0.000	0.000	7.907	0.000
CBMAI - HW S - Ballistic Gas Chromatograph (GC)	C/CPFF	MRIGlobal : Kansas City, MO	0.286	1.474	Dec 2019	0.000		0.000		0.000		0.000	0.000	1.760	0.000
CBMAI - HW S - Government SE & Technical Management Team	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	1.261	1.538	Nov 2019	0.894	Dec 2020	0.000		0.000		0.000	0.000	3.693	0.000
Subtotal			4.851	5.112		4.941		0.000		0.000		0.000	0.000	14.904	N/A

Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CBMAI - OTE S - Test Grid Sustainment	C/CPFF	MRIGlobal : Kansas City, MO	0.667	0.500	Dec 2019	0.000		0.000		0.000		0.000	0.000	1.167	0.000
Subtotal			0.667	0.500		0.000		0.000		0.000		0.000	0.000	1.167	N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (EMD)</i>	Project (Number/Name) TE5 / <i>Test & Evaluation (SDD)</i>

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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
CBMAI - Ballistic GC	[REDACTED]																											
CBMAI - Test Grid	[REDACTED]																											
CBMAI - Upgrades, V&V, Transitions	[REDACTED]																											
CBMAI - Open Architecture Data Management System (OADMS) Integration	[REDACTED]																											

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (EMD)</i>	Project (Number/Name) TE5 / <i>Test & Evaluation (SDD)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
CBMAI - Ballistic GC	1	2020	4	2020
CBMAI - Test Grid	1	2020	4	2020
CBMAI - Upgrades, V&V, Transitions	1	2020	4	2020
CBMAI - Open Architecture Data Management System (OADMS) Integration	1	2020	4	2021

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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 6: RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0605384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (RDT&E MGT SUPPORT)</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	113.307	127.951	110.503	-	110.503	-	-	-	-	-	-
DT6: <i>Joint Doctrine And Training Support (Mgmt Support)</i>	-	1.735	3.600	2.040	-	2.040	-	-	-	-	-	-
DW6: <i>Major Range And Test Facility Base (Mgmt Support)</i>	-	53.624	66.466	60.560	-	60.560	-	-	-	-	-	-
LS6: <i>Laboratory Support (Mgmt Support)</i>	-	19.260	13.078	10.213	-	10.213	-	-	-	-	-	-
MS6: <i>Management Support (Mgmt Support)</i>	-	36.996	43.807	36.750	-	36.750	-	-	-	-	-	-
O49: <i>Joint Concept Development (Mgmt Support)</i>	-	1.692	1.000	0.940	-	0.940	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

The projects in this program element (PE) support Joint Doctrine and Training, sustains the technical test capability at West Desert Test Center (WDTC), sustains the core Department of Defense (DoD) Chemical Biological (CB) Science and Technology (S&T) laboratory infrastructure, provides for program and financial management support, and supports the Joint Concepts, Studies, and Analysis program.

Individual projects include:

- Joint Doctrine and Training Support (DT6): develops Joint Doctrine and Multi-Service Tactics, Techniques and Procedures (TTPs) for CB defense programs of record; develops non-materiel solutions for the CWMD/CBRN defense community; and supports Combatant Command training and exercises and leader development.

- Major Range and Test Facility Base (MRTFB) (DW6): operating support to WDTC and BioTesting Division (Chemical Biological Center) for the required institutional test operating costs (e.g. institutional civilian and contractor labor; repair and maintenance of test instrumentation, equipment, and facilities; and replacement of test equipment).

- Laboratory Support (LS6): operating support for sustainment and modernization efforts for surety laboratory infrastructure in order to maintain and enhance DoD infrastructure capabilities to counter an expanding threat space, exploit advances in technology; and develop and transition CB defense equipment and countermeasures to the Warfighter.

- Management Support (MS6): management support for the DoD Chemical Biological Defense Program (CBDP) to allow program overview and integration of overall medical and non-medical programs by the Assistant Secretary of Defense for Nuclear, Chemical, and Biological Defense Programs (ASD(NCB)), through the Deputy Assistant Secretary of Defense for Chemical Biological Defense (DASD(CBD)).

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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 6: RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0605384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (RDT&E MGT SUPPORT)</i>
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- Joint Concept Development (O49): conducts foundational Joint Concepts development, studies and analyses to enable requirements and capabilities development of both medical and physical CBRN defense systems; coordinates WMD/CBRN threat information requirements; and conducts integrated CBRN risk assessments.

B. Program Change Summary (\$ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	110.363	122.951	122.579	-	122.579
Current President's Budget	113.307	127.951	110.503	-	110.503
Total Adjustments	2.944	5.000	-12.076	-	-12.076
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	0.000	5.000			
• Congressional Directed Transfers	0.000	-			
• Reprogrammings	5.008	-			
• SBIR/STTR Transfer	-2.064	-			
• Other Adjustments	0.000	-	-12.076	-	-12.076

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

Project: DW6: *Major Range And Test Facility Base (Mgmt Support)*

Congressional Add: 1) *Chemical/Biological Defense Testing*

Congressional Add Subtotals for Project: DW6

Congressional Add Totals for all Projects

	FY 2020	FY 2021
	-	5.000
	-	5.000
	-	5.000

Change Summary Explanation

Funding: FY20 (+\$5.008 Million): Reprogrammings for support to laboratory infrastructure for laboratory operations, facilities sustainment, and regulatory compliance for critical chemical biological defense activities at USAMRIID and USAMRICD.

FY20 (-\$2.064 Million): Transfer of funding to support Small Business Innovative Research/Small Business Technology Transfer efforts.

FY21 (+\$5.000 Million): Congressional Add for chemical/biological defense testing.

FY22 (-\$12.076 Million): Decreases due to RDT&E Management Support efficiencies redirected to emerging threats (-\$8.351 Million), and Departmental inflation/travel adjustments (-\$3.725 Million).

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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide</i> / BA 6: <i>RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0605384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (RDT&E MGT SUPPORT)</i>	
Schedule: N/A		
Technical: N/A		

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 6					R-1 Program Element (Number/Name) PE 0605384BP / CHEMICAL/BIOLOGICAL DEFENSE (RDT&E MGT SUPPORT)				Project (Number/Name) DT6 / Joint Doctrine And Training Support (Mgmt Support)			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
DT6: Joint Doctrine And Training Support (Mgmt Support)	-	1.735	3.600	2.040	-	2.040	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Joint Requirements Office for Chemical, Biological, Radiological and Nuclear Defense (JRO-CBRND) Training and Leader Education program directly supports the Joint Service Chemical Biological Defense Program (CBDP); in particular, the development of Joint Chemical, Biological, Radiological, and Nuclear (CBRN) defense capability requirements and the improvement of CBRN defense related education and training at the Joint and Service levels. The purpose of this requirement is to provide technical and subject matter expert support in the areas of: related CBRN Defense (CBRND)/Countering Weapons of Mass Destruction (CWMD); Joint and Service training, leadership development, and education. This effort provides for: (1) The CBPD Joint Senior Leader Course (JSLC) and (2) Assistance in correcting training and doctrine deficiencies covered in the lessons learned process, combat operations, capability development studies and Department of Defense Inspector General (DoDIG) and Government Accountability Office (GAO) reports.

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

	FY 2020	FY 2021	FY 2022
Title: 1) Joint Requirements Office Doctrine and Training (JRO DT)	1.735	3.600	2.040
Description: Supports Joint Doctrine, Training, Leader Development & Education.			
FY 2021 Plans: Continue to support Joint and Multi-service doctrine development. This includes preparation of various Joint publications which then inform MTTs. Continue to support COCOM scenario development and controller/evaluator training by providing SMEs to exercises. Continue to support training efforts at various Joint Senior Leadership schools.			
FY 2022 Plans: Continue to support training efforts at various Joint Senior Leadership schools.			
FY 2021 to FY 2022 Increase/Decrease Statement: Decrease due to fact of life change in the program/project. Beginning in FY21, JRO will no longer provide funding to National Defense University - Center for the Study of Weapons of Mass Destruction (NDU-CSWMD).			
Accomplishments/Planned Programs Subtotals	1.735	3.600	2.040

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

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605384BP / CHEMICAL/BIOLOGICAL DEFENSE (RDT&E MGT SUPPORT)	Project (Number/Name) DT6 / Joint Doctrine And Training Support (Mgmt Support)

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

Remarks

D. Acquisition Strategy

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 6					R-1 Program Element (Number/Name) PE 0605384BP / CHEMICAL/BIOLOGICAL DEFENSE (RDT&E MGT SUPPORT)				Project (Number/Name) DW6 / Major Range And Test Facility Base (Mgmt Support)			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
DW6: Major Range And Test Facility Base (Mgmt Support)	-	53.624	66.466	60.560	-	60.560	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project provides for the technical and operational capability for testing Department of Defense (DoD) Chemical and Biological (CB) and Non Traditional Agent (NTA) defense materiel, equipment, and systems from concept through production to include associated special operations Tactics, Techniques, and Procedures Development (TTPD) activities at West Desert Test Center (WDTC), and the BioTesting Division (BTD) of the Chemical and Biological Center (CBC), both part of the Major Range and Test Facility Base (MRTFB) located at Dugway Proving Ground (DPG). Project provides institutional and overhead funding required to operate WDTC and BTD-CBC in compliance with Section 232 of the National Defense Authorization Act (NDAA) for FY03 (Public Law 107-314 - December 2002).

WDTC and BTD-CBC are the reliance centers for all DoD CB defense testing and provide the United States' only combined range, chamber, toxic chemical lab, and bio-safety level-3 (BSL-3) test facility. Institutional operating costs were transferred to the consolidated OSD Chemical and Biological Defense Program consistent with Public Law 103-160 Section 1701 and Program Budget Decision 250 (1996).

WDTC and BTD-CBC use state-of-the-art chemical and life-sciences test facilities and test chambers to perform CB defense testing of protective gear, decontamination systems, detectors, equipment, and non-materiel CB defense solutions while maintaining safety, security, and surety of chemical agents and biological pathogens. WDTC also provides test ranges, to include fully instrumented outdoor ranges, for TTPD activities and testing with simulants that can be correlated to the laboratory testing with live agents to ensure reliable and repeatable data are generated to support acquisition decisions of CB defense equipment.

The Secretary of the Army has been directed to conduct additional research addressing existing gaps in scientific knowledge encompassing the Biological Select Agents and Toxins (BSAT) Program. The transition of the BTD to CBC has enabled the DoD BSAT Biosafety Program to meet end to end enterprise tracking, reporting, and auditability requirements within an approved Governance, Risks, and Compliance framework. The laboratory commanders and directors are best able to identify potential risk through the use of local risk assessments and are responsible to promote cultures of safety and responsibility. Direct liaison with and oversight by the Executive Agent Responsible Officer will ensure laboratory directors or the MRTFB commander are empowered and supported in their operational environment. The ultimate responsibility for the safe and secure receipt, storage, handling, shipment and transfer of BSAT resides with the laboratory director or the MRTFB commander in accordance with Army, Navy, Air Force, and Federal policies and regulations. The implementation of a structured BSAT Biosafety Program includes clear standards and procedures, policy and regulations, peer review, quality control, accountability and oversight, adequate resources and infrastructure, and continuous process improvement. Through these means employees and members of the public are protected against the hazards associated with BSAT.

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

	FY 2020	FY 2021	FY 2022
Title: 1) BioTesting Division (BTD) - Sustainment of Operations	4.297	3.402	3.639

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605384BP / CHEMICAL/BIOLOGICAL DEFENSE (RDT&E MGT SUPPORT)	Project (Number/Name) DW6 / Major Range And Test Facility Base (Mgmt Support)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p><i>FY 2021 Plans:</i> Maintain BTD-CBC, MRTFB technical test capability and operations to include institutional civilian labor costs. Ensure the safe and efficient operations of the MRTFB to include safety, security, resource management, surety operations, range control, environmental oversight, workload management, and training. Represents the civilian labor and MRTFB operating costs required to support operations, which cannot be directly tied to a single test customer.</p> <p><i>FY 2022 Plans:</i> Maintains BTD-CBC, MRTFB technical test capability and operations to include institutional and overhead costs. Ensures the safe and efficient operations of the MRTFB to include administrative oversight of safety and risk management, program management, bio-surety lab operations, and employee training. Represents MRTFB operating costs not directly charged to a single test customer in compliance with Section 232 of the National Defense Authorization Act (NDAA) for FY03 (Public Law 107-314 - December 2002).</p> <p><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i> Minor change due to routine program adjustments. Minor change due to backfilling authorized civilian vacancies.</p>			
<p><i>Title:</i> 2) BTD TEST - Lothar Salomon Test Facility (LSTF) 24-Hour Support</p> <p><i>FY 2021 Plans:</i> Provide dedicated and specially trained, 24-hour, support staff who operate and maintain all critical control systems, such as, test specific HVAC systems and decontamination systems within LSTF Complex and the Baker Lab.</p> <p><i>FY 2022 Plans:</i> Provide dedicated and specially trained, 24-hour, support staff who operate and maintain all critical control systems, such as, test specific HVAC systems and decontamination systems within LSTF Complex and the Baker Lab.</p> <p><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i> Minor change due to routine program adjustments.</p>	0.643	0.650	0.637
<p><i>Title:</i> 3) BTD TEST - Test Capabilities Sustainment</p> <p><i>FY 2021 Plans:</i> Provides for ongoing sustainment of existing test instrumentation and equipment at BTD-CBC, in support of their operations. Support annual service contracts for equipment operation, diagnostics, and calibration, as well as routine life-cycle and use-related replacement of existing field, administrative, and analytical instrumentation components and systems. Funds the ongoing life-cycle replacement of field and laboratory calibrated instrumentation and equipment that has reached the end of its useful life.</p> <p><i>FY 2022 Plans:</i></p>	1.338	2.850	3.384

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605384BP / CHEMICAL/BIOLOGICAL DEFENSE (RDT&E MGT SUPPORT)	Project (Number/Name) DW6 / Major Range And Test Facility Base (Mgmt Support)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
<p>Provides for ongoing sustainment of existing test instrumentation and equipment at BTD-CBC, in support of their operations. Funds annual service contracts for scientific instruments and equipment maintenance and repair, diagnostic, and calibration, as well as life-cycle and use-related replacement of existing field, administrative, and analytical instrumentation components and systems. Funds the ongoing life-cycle replacement of field and laboratory calibrated instrumentation and equipment that will reach the end of its useful life.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to change in program/project technical parameters. Increased funds for purchasing additional laboratory and field instruments scheduled for replacement in FY22.</p>				
<p>Title: 4) BTD TEST - Support</p> <p>FY 2021 Plans: Support the BTD-CBC defense mission by funding contractor labor overhead costs. Provides contractual efforts to the MRTFB including chemical and biological analysis, field support, planning, and report documentation. Provides the additional support through contractual efforts to support variable workload rates and address capacity shortfalls created by civilian authorization limits.</p> <p>FY 2022 Plans: Supported the BTD-CBC defense mission by funding contractor mission support providing biological analysis, field support, planning, and report documentation. Provided additional support through contractual efforts to support variable workload rates and address capacity shortfalls created by civilian vacancies.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Decrease due to change in program/project technical parameters. Decrease due to shifting contractual scientific, technical, and logistical support costs to direct customer workload.</p>		1.030	0.650	0.454
<p>Title: 5) West Desert Test Center (WDTC), MRTFB</p> <p>Description: Civilian Labor</p> <p>FY 2021 Plans: Funds will continue to support the overhead costs of the civilian labor for PBG authorizations. The balance will be customer funded. The test customer will pay all direct costs directly attributable to the use of a test facility or resource for testing of a particular program. Funding will be essential to maintain core T&E skills as part of the Government civilian workforce.</p> <p>FY 2022 Plans: Funds will continue to support the overhead costs of the civilian labor for Program Budget Guidance (PBG) authorizations. The balance will be customer funded. The test customer will pay all direct costs directly attributable to the use of a test facility or</p>		24.923	26.504	24.806

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605384BP / CHEMICAL/BIOLOGICAL DEFENSE (RDT&E MGT SUPPORT)	Project (Number/Name) DW6 / Major Range And Test Facility Base (Mgmt Support)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
resource for testing of a particular program. Funding will be essential to maintain core Test and Evaluation (T&E) skills as part of the Government civilian workforce.				
FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.				
Title: 6) WDTC, MRTFB		5.438	11.968	10.876
Description: Sustainment				
FY 2021 Plans: Provide ongoing sustainment of existing test instrumentation and equipment at WDTC in support of their operations. Support annual service contracts for equipment operation, diagnostics, and calibration, as well as routine life-cycle and use-related replacement of existing field, administrative, and analytical instrumentation components and systems.				
FY 2022 Plans: Provide ongoing sustainment of existing test instrumentation and equipment at WDTC in support of their operations. Support annual service contracts for equipment operation, diagnostics, and calibration, as well as routine life-cycle and use-related replacement of existing field, administrative, and analytical instrumentation components and systems.				
FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.				
Title: 7) WDTC, MRTFB		1.812	1.872	1.826
Description: Support Staff				
FY 2021 Plans: Provide WDTC with a specially trained support staff to operate and maintain all critical testing systems such as mission related HVAC systems and decontamination systems within WDTC's MTF and CCTF.				
FY 2022 Plans: Provide WDTC with a specially trained support staff to operate and maintain all critical testing systems such as mission related HVAC systems and decontamination systems within WDTC's Material Test Facility (MTF) and Combined Chemical Test Facility (CCTF).				
FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.				
Title: 8) WDTC, MRTFB		13.142	13.570	14.938

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605384BP / CHEMICAL/BIOLOGICAL DEFENSE (RDT&E MGT SUPPORT)	Project (Number/Name) DW6 / Major Range And Test Facility Base (Mgmt Support)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
Description: Contractor Labor, Overhead - not billable to customers.			
FY 2021 Plans: Funds will continue to support contractor labor costs not billable to the customer. Contract labor will be essential to augment core civilian T&E personnel. Functions performed include chemical and biological analysis, field support, planning, and report documentation.			
FY 2022 Plans: Funds will continue to support contractor labor costs not billable to the customer. Contract labor will be essential to augment core civilian T&E personnel. Functions performed include chemical and biological analysis, field support, planning, and report documentation.			
FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.			
Title: 9) Non-Traditional Agent (NTA) TEST	1.001	-	-
Accomplishments/Planned Programs Subtotals	53.624	61.466	60.560

	FY 2020	FY 2021
Congressional Add: 1) Chemical/Biological Defense Testing	-	5.000
FY 2021 Plans: Conduct testing upgrades and modernization to support chemical/biological defense testing at West Desert Test Center.		
Congressional Adds Subtotals	-	5.000

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 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 6					R-1 Program Element (Number/Name) PE 0605384BP / CHEMICAL/BIOLOGICAL DEFENSE (RDT&E MGT SUPPORT)				Project (Number/Name) LS6 / Laboratory Support (Mgmt Support)			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
LS6: Laboratory Support (Mgmt Support)	-	19.260	13.078	10.213	-	10.213	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project (LS6/Laboratory Support) provides for the sustainment and modernization of the Department of Defense (DoD) laboratory infrastructure capabilities to counter an expanding threat space, exploit advances in technology, and develop and transition chemical and biological (CB) defense equipment and countermeasures to the Warfighter. This laboratory infrastructure project upgrades key systems to the current state-of-the-art capabilities. Key systems include: gas filters, mechanical/electrical, fume hoods, duct work and structural systems. Provides for the initial equipment outfitting of new facilities. Ensures that the necessary surety operations can be conducted effectively and safely in support of Chemical and Biological Defense Program (CBDP) research, development, test, and evaluation (RDT&E) programs. As a force multiplier, this project will provide more robust capabilities to the CBDP and ensure continuity of operations and environmental compliance.

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

	FY 2020	FY 2021	FY 2022
<p>Title: 1) Laboratory Infrastructure</p> <p>Description: Chemical Biological Center (CBC) Surety Facility Sustainment</p> <p>FY 2021 Plans: Modernization efforts continue to be directed at 25 year or older surety laboratory infrastructure. FY21 planned efforts include: Continued upgrade and modernization efforts for the Data Reduction Building and primary chamber and Laboratory, to include fume hood exhaust systems, heating, ventilation, and air conditioning (HVAC), epoxy floors, fire protection, and security systems. Modernization efforts will bring laboratories up to state of the art standards and enable CBDP core capabilities. Sustainment efforts provide for gas filter maintenance and change out, and sustainment of critical laboratory systems.</p> <p>FY 2022 Plans: Modernization efforts continue to be directed at 25 year or older surety laboratory infrastructure. FY22 planned efforts include: continued upgrade and modernization efforts within primary chambers and laboratories, to include fume hood exhaust systems, mechanical/electrical, heating, ventilation, and air conditioning (HVAC), fire protection, security systems, and toxic demolition of laboratories. Modernization efforts will bring laboratories up to state of the art standards while enabling CBDP core capabilities. Sustainment efforts continue with both gas filter maintenance and change out and maintenance of critical laboratory systems.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Decrease due to change in program/project technical parameters.</p>	10.767	11.302	8.643
<p>Title: 2) Laboratory Infrastructure</p>	8.493	1.776	1.570

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605384BP / CHEMICAL/BIOLOGICAL DEFENSE (RDT&E MGT SUPPORT)	Project (Number/Name) LS6 / Laboratory Support (Mgmt Support)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Description: U.S. Army Medical Research Institute for Infectious Diseases (USAMRIID) and the U.S. Army Medical Research Institute for Chemical Defense (USAMRICD) Infrastructure Support</p> <p>FY 2021 Plans: Continues support to laboratory infrastructure for laboratory operations, facilities sustainment, and regulatory compliance for critical chemical biological defense activities at USAMRIID and USAMRICD. Activities supported include laboratory support operations, maintenance and repair of existing capabilities, chemical agent security, quality systems compliance, chemical and biological safety, and research protections. Sustain JWICS TS/SCI onsite communication access at USAMRICD to assist with ensuring USAMRICD meets all security regulations and policies related to its chemical defense mission.</p> <p>FY 2022 Plans: Continues support to laboratory infrastructure for laboratory operations, facilities sustainment, and regulatory compliance for critical chemical biological defense activities at USAMRIID and USAMRICD. Activities supported include laboratory support operations, maintenance and repair of existing capabilities, chemical agent security, quality systems compliance, chemical and biological safety, and research protections. Sustain Joint Worldwide Intelligence Communications System (JWICS) access at USAMRICD for Top Secret (TS) and TS/Sensitive Compartmented Information (SCI) onsite communication. The SCI Facility (SCIF) will assist with ensuring USAMRICD meets all security regulations and policies related to its chemical defense mission.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments. Funding increase supports requirement to increase capability to synchronize Intelligence Community threats with research, training, and operational needs.</p>			
Accomplishments/Planned Programs Subtotals	19.260	13.078	10.213

<p>C. Other Program Funding Summary (\$ in Millions) N/A</p> <p>Remarks</p> <p>D. Acquisition Strategy N/A</p>

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program										Date: May 2021		
Appropriation/Budget Activity 0400 / 6					R-1 Program Element (Number/Name) PE 0605384BP / CHEMICAL/BIOLOGICAL DEFENSE (RDT&E MGT SUPPORT)				Project (Number/Name) MS6 / Management Support (Mgmt Support)			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
MS6: Management Support (Mgmt Support)	-	36.996	43.807	36.750	-	36.750	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project provides management support for the Department of Defense (DoD) Chemical and Biological Defense Program (CBDP). It includes program oversight and integration of overall non-Chemical Biological Radiological Nuclear (CBRN) Defense Equipment (non-CDE) and CBRN Defense Equipment (CDE) programs by the Assistant Secretary of Defense for Nuclear, Chemical, and Biological Defense Programs (ASD(NCB)) and defense programs through the Deputy Assistant Secretary of Defense for Chemical and Biological Defense (DASD(CBD)). Funds execution management is provided by Defense Threat Reduction Agency (DTRA).

This project supports the Office of the Secretary of Defense (OSD) Biosafety. The Biological Select Agent and Toxins (BSAT) Biorisk Program Office (BBPO) supports the DoD Executive Agent (EA) and Executive Agent Responsible Official (EARO) for BSAT Biosafety and Biosecurity Programs in their responsibilities for mission oversight, technical review, inspection, harmonization of biosafety and biosecurity protocols and procedures across DoD laboratories handling BSAT. A portion of the funding line transitions to BSAT Research Support starting in FY20 to support the Scientific Gaps in Biorisk Research Program (SGBRP) to address gaps in scientific knowledge to facilitate validation of BSAT protocols and procedures. Closing these gaps will reduce the inherent risks associated with BSAT research in CBDP laboratories and supports research and development work on priority agents. Research projects, selected from an order of merit list are funded for one year.

The Joint Acquisition Chemical, Biological, Knowledge System (JACKS) Defense Business System (DBS) provides for management support for software development and application hosting on Non-classified Internet Protocol (IP) Router Network (NIPRNet) and Secret Internet Protocol Router Network (SIPRNet) of the JACKS; and information technology solutions, and business intelligence tools to provide data visualization, reporting, and Commercial off the Shelf (COTS) utilization for the CBRN community. JACKS provides the CBRN community a centralized authoritative and comprehensive source of CBRN products information through a single database interface.

The project also provides management support for the Joint Staff/J8 Joint Requirements Office (JRO) for CBRN defense. The JRO represents the Services and Combatant Commands (CCMD) in the requirements generation process for materiel and non-materiel solutions in the medial and physical CBRN defense mission areas; leads the CBD Program Objective Memorandum (POM)/budgeting process development; conducts foundational studies for the CWMD/CBRN defense community; and supports CCMD exercises; Joint CBRN Defense Research, Development, and Acquisition (RDA) planning; input to the Chemical Biological Defense (CBD) Annual Report to Congress; and program guidance development by the Program Analysis and Integration Office (PAIO).

This project also supports the Chemical, Biological, Radiological and Nuclear Defense (CBRND) Test and Evaluation (T&E) Executive, who is responsible for the planning, balancing, and oversight of test infrastructure and test technology requirements to support Developmental Testing (DT) and Operational Testing (OT) of DoD CBRND systems, as outlined in the RDA Plan. The CBRND T&E Executive oversees the Enterprise processes to develop and sustain standardized T&E methodologies and validated instrumentation and infrastructure to ensure the adequacy of test for CBRND systems in alignment with acquisition milestones and associated decision

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605384BP / CHEMICAL/BIOLOGICAL DEFENSE (RDT&E MGT SUPPORT)	Project (Number/Name) MS6 / Management Support (Mgmt Support)
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points. The Joint Test Infrastructure Working Group (JTIWG) program supports T&E Early Involvement; test threat planning; T&E studies; and T&E standards planning and development to support CBRND testing for all Services to include medical T&E efforts.

The CBRND T&E Executive directly supports OSD T&E oversight of acquisition programs and provides the mechanism for early T&E involvement in the acquisition process. The CBRND T&E Executive provides the T&E infrastructure investment strategy and coordinates investment planning and T&E capabilities validation among the Joint Service Community to ensure that program needs are met. The CBRND T&E Executive oversees the T&E processes to ensure end to end feedback loops to support to the Warfighter.

The project includes programming support for the Joint Service CB Information System (JSCBIS) which serves as a budgetary and informational database for the DoD CBDP. JSCBIS will transition to the modernized system, the Joint Integrated CBRN Analytic Platform (JICAP). Also included within the project is financial management services to include fund distribution, execution reporting, and fiscal financial statements.

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

	FY 2020	FY 2021	FY 2022
<p>Title: 1) Office of the Secretary of Defense (OSD) Biosafety (OSD BIOSAFETY)</p> <p>Description: Biological Select Agent and Toxins (BSAT) Support</p> <p>FY 2021 Plans: Continue to maintain the Joint Interagency Biorisk Program System (JIBS) (Defense BSAT Business System), continue to perform laboratory site visits, participate and oversee laboratory inspections, execute stakeholders meetings, BSRP meetings, SGBRP committees, contribute towards harmonization of the biosafety and biosecurity across DoD BSAT registered laboratories.</p> <p>FY 2022 Plans: Continue to maintain the Joint Interagency Biorisk Program System (JIBS) (Defense BSAT Business System), continue to perform laboratory site visits, participate and oversee laboratory inspections, execute stakeholders meetings, BSRP meetings, SGBRP committees, contribute towards harmonization of the biosafety and biosecurity across DoD BSAT registered laboratories.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.</p>	2.233	2.249	1.956
<p>Title: 2) BSAT RESEARCH SUPPORT</p> <p>Description: Scientific Gaps in Biorisk Research Program (SGBRP) Support</p> <p>FY 2021 Plans: Continue to support the SGBRP. Conduct two preliminary gap research projects.</p> <p>FY 2022 Plans:</p>	0.952	0.959	0.806

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605384BP / CHEMICAL/BIOLOGICAL DEFENSE (RDT&E MGT SUPPORT)	Project (Number/Name) MS6 / Management Support (Mgmt Support)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
Conduct two preliminary gap research projects based on a new order of merit list.				
FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.				
Title: 3) Executive Agent (EA) Management		-	1.000	0.940
FY 2021 Plans: Provides support to the DoD EA to conduct coordination and integration of the Research Development Test & Evaluation (RDT&E) and acquisition requirements of the military departments for chemical and biological warfare defense programs of the DoD and review all funding requirements for the Chemical Biological Defense Program as codified in public law and Department of Defense Directive (DoDD) 5160.05E.				
FY 2022 Plans: Continue providing support to the DoD EA to conduct coordination and integration of the Research Development Test & Evaluation (RDT&E) and acquisition requirements of the military departments for chemical and biological warfare defense programs of the DoD and review all funding requirements for the Chemical Biological Defense Program as codified in public law and Department of Defense Directive (DODD) 5160.05E.				
FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.				
Title: 4) Joint Acquisition CB Knowledge System Defense Business System (JACKS DBS)		-	2.798	3.200
Description: CBRN Enterprise Services and Support				
FY 2021 Plans: Support the Joint Program Executive Office for Chemical Biological Radiological and Nuclear Defense (JPEO-CBRND) enterprise and Chemical Biological Radiological Nuclear (CBRN) community of users with accessible CBRN information and defense business systems.				
FY 2022 Plans: Support the JPEO-CBRND enterprise and CBRN community of users by modernizing the JACKS DBS development platform and migrating the JACKS DBS to the Cloud to ensure the system remains flexible, relevant, reliable and secure				
FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments. Funding line established to increase visibility into defense business system management.				
Title: 5) Joint Requirements Office Management (JRO MGT)		7.873	8.502	6.568

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605384BP / CHEMICAL/BIOLOGICAL DEFENSE (RDT&E MGT SUPPORT)	Project (Number/Name) MS6 / Management Support (Mgmt Support)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Description: JRO Management Support & Requirements Development</p> <p>FY 2021 Plans: Continue to implement CBRN Defense medical and non-medical capabilities development by representing the Services and COCOMs in JCIDS and acting as their proponent for coordinating and integrating CBRND operational capabilities. Continue to chair the CWMD Working Group for the Protection FCB. Continue to serve as the Joint Staff focal point for CBRN reports, assessments, meetings, agreements, concepts and studies, ATDs, and JCTDs. Continue to lead the CBDP Enterprise POM development. Continue to prepare various JCIDS documents, including AoAs, IS ICDs, CDDs, and CPDs.</p> <p>FY 2022 Plans: Continue to represent the Services and Combatant Commands (CCMD) in the requirements generation process for materiel and non-materiel solutions in the medial and physical CBRN defense mission areas; lead the CBD Program Objective Memorandum (POM)/budgeting process development; conduct foundational studies for the CWMD/CBRN defense community; and support CCMD exercises. Continue to chair the CBRN Support to Command and Control Sub-working Group supporting the C4Cyber FCB include the preparation and validation of Capability Development Packages and Capability Packages.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.</p>			
<p>Title: 6) Joint Test Infrastructure Working Group (JTIWG)</p> <p>FY 2021 Plans: Continue T&E Executive mission support to ensure credible testing; T&E Early Involvement; T&E Studies; evaluation and decision support for CBDP systems; support the DOT&E for OSD T&E Oversight; and support the NCB in infrastructure planning; input to the POM process; continue efforts to develop, refine, and/or streamline processes for identifying, assessing, and addressing gaps in T&E capabilities to ensure timely support to acquisition programs. Continue mission to improve the quality and reduce the costs of test planning and execution; eliminate unnecessary redundancies in test infrastructure. Continue efforts to identify and mitigate critical Test and Evaluation Gaps in order to reduce cost/test schedule impacts to near-term PORs. Continue to align and streamline policies and processes to support more efficient and effective management and sustainment of test infrastructure and methodologies.</p> <p>FY 2022 Plans: Continue T&E Executive mission support to ensure credible testing; T&E Early Involvement; T&E Studies; evaluation and decision support for CBDP systems; support the DOT&E for OSD T&E Oversight; and support the NCB in infrastructure planning; input to the POM process; continue efforts to develop, refine, and/or streamline processes for identifying, assessing, and addressing gaps in T&E capabilities to ensure timely support to acquisition programs. Continue mission to improve the quality and reduce the</p>	6.207	6.708	5.749

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605384BP / CHEMICAL/BIOLOGICAL DEFENSE (RDT&E MGT SUPPORT)	Project (Number/Name) MS6 / Management Support (Mgmt Support)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
costs of test planning and execution; eliminate unnecessary redundancies in test infrastructure. Continue efforts to identify and mitigate critical Test and Evaluation Gaps in order to reduce cost/test schedule impacts to near-term PORs. Continue to align and streamline policies and processes to support more efficient and effective management and sustainment of test infrastructure and methodologies.				
FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.				
Title: 7) Office of the Secretary of Defense Management (OSD MGT)		12.314	12.108	8.929
FY 2021 Plans: Continue performing program reviews/assessments, providing programmatic PPBE oversight/analysis, and providing congressional issue analysis and support. Supporting financial management services provided by DTRA, such as funding distribution and execution reporting. Continue to provide the CBDP Enterprise all aspects of accounting; financial statements; reconciliation of budgetary and proprietary accounts, processing of commitments and obligations; financial accounting compliance; funds management and control; management of the Managers' Internal Control Program and financial systems integration and coordination.				
FY 2022 Plans: Continue performing program reviews/assessments, providing programmatic PPBE oversight/analysis, and providing congressional issue analysis and support. Supporting financial management services provided by DTRA, such as funding distribution and execution reporting. Continue to provide the CBDP Enterprise all aspects of accounting; financial statements; reconciliation of budgetary and proprietary accounts, processing of commitments and obligations; financial accounting compliance; funds management and control; management of the Managers' Internal Control Program and financial systems integration and coordination.				
FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.				
Title: 8) Program Analysis and Integration Office Management (PAIO MGT)		7.417	9.483	8.602
FY 2021 Plans: Continue to develop assessments to support RDA Planning. Continue providing analytic programmatic support for development of program guidance, the Program, Budget and Execution Reviews, and the President's Budget submissions. Respond to specialized evaluation studies throughout the PPBE process. Continue to provide JSCBIS database management in the modernized system. Initiate Phase II of development, for the modernized system JICAP.				
FY 2022 Plans:				

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605384BP / CHEMICAL/BIOLOGICAL DEFENSE (RDT&E MGT SUPPORT)	Project (Number/Name) MS6 / Management Support (Mgmt Support)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
Continue to develop assessments to support RDA Planning. Continue providing analytic programmatic support for development of program guidance, the Program, Budget and Execution Reviews, and the President's Budget submissions. Respond to specialized evaluation studies throughout the PPBE process. Provide sustainment support of JICAP and continue Phase II development with focus on programmatic data integration and developing a data analytics layer.			
<i>FY 2021 to FY 2022 Increase/Decrease Statement:</i> Minor change due to routine program adjustments.			
Accomplishments/Planned Programs Subtotals	36.996	43.807	36.750

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 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 6					R-1 Program Element (Number/Name) PE 0605384BP / CHEMICAL/BIOLOGICAL DEFENSE (RDT&E MGT SUPPORT)				Project (Number/Name) O49 / Joint Concept Development (Mgmt Support)			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
O49: Joint Concept Development (Mgmt Support)	-	1.692	1.000	0.940	-	0.940	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The objectives of the Joint Concepts, Studies, and Analyses (JCSA) program are: to support the Joint Requirements Office and the Chairman's Risk Assessment Process by producing, coordinating, & executing Chemical, Biological, Radiological, and Nuclear (CBRN) defense studies, experiments, analyses, and architecture, in order to develop future operational concepts and support the efficient and effective generation of CBRN requirements.

Specific lines of effort across the Future Years Defense Program (FYDP) include: qualitatively characterizing emerging CBRN threats and operational risks to the Joint Force; conducting innovative approaches to deal with technical studies; analyzing Concepts of Operations (CONOPS) for employing and developing capabilities; and analyzing specific issues that contribute to Program Objective Memorandum (POM) development.

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

	FY 2020	FY 2021	FY 2022
Title: 1) Joint Concepts, Studies, and Analysis (JCSA)	1.692	1.000	0.940
Description: Support to JCSA			
FY 2021 Plans: Continue to perform Advanced Threat Analysis with several more categories of threat. Continue to update best representative agents for consideration in requirements and testing. Continue to conduct detailed quantitative analyses to determine detection and challenge levels from key representative threats determined in the FY15 Advanced Threat Studies. Continue to update detailed operational risk analyses to support CDBP leadership decisions.			
FY 2022 Plans: Implement the Chairman's Joint Supporting Concept by publishing a new Joint CBRND Modernization Plan per CM 749-033.c. (6), to wit: "[JRO shall] provide the Modernization Plan to defense agencies involved in research, development, acquisition as direction in their acquisition and technology program planning". Conduct a study to inform specific requirement Key Performance Parameters and System Attributes (KPPs/KSAs) in an integrated layered defense against persistent chemical agents like Fourth Generation Agents, which were recently operationally employed twice by the Russian Federation. Continue to sponsor and prepare various JCIDS supporting documents, including AoAs.			
FY 2021 to FY 2022 Increase/Decrease Statement:			

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605384BP / CHEMICAL/BIOLOGICAL DEFENSE (RDT&E MGT SUPPORT)	Project (Number/Name) O49 / Joint Concept Development (Mgmt Support)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
Decrease due to change in program/project technical parameters.			
Accomplishments/Planned Programs Subtotals	1.692	1.000	0.940

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

N/A

Remarks

D. Acquisition Strategy

N/A

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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 6: RDT&E Management Support</i>					R-1 Program Element (Number/Name) PE 0605502BP / <i>SMALL BUSINESS INNOVATIVE RESEARCH (SBIR)</i>							
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	22.072	0.000	0.000	-	0.000	-	-	-	-	-	-
SB6: <i>Small Business Innovative Research (SBIR)</i>	-	22.072	0.000	0.000	-	0.000	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

The overall objective of the Chemical Biological Defense (CBD) Small Business Innovative Research (SBIR) program is to improve the transition or transfer of innovative chemical and biological defense (CBD) technologies between Department of Defense (DoD) components and the private sector for mutual benefit. The CBD SBIR program includes those technology efforts that maximize a strong defensive posture in a biological or chemical environment using passive and active means as deterrents. These technologies include chemical and biological detection; information assessment, which includes identification, modeling, and intelligence; contamination avoidance; and protection of both individual soldiers and equipment.

B. Program Change Summary (\$ in Millions)

	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	22.072	0.000	0.000	-	0.000
Total Adjustments	22.072	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	0.000	-			
• Congressional Directed Transfers	0.000	-			
• Reprogrammings	0.000	-			
• SBIR/STTR Transfer	22.072	-			
• Other Adjustments	0.000	-		-	-

Change Summary Explanation

Funding: FY20 (+\$22.072 Million): Funding transferred and applied to Small Business Innovative Research program (+\$19.351 Million) and funding transferred and applied to Small Business Technology Transfer (STTR) program (+\$2.721 Million).

Schedule: N/A

Technical: N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program										Date: May 2021		
Appropriation/Budget Activity 0400 / 6					R-1 Program Element (Number/Name) PE 0605502BP / SMALL BUSINESS INNOVATIVE RESEARCH (SBIR)				Project (Number/Name) SB6 / Small Business Innovative Research (SBIR)			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
SB6: <i>Small Business Innovative Research (SBIR)</i>	-	22.072	0.000	0.000	-	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Small Business Innovative Research (SBIR) Program is a Congressionally mandated program established to increase the participation of small business in federal research and development (R&D). Currently, each participating Government agency must reserve 2.5% of its extramural R&D for SBIR awards to competing small businesses. The goal of the SBIR Program is to invest in the innovative capabilities of the small business community to help meet Government R&D objectives while allowing small companies to develop technologies and products which they can then commercialize through sales back to the Government or in the private sector.

The Small Business Technology Transfer (STTR) Program like SBIR, is a Government-wide program, mandated by the Small Business Research and Development Enhancement Act of 1992, Public Law (PL) 102-564. STTR was established in FY94 as a three-year pilot program. In early 1996, the General Accounting Office (GAO) conducted a comprehensive review of the Government-wide STTR Program to determine the effectiveness of the pilot program. Upon review of the GAO report, Congress voted to reauthorize the STTR Program to the year 2000, consistent with the authorization period for the SBIR Program.

STTR was established as a companion program to the SBIR Program and is executed in essentially the same manner; however, there are several distinct differences. The STTR Program provides a mechanism for participation by university, Federally-Funded Research and Development Centers (FFRDCs), and other non-profit research institutions. Specifically, the STTR Program is designed to provide an incentive for small companies and research at academic institutions and non-profit research and development institutions to work together to move emerging technical ideas from the laboratory to the marketplace to foster high-tech economic development and to advance U.S. economic competitiveness. Each STTR proposal must be submitted by a team which includes a small business (as the prime contractor for contracting purposes) and at least one research institution, which have entered into a Cooperative Research and Development Agreement for the purposes of the STTR effort. Furthermore, the project must be divided up such that the small business performs at least 40% of the work and the research institution(s) performs at least 30% of the work. The remainder of the work may be performed by either party or a third party. The budget is separate from the SBIR budget and is significantly smaller (0.15% of the extramural R&D budget vs. 2.5% for the SBIR Program).

The Department of Defense (DoD) has consolidated management and oversight of the Chemical Biological Defense Program (CBDP) into a single office within the Office of the Secretary of Defense (OSD). The Army was designated as the Executive Agent for coordination and integration of the CBDP. The executive agent for the SBIR/STTR portion of the program is the Army Research Office-Washington.

The overall objective of the CBD SBIR/STTR program is to improve the transition or transfer of innovative CBD technologies between DoD components and the private sector for mutual benefit. The CBD program includes those technology efforts that maximize a strong defensive posture in a biological or chemical environment using passive and active means as deterrents. These technologies include chemical and biological detection; information assessment, which includes identification, modeling, and intelligence; contamination avoidance; and protection of both individual soldiers and equipment.

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605502BP / <i>SMALL BUSINESS INNOVATIVE RESEARCH (SBIR)</i>	Project (Number/Name) SB6 / <i>Small Business Innovative Research (SBIR)</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
Title: 1) SBIR/STTR Description: Small Business Innovative Research.	22.072	-	-
Accomplishments/Planned Programs Subtotals	22.072	-	-

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

N/A

Remarks

D. Acquisition Strategy

N/A

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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0607384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	50.708	39.530	58.261	-	58.261	-	-	-	-	-	-
CA7: <i>Contamination Avoidance (Op Sys Dev)</i>	-	10.064	15.789	15.051	-	15.051	-	-	-	-	-	-
CM7: <i>Homeland Defense (Op Sys Dev)</i>	-	2.238	1.421	1.522	-	1.522	-	-	-	-	-	-
C07: <i>Collective Protection (Op Sys Dev)</i>	-	5.690	7.865	8.442	-	8.442	-	-	-	-	-	-
DE7: <i>Decontamination (Op Sys Dev)</i>	-	1.414	0.633	1.072	-	1.072	-	-	-	-	-	-
IP7: <i>Individual Protection (Op Sys Dev)</i>	-	6.364	6.463	11.724	-	11.724	-	-	-	-	-	-
IS7: <i>Information Systems (Op Sys Dev)</i>	-	15.773	3.234	15.281	-	15.281	-	-	-	-	-	-
MB7: <i>Medical Biological Defense (Op Sys Dev)</i>	-	2.663	2.308	3.833	-	3.833	-	-	-	-	-	-
MC7: <i>Medical Chemical Defense (Op Sys Dev)</i>	-	1.222	1.817	1.336	-	1.336	-	-	-	-	-	-
TE7: <i>Test & Evaluation (Op Sys Dev)</i>	-	5.280	0.000	0.000	-	0.000	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

The projects in this program element (PE) support efforts to upgrade systems that have been fielded or have received approval for full rate production in order to maintain Joint Force readiness.

Individual projects include:

- Contamination Avoidance (CA7): technology refresh of fielded analytical laboratory system capabilities to conduct on-site analysis of any unknown sample and test potential life-threatening substances.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0607384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)</i>	
<p>- Homeland Defense (CM7): technology refresh of fielded analytical laboratory system capabilities to conduct on-site analysis of any unknown sample and test potential life-threatening substances.</p> <p>- Collective Protection (CO7): technology upgrade and refresh of fielded collective protection systems that are smaller, lighter, less costly to produce and maintain, and more logistically supportable, enabling mission accomplishment in spaces safe from the effects of chemical, biological, and radiological (CBR) contamination.</p> <p>- Decontamination (DE7): technology refresh of fielded Contamination Mitigation (ConMit) systems that will remove and/or detoxify contaminated material without damaging combat equipment, personnel, or the environment.</p> <p>- Individual Protection (IP7): technology refresh of fielded individual protective equipment which enable the Joint Force to operate in a contaminated CBR environment with little or no degradation to performance.</p> <p>- Information Systems (IS7): technology refresh, modernization and continuous engineering of software applications and information systems to shape and inform the battlespace against CBRN threats.</p> <p>- Medical Biological Defense (MB7): technology refresh of fielded medical diagnostic systems and associated capabilities (e.g., assays) that contribute to the layered medical defenses against biological warfare agent and fielded medical nerve agent treatment system threats facing U.S. Forces in the field.</p> <p>- Medical Chemical Defense (MC7): technology upgrade of fielded medical nerve agent treatment system that contribute to the layered medical defenses against chemical warfare agent threats facing U.S. Forces in the field.</p> <p>- Test and Evaluation (TE7): technology upgrades and revitalization of fielded test capabilities and infrastructure at Dugway Proving Ground necessary to evaluate CBRN Defense systems in realistic operating environments.</p> <p>The projects in this PE support operational systems development necessary to maintain operational effectiveness and are therefore correctly placed in Budget Activity 7.</p>		

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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Chemical and Biological Defense Program	Date: May 2021
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0607384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)</i>
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B. Program Change Summary (\$ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	51.834	39.530	42.982	-	42.982
Current President's Budget	50.708	39.530	58.261	-	58.261
Total Adjustments	-1.126	0.000	15.279	-	15.279
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	0.000	-			
• Congressional Directed Transfers	0.000	-			
• Reprogrammings	-0.008	-			
• SBIR/STTR Transfer	-1.118	-			
• Other Adjustments	0.000	-	15.279	-	15.279

Change Summary Explanation

Funding: FY20 (-\$0.008 Million): Reprogramming adjustments to balance overall portfolio efforts.

FY20 (-\$1.118 Million) Transfer of funding to support Small Business Innovative Research/Small Business Technology Transfer efforts.

FY22 (+\$15.279 Million): Increase supports Reactive Chemistry Orthogonal Surface and Environmental Threat Ticket Array acceleration, and efforts to reduce hazard for aircrew respiratory and ocular protection on Modernization Individual Protection programs (+\$16.423 Million). Departmental inflation/travel adjustments (-\$1.144 Million).

Schedule: N/A

Technical: N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) CA7 / Contamination Avoidance (Op Sys Dev)
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
CA7: Contamination Avoidance (Op Sys Dev)	-	10.064	15.789	15.051	-	15.051	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

The project supports technology upgrade and refresh of fielded dismantled reconnaissance and detection systems that minimize chemical, biological, and radiological (CBR) contamination and prevent further cross-contamination during operations. The project supports technology upgrade and refresh of fielded dismantled reconnaissance and detection systems that minimize chemical, biological, and radiological (CBR) contamination and prevent further cross-contamination during operations.

Efforts included in this project are:

- (1) Chemical Biological Radiological Nuclear Dismounted Reconnaissance Systems (CBRN DRS)
- (2) Expeditionary Analytic Modernization (EXANA MOD)
- (3) Modernization Sensors (MOD SEN)
- (4) Enhanced Maritime Biological Detection (EMBD)
- (5) Joint Chemical Agent Detector (JCAD), and
- (6) Reactive Chemistry Orthogonal Surface and Environmental Threat Ticket Array (ROSETTA)

The CBRN DRS program effort provides the technology upgrade and refresh for the CBRN DRS system supporting Dismounted Reconnaissance, Surveillance, CBRN Sensitive Site Assessment, and CBRN Sensitive Site Exploitation missions, which enables more detailed and near real-time CBRN information flow for the Warfighter. The program will be moved into the MOD SEN program starting in FY22.

The EXANA MOD effort supports the evaluation of analytical components for technical refreshment and upgrades of key components of the analytical laboratory systems that have become obsolete or are no longer being supported by the manufacturer. This allows the Common Analytical Laboratory System (CALs) and Analytical Laboratory System Modification (ALS MOD) users to maintain their operational capability and operational effectiveness. The program will be moved into the MOD SEN program starting in FY22.

The MOD SEN program will address critical analytical equipment obsolescence and system functionality issues for the Services by establishing a time phased modernization plan to integrate and incorporate advancements in technology for the ALS MOD, CALs Field Confirmatory Analytical Capability Set (FC ACS), CALs Theater Validation Integrated System (TV IS) and CBRN DRS. This program consolidates the efforts previously included in the EXANA MOD and CBRN DRS program efforts. In FY22 MOD SEN supports the evaluation of components for technical refreshment of the CBRN DRS, CALs and ALS MOD.

The EMBD is the Navy's automated biological point detection, collection and identification system. EMBD replaces/upgrades the 135 Joint Biological Point Detection Systems (JBPDS) currently fielded to the Navy and provides 40 systems for new construction ships. EMBD improves detection sensitivity providing the Navy the

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) CA7 / Contamination Avoidance (Op Sys Dev)
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ability to detect to inform reducing the number of contaminated ships during a biological warfare agent attack and minimizing sailor casualties. EMBD reduces false alarm rates, modernizes the computing architecture and increases reliability and sailors confidence in the system. These improvements decrease fleet O&S costs and reduce the obsolescence issues with current biological detection capability. In FY22 the EMBD program plans to execute Full Rate Production contract options for Obsolescence Support in Production (OSIP). OSIP will address obsolescence concerns that may arise during the production of the EMBD kit.

The JCAD Solid Liquid Adaptor (SLA) effort is an Additional Authorized List (AAL) item that extends the capability of the JCAD M4A1 from a vapor-only capability to generate vapors from non-volatile liquids and solids. JCAD SLA continues the development of the JCAD CED, which was an Next Generation Chemical Detection (NGCD) acceleration effort for USSOCOM. The SLA interfaces with the fielded M4A1 JCAD to allow for solid and liquid sampling of Non-Traditional Agents (NTAs), Pharmaceutical Based Agents (PBAs), and explosives off surfaces. In addition, JCAD SLA is an explosive detector candidate for CBRN DRS.

The ROSETTA is a modernization effort to provide the General Forces a low-cost, easy to use surface and/or vapor hazard detection ticket for a wide range of Chemical Warfare Agents (CWAs) and NTAs. These highly-selective, multiplexed array tickets will enable accurate hazard identification in the presence of common battlefield interferents at the tactical-level. ROSETTA is based on colorimetric technology and will be eye-readable and has potential for integration onto unmanned platforms especially micro-sized unmanned aerial sensors. In addition, the ROSETTA tickets will provide improved hazard detection performance with reduced false alarm rate, potential for increased number of chemicals detected, reduced detection time especially for compounds of interest (CWAs, PBAs, NTAs and Toxic Industrial Chemicals (TICs)), and potential for integration onto unmanned platforms especially micro-sized unmanned aerial sensors. In FY22 ROSETTA will initiate contract award, and Contractor Preliminary Design Review for a Vapor Detector.

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

	FY 2020	FY 2021	FY 2022
<p>Title: 1) CBRN Dismounted Reconnaissance System (CBRN DRS) - Obsolescence</p> <p>Description: Provide analysis of the existing components of CBRN Dismounted Reconnaissance Systems to ensure current requirements baseline can be met. Identify potential obsolescence in current components, identify concerns with current components (technical, human factors, sustainment), assess the current market, procurement and testing of candidates that could correct concerns, and integrate the new items into the product baseline. Identifies and tests technology that can meet emerging requirements.</p> <p>FY 2021 Plans: Continue obsolescence management activities for existing fielded components. Continue/complete purchasing of components for testing. Continue and complete testing of potential candidates. Incorporate successful candidates to product baseline.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program/project funding transferred to another funding line. Funding transferred to Modernization Sensors funding in FY22 to continue efforts on obsolescence management and technology insertion for CBRN DRS and CALS family of systems.</p>	6.253	4.411	-
<p>Title: 2) CBRN DRS - Development of System Modernization Packages</p>	-	9.000	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) CA7 / Contamination Avoidance (Op Sys Dev)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Description: Identify and test solutions to meet evolving demands of the National Defense Strategy (NDS) to Counter Weapons of Mass Destruction via a System Modernization Package to support dismounted reconnaissance, sensitive site assessment and exploitation, and render safe operations. Efforts will be focused on system modernization packages for improved biological detection, improved protective equipment, improve chemical detection, and improved battlespace awareness.</p> <p>FY 2021 Plans: Initiate and conduct requirements analyses on emerging technologies for system modernization packages to meet required changes to the system. Identify, procure and test technologies to support specific improved capability.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program/project funding transferred to another funding line. Funding transferred to Modernization Sensors funding in FY22 to continue efforts on obsolescence management and technology insertion for CBRN DRS and CALS family of systems.</p>			
<p>Title: 3) EXANA MOD</p> <p>Description: Expeditionary Analytics</p> <p>FY 2021 Plans: Funding supports the evaluation of analytical components for technical refreshment of the Common Analytical Laboratory System (CALS) and Analytical Laboratory System (ALS) Modification (MOD). Plans include, identifying new Fourier Transform Infrared Spectroscopy (FTIR)'s, new toxin identifiers, new Ion Mobility Spectrometry (IMS) chemical agent detector, new computer subsystems and testing the Hydrogen 2 generators.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program/project funding transferred from another funding line. Funding transferred to Modernization Sensors (MOD SEN) starting in FY22.</p>	-	2.378	-
<p>Title: 4) MOD SEN</p> <p>Description: Sensors Modernization</p> <p>FY 2022 Plans: Funding supports the evaluation of components for technical refreshment of the CBRN Dismounted Reconnaissance Systems, Common Analytical Laboratory System (CALS) and Analytical Laboratory System (ALS) Modification (MOD). Plans include improved and integrated sensors and PPE, identifying new electrochemiluminescence (ECL) technology.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement:</p>	-	-	10.391

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) CA7 / Contamination Avoidance (Op Sys Dev)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
Program/project funding transferred from another funding line. Program/project transferred from CBRN DRS and EXANA MOD funding lines to create potential efficiencies in operational assessment.				
Title: 5) EMBD Description: Obsolescence and replacement efforts FY 2022 Plans: Initiate obsolescence events and will include all engineering efforts to finalize the production design of the replacement item/ technology, integration efforts, test hardware fabrication, test (verification and validation), and document changes resulting from OSIP efforts. FY 2021 to FY 2022 Increase/Decrease Statement: Program/project transitioned to Production and Deployment Phase. BA7 funding line starts in FY22 to address obsolescence.		-	-	1.615
Title: 6) Joint Chemical Agent Detector (JCAD) Solid Liquid Adapter (SLA) Description: Product Development, Program Management, T&E and Support		3.811	-	-
Title: 7) ROSETTA Description: Product Development FY 2022 Plans: Initiate contract Award, Contractor Preliminary Design Review for Vapor Detector. FY 2021 to FY 2022 Increase/Decrease Statement: Program/project funding transferred from another funding line. ROSETTA transitioned from RDT&E Project Contamination Avoidance (CA5) into CA7 to continue modernization efforts.		-	-	3.045
Accomplishments/Planned Programs Subtotals		10.064	15.789	15.051
C. Other Program Funding Summary (\$ in Millions) N/A Remarks				
D. Acquisition Strategy CBRN DISMOUNTED RECONNAISSANCE SYSTEMS				

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program	Date: May 2021
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Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) CA7 / Contamination Avoidance (Op Sys Dev)
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The Chemical Biological Radiological Dismounted Reconnaissance Systems (CBRN DRS) program uses a GOTS/COTS non-developmental item (NDI) single step acquisition approach to a full capability. This strategy employs an NDI acquisition concept to establish a simplified management framework to translate mission needs and emerging technology capabilities into a stable, affordable, well-managed acquisition program. Current efforts focus on maintaining baseline capabilities through obsolescence management and technology insertions. In order to meet the demands of the National Defense Strategy (NDS) to Counter Weapons of Mass Destruction, units equipped with the CBRN DRS must be able to both assess CBRN hazards and exploit them. Advancing threats and current capability gaps in sensitive site exploitation capability require a System Modernization Package (SMP) to the baseline CBRN DRS. In FY21 and beyond, the Defense-Wide Review (DWR) reduced this program for higher priorities.

EXPEDITIONARY ANALYTIC MODERNIZATION (EXANA MOD)

The Common Analytical Laboratory System (CALs) and the Analytical Laboratory System (ALS) Modification (MOD) program's objective is to address critical analytical equipment obsolescence (Analytical Suite) and system functionality issues for the National Guard Bureau's (NGB) Civil Support Teams. This includes market survey, down select, testing, integration, and update of Technical Data Package and logistical documentation. It is anticipated that Capability Development Document (CDD) updates will be finalized for the CALs Theater Validation Integrated System (TV IS) and Field Confirmatory Analytical Capability Set (FC ACS) variants in FY21. As such, this program will follow continue to follow the most up-to-date requirement documentation for CALs and ALS MOD.

MODERNIZATION SENSORS (MOD SEN)

MOD SEN program uses a COTS/GOTS non-developmental item (NDI) single step acquisition approach to a full capability. This strategy employs an NDI acquisition concept to establish a simplified management framework to translate mission needs and emerging technology capabilities into a stable, affordable, well managed acquisition program. Current efforts focus on supporting CALs TV-IS, FC-ACS, ALS MOD, and CBRN DRS PoR's through maintaining baseline capabilities with obsolescence management, technology insertions, and enhancements based on changes in requirements. Additionally, in order to meet the demands of the NDS to Counter Weapons of Mass Destruction, units equipped with the systems must be able to both assess and exploit CBRN hazards. OSD (CB) goals to modernize the Joint Force to combat advancing threats and current capability gaps in sensitive site exploitation capability require a system modernization (SM) strategy for each system.

ENHANCED MARITIME BIOLOGICAL DETECTION (EMBD)

The Enhanced Maritime Biological Detection (EMBD) program uses a streamlined acquisition strategy and acquired a Milestone B decision in June 2018. EMBD will replace/upgrade 135 Joint Biological Point Detection Systems (JBPDS) in the Navy and provide 40 systems for new construction ships. In July 2018 EMBD awarded a contract through Joint Enterprise Research, Development, Acquisition and Production/Procurement (JE-RDAP) contract for Engineering and Manufacturing Development (EMD) with options for Low Rate Initial Production (LRIP) in FY20. EMBD plans to award a Full Rate Production contract in FY21 with options for production of EMBD kits and Obsolescence Support in Production (OSIP). OSIP will address obsolescence concerns that may arise during the production of the EMBD kit.

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)
0400 / 7	PE 0607384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)</i>	CA7 / <i>Contamination Avoidance (Op Sys Dev)</i>

JOINT CHEMICAL AGENT DETECTOR (JCAD)

The JCAD SLA kit will be an Additional Authorized List (AAL) item to the M4A1 JCAD. The JCAD SLA attaches to the JCAD and expands existing JCAD capability to detect NTAs, PBAs (opioids and fentanyl), and explosives. The JCAD SLA acquisition strategy will award a FFP / CPFF IDIQ to produce the required JCAD SLA quantities based on service requirements with initial fielding in FY21 to SOCOM.

REACTIVE CHEMISTRY ORTHOGONAL SURFACE AND ENVIRONMENTAL THREAT TICKET ARRAY (ROSETTA)

ROSETTA will use a streamlined approach to rapidly field multiple modernizations of currently fielded components of the M256 kit via engineering change proposals (ECPs). This approach is based on technology that will transition from Science and Technology Efforts and/or commercial off the shelf (COTS) products to the M256 kit. These efforts will utilize multiple contract vehicles including Countering Weapons of Mass Destruction (CWMD) OTA and JERDAP in order to streamline the acquisition of the products. The ROSETTA funding completed the acquisition of the M8 component to the M256 kit and will support the acquisition of a PBA ticket, the M256 vapor unmasking tool, and the other NTAs and TICs. These products will be transitioned to TACOM for production and sustainment.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) CA7 / Contamination Avoidance (Op Sys Dev)
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CBRN DRS - HW - Product Development	MIPR	Various : Various	3.149	1.307	Nov 2019	0.000		0.000		0.000		0.000	0.000	4.456	0.000
CBRN DRS - HW S - System Modernization OTA	C/CPAF	TBD : N/A	0.000	1.065	Nov 2020	9.000	Feb 2021	0.000		0.000		0.000	0.000	10.065	0.000
CBRN DRS - HW C - Government Product Development Team Labor	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	0.475	0.000		0.688	Nov 2020	0.000		0.000		0.000	0.000	1.163	0.000
MOD SEN - HW C - Government Product Development Team Labor	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	0.000	0.000		0.000		0.423	Nov 2021	0.000		0.423	0.000	0.423	0.000
EMBD - HW SB - Obsolescence Support in Production	C/CPIF	Various : Various	0.000	0.000		0.000		0.965	Dec 2021	0.000		0.965	0.000	0.965	0.000
JCAD - PM/MS S - Government Product Development Core Team Labor	MIPR	JPM CBRN Sensors : JPEO-CBRND, Aberdeen Proving Ground, MD	0.000	0.130	Apr 2020	0.000		0.000		0.000		0.000	0.000	0.130	0.000
JCAD - PM/MS S - Contractor Product Development Team Labor	MIPR	JPM CBRN Sensors : JPEO-CBRND, Aberdeen Proving Ground, MD	0.000	0.134	Apr 2020	0.000		0.000		0.000		0.000	0.000	0.134	0.000
JCAD - PM/MS S - Government Product	MIPR	U.S. Army Combat Capabilities Development	0.000	1.803	Mar 2020	0.000		0.000		0.000		0.000	0.000	1.803	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) CA7 / Contamination Avoidance (Op Sys Dev)
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Development Matrix Team Labor		Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD													
ROSETTA - HW C - Government Product Development Team Labor	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	0.000	0.000		0.000		0.146	Nov 2021	0.000		0.146	0.000	0.146	0.000
ROSETTA - HW C - OTA Contract	C/CPFF	Various : Various	0.000	0.000		0.000		2.845	Jun 2022	0.000		2.845	0.000	2.845	0.000
Subtotal			3.624	4.439		9.688		4.379		0.000		4.379	0.000	22.130	N/A

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CBRN DRS - ES - Market Analysis	MIPR	Various : Various	1.878	0.750	Nov 2019	0.000		0.000		0.000		0.000	0.000	2.628	0.000
CBRN DRS - ES C - Requirements Analysis and Obsolescence Management	C/CPFF	Johns Hopkins University - Applied Physics Lab : Laurel, MD	2.284	0.000		0.945	Nov 2020	0.000		0.000		0.000	0.000	3.229	0.000
CBRN DRS - ES - Obsolescence Management	MIPR	Various : Various	2.869	1.183	Nov 2019	0.000		0.000		0.000		0.000	0.000	4.052	0.000
EXANA MOD - ES C - Science & Engineering Support	MIPR	Naval Air Warfare Center (Aircraft Division) : Patuxent River, MD	0.000	0.000		1.479	Mar 2021	0.000		0.000		0.000	0.000	1.479	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) CA7 / Contamination Avoidance (Op Sys Dev)
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Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
MOD SEN - ES C - Obsolescent Management	Various	Various : Various	0.000	0.000		0.000		0.938	Nov 2021	0.000		0.938	0.000	0.938	0.000
MOD SEN - ES C - Science and Engineering Support	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	0.000	0.000		0.000		0.294	Nov 2021	0.000		0.294	0.000	0.294	0.000
JCAD - ES C - Navy Combat Support	MIPR	Indian Head : Indian Head, MD	0.000	0.145	Apr 2020	0.000		0.000		0.000		0.000	0.000	0.145	0.000
JCAD - ES C - Logistics Support	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	0.000	0.290	Apr 2020	0.000		0.000		0.000		0.000	0.000	0.290	0.000
Subtotal			7.031	2.368		2.424		1.232		0.000		1.232	0.000	13.055	N/A

Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CBRN DRS - OTE - Candidate Testing	Various	Various : Various	5.100	0.591	Mar 2020	0.864	Mar 2021	0.000		0.000		0.000	0.000	6.555	0.000
EXANA MOD - OTH C - Tech Refresh Efforts	C/CPFF	Battelle Memorial Institute : Columbus, OH	0.000	0.000		0.566		0.000		0.000		0.000	0.000	0.566	0.000
MOD SEN - DTE C - Component Test and Evaluation	MIPR	U.S. Army Combat Capabilities Development	0.000	0.000		0.000		1.191	Nov 2021	0.000		1.191	0.000	1.191	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) CA7 / Contamination Avoidance (Op Sys Dev)
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Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
		Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD													
MOD SEN - DTE C - Information Assurance	Various	Various : Various	0.000	0.000		0.000		0.254	Nov 2021	0.000		0.254	0.000	0.254	0.000
MOD SEN - DTE C - System Modernization	Various	Various : Various	0.000	0.000		0.000		5.661	Nov 2021	0.000		5.661	0.000	5.661	0.000
EMBD - Obsolescence Support in Production testing and verification	C/CPIF	Various : Various	0.000	0.000		0.000		0.400	Dec 2021	0.000		0.400	0.000	0.400	0.000
JCAD - DTE C - Operational Test	MIPR	Aberdeen Test Center (ATC) : Aberdeen Proving Ground, MD	0.000	0.037	Mar 2020	0.000		0.000		0.000		0.000	0.000	0.037	0.000
JCAD - Test Support	MIPR	Indian Head : Indian Head, MD	0.000	0.118	Mar 2020	0.000		0.000		0.000		0.000	0.000	0.118	0.000
JCAD - DTE C - Battelle Support	MIPR	Defense Technical Information Center (DTIC) : Fort Belvoir, VA	0.000	0.201	May 2020	0.000		0.000		0.000		0.000	0.000	0.201	0.000
JCAD - DTE C - Operational Test Support	MIPR	Navy Operational Test and Eval Force (OPTEVFOR) : Norfolk, VA	0.000	0.255	May 2020	0.000		0.000		0.000		0.000	0.000	0.255	0.000
JCAD - DTE C - Test Plan & Oversight	MIPR	Army Test and Evaluation Command (ATEC) : Aberdeen Proving Ground, MD	0.000	0.144	Apr 2020	0.000		0.000		0.000		0.000	0.000	0.144	0.000
JCAD - DTE C - Scott Hunter Support	MIPR	West Desert Test Center : Dugway, UT	0.000	0.043	Apr 2020	0.000		0.000		0.000		0.000	0.000	0.043	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) CA7 / Contamination Avoidance (Op Sys Dev)
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Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
JCAD - DTE C - Ship Shock	MIPR	Naval Surface Warfare Center (NSWC) - Dahlgren Center : Dahlgren, VA	0.000	0.018	Apr 2020	0.000		0.000		0.000		0.000	0.000	0.018	0.000
Subtotal			5.100	1.407		1.430		7.506		0.000		7.506	0.000	15.443	N/A

Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CBRN DRS - PM/MS S - Program Management Support	MIPR	Various : Various	2.622	1.357	Nov 2019	1.914	Nov 2020	0.000		0.000		0.000	0.000	5.893	0.000
EXANA MOD - PM/MS S - Program Management Support	MIPR	Various : Various	0.000	0.000		0.333	Jan 2021	0.000		0.000		0.000	0.000	0.333	0.000
MOD SEN - PM/MS S - Program Management Support	Various	Various : Various	0.000	0.000		0.000		1.630	Jan 2022	0.000		1.630	0.000	1.630	0.000
EMBD - PM/MS S - Program Management Support	MIPR	Various : Various	0.000	0.000		0.000		0.250	Dec 2021	0.000		0.250	0.000	0.250	0.000
JCAD - PM/MS C - Program Management Support	MIPR	JPM CBRN Sensors : JPEO-CBRND, Aberdeen Proving Ground, MD	0.000	0.493	Mar 2020	0.000		0.000		0.000		0.000	0.000	0.493	0.000
ROSETTA - PM/MS S - Program Management Support	MIPR	Various : Various	0.000	0.000		0.000		0.054	Nov 2021	0.000		0.054	0.000	0.054	0.000
Subtotal			2.622	1.850		2.247		1.934		0.000		1.934	0.000	8.653	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program								Date: May 2021			
Appropriation/Budget Activity 0400 / 7			R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)				Project (Number/Name) CA7 / Contamination Avoidance (Op Sys Dev)				
	Prior Years	FY 2020		FY 2021		FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	18.377	10.064		15.789		15.051	0.000	15.051	0.000	59.281	N/A

Remarks

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) CA7 / Contamination Avoidance (Op Sys Dev)

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
CBRN DRS - Test components to replace obsolete items and insert new technologies	1	2020	4	2021
CBRN DRS - System Modernization Packages (SMP) Production	4	2020	4	2021
EXANA MOD - CALS & ALS MOD - Upgrade Fielded Systems	1	2021	4	2021
MOD SEN - CALS, ALS MOD, CBRN DRS - Upgrade Fielded Systems	1	2022	4	2026
EMBD - MS C	3	2020	3	2020
EMBD - FRP Production	2	2021	4	2026
EMBD - IOC	4	2022	4	2022
JCAD - JCAD SLA- Kit Development	1	2020	2	2021
JCAD - JCAD SLA (Material Release)	4	2021	4	2021
ROSETTA - Engineering Design (Vapor)	4	2022	2	2023
ROSETTA - Update TDP and TMs (Vapor)	1	2026	4	2026
ROSETTA - OTA Contract Award (Vapor)	3	2022	4	2026

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) CM7 / Homeland Defense (Op Sys Dev)
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
CM7: <i>Homeland Defense (Op Sys Dev)</i>	-	2.238	1.421	1.522	-	1.522	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

This project supports technology refresh of fielded analytical laboratory system capabilities which allows the conduct on-site analysis of any unknown sample and test potential life-threatening substances.

Efforts included in this Project are:

- (1) Common Analytical Laboratory System (CALS) and Analytical Laboratory System Modification (ALS MOD), and
- (2) Weapons of Mass Destruction - Civil Support Team (WMD CST)

The CALS/ALS MOD program supports the evaluation of analytical components for technical refreshment and upgrades of key components of the CALS and ALS MOD systems that have become obsolete, or are no longer being supported by the manufacturer. This allows the CALS and ALS MOD users to maintain their operational capability and operational effectiveness.

The WMD CST program supports the fielded system upgrade and ongoing assessment and acquisition of commercial off-the-shelf (COTS) and Government off-the-shelf (GOTS) analytical detection, protection, decontamination and sampling equipment for survey in order to expand/enhance the operational capabilities of the (57) WMD CST Teams. Program efforts support upgrades of key components of the WMD CST Program that have become obsolete, or are no longer being supported by the manufacturer. In FY22 the WMD CST program continues system-related test activities, including costs of specially fabricated hardware to obtain or validate engineering data on the performance of the system.

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

	FY 2020	FY 2021	FY 2022
Title: 1) ALS MOD	0.829	-	-
Description: Technology Refresh Effort			
Title: 2) WMD CST	1.409	1.421	1.522
Description: System Upgrade and Support			
FY 2021 Plans: Provides system-related test activities, including costs of specially fabricated hardware to obtain or validate engineering data on the performance of the system. This element also includes costs of the detailed planning, conduct, support, data reduction,			

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) CM7 / Homeland Defense (Op Sys Dev)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
and reports from such testing, as well as hardware items that are consumed or planned to be consumed in the conduct of such operations. Provides functions of logistics engineering and ILS management (e.g., maintenance support, facilities, personnel, training, testing, and activation of the system). FY 2022 Plans: Continue system-related test activities, including costs of specially fabricated hardware to obtain or validate engineering data on the performance of the system. Continue the detailed planning, conduct, support, data reduction, and reports from such testing, as well as hardware items that are consumed or planned to be consumed in the conduct of such operations. Conduct logistics engineering and ILS management (e.g., maintenance support, facilities, personnel, training, testing, and activation of the system). FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.			
Accomplishments/Planned Programs Subtotals	2.238	1.421	1.522

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

N/A

Remarks

D. Acquisition Strategy

ANALYTICAL LABORATORY SYSTEM MODIFICATION (ALS MOD)

The Common Analytical Laboratory System (CALs) and the Analytical Laboratory System (ALS) Modification (MOD) program's objective is to address critical analytical equipment obsolescence (Analytical Suite) and system functionality issues for the National Guard Bureau's (NGB) Civil Support Teams. This includes market survey, down select, testing, integration, and update of Technical Data Package and logistical documentation. As such, this program will continue to follow the most up-to-date requirement documentation for CALs and ALS MOD.

WMD - CIVIL SUPPORT TEAMS (WMD CST)

The Weapons of Mass Destruction Civil Support Team Program (WMD-CST) is a COTS based program that supports the evaluation of advancements in CBRN commercial off the shelf (COTS)/government-off-the-shelf (GOTS) equipment against the current technology baseline of equipment fielded to the (57) WMD CST Teams, this is to address analytical equipment obsolescence. As such, the program establishes a time phased modernization plan to integrate and incorporate proven advancements in commercially available technology into the CST operating mission set based on highest priority capability requirements and availability of resources.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) CM7 / Homeland Defense (Op Sys Dev)
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Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
WMD CST - ES C - Government Product Development Team Labor	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	0.000	0.000		0.150	Nov 2020	0.085	Nov 2021	0.000		0.085	0.000	0.235	0.000
WMD CST - ES C - Science & Engineering Support	MIPR	Naval Air Warfare Center (Aircraft Division) : Patuxent River, MD	0.000	0.096	Nov 2019	0.000		0.095	Nov 2021	0.000		0.095	0.000	0.191	0.000
Subtotal			0.000	0.096		0.150		0.180		0.000		0.180	0.000	0.426	N/A

Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
ALS MOD - OTE C - Chlorinated Compound Effort	C/CPFF	Battelle Memorial Institute : Columbus, OH	0.000	0.749	Mar 2020	0.000		0.000		0.000		0.000	0.000	0.749	0.000
WMD CST - OTHC C - CBRN COTS Component	MIPR	U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD	5.724	0.921	Feb 2020	0.923	Feb 2021	1.110	Feb 2022	0.000		1.110	0.000	8.678	0.000
Subtotal			5.724	1.670		0.923		1.110		0.000		1.110	0.000	9.427	N/A

Remarks

ALS MOD: The capability for assessing for chlorinated compounds within CALS was lost due to obsolescence. This effort is to find an alternative to that technology. Without this capability, and with no down-range capability, CALS Users would lose the ability to detect and identify volatile corrosive chlorinated compounds brought into the laboratory.

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) CM7 / Homeland Defense (Op Sys Dev)

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
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

ALS MOD - ALS MOD / CALS- Technology Refresh	[REDACTED]																											
WMD CST - Upgrade Fielded Systems	[REDACTED]																											

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) CM7 / Homeland Defense (Op Sys Dev)

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
ALS MOD - ALS MOD / CALS- Technology Refresh	2	2020	1	2021
WMD CST - Upgrade Fielded Systems	1	2020	4	2026

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program										Date: May 2021		
Appropriation/Budget Activity 0400 / 7					R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)				Project (Number/Name) C07 / Collective Protection (Op Sys Dev)			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
C07: Collective Protection (Op Sys Dev)	-	5.690	7.865	8.442	-	8.442	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project provides for technology upgrade and refresh of fielded Collective Protection (CP) equipment and systems that are smaller, lighter, less costly to produce and maintain, and more logistically supportable enabling mission accomplishment in spaces safe from the effects of chemical, biological, and radiological (CBR) contamination.

Efforts included in this project are:

- (1) Joint Expeditionary Collective Protection (JECP)
- (2) Modernization Protection (MODPROT), and
- (3) Modernization Protection Collective Protection (MODPROT CP)

JECP provides the Joint Forces a CP capability which is lightweight, compact, modular, and affordable. Modernization and improvement efforts addressed include development of a field leakage test capability that allows Warfighters to validate the integrity of JECP and other fielded CP systems; integration of a newly developed filtration material into existing M98 Gas Particulate Filter Sets to provide the Warfighter with improved protection against Toxic Industrial Chemicals (TICs) and Toxic Industrial Materials (TIMs), while maintaining current performance characteristics against Chemical Warfare Agents (CWAs) and meeting military standards; development of a CP kit for non-CP Environmental Control Units (ECUs) and improvement on the current tent liner restraint systems. The JECP BA7 program transitions to the MODPROT CP BA7 program in FY21.

MODPROT will be split into three programs in FY21 to fund three separate Modernization Efforts: Modernization Protection Collective Protection (MODPROT CP), Modernization Protection Decontamination (MODPROT DE), and Modernization Protection Individual Protection (MODPROT IP).

MODPROT CP incorporates a value engineering approach to address the need to reduce logistics cost and solve obsolescence issues to the DoD /Joint Services fielded CBR protection portfolio for mobile, transportable, fixed facility and shipboard CP systems. MODPROT CP provides for upgrades, improvements and modernizations of fielded CP Systems such as Mobile ColPro Systems, Fixed Site ColPro Systems, Transportable ColPro Systems, Modular CP Equipment Systems, and Collectively Protected Field Hospitals (CPFH). MODPROT CP also addresses obsolescence issues in test quality standards for gas filters and tests sealants and coatings to mitigate corrosion on filter systems to extend service life of these systems. In FY22, MODPROT CP completes Non-Destructive Production Acceptance Leak Test improvements, continues redesign of M49 gas filters, continues M48A1 Filter Redesign, continues developing ColPro training upgrades, and continues Collective Protection Modernization for Ships and Buildings and conduct system scale lab testing.

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) C07 / Collective Protection (Op Sys Dev)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
Title: 1) JECP Description: Field Leakage Test Capability (FLTC), M98 gas particulate filter sets, CP kit for Non-CP Environmental Control Units (ECU), and tent liner restraint system improvement	1.955	-	-
Title: 2) MODPROT Description: Upgrades, improvements, and modernizations to fielded CP systems	3.735	-	-
Title: 3) MODPROT CP Description: Upgrades, improvements, and modernizations to fielded CP systems FY 2021 Plans: Complete Electromagnetic Interference (EMI) testing on the M93/M59 Gas Particulate Filter Unit (GPFU), complete environmental M98 guard bed testing, continue Non-Destructive Production Acceptance Leak Test improvements. Complete testing for the seals of the M48A1 Filter Redesign. Begin Collective Protection Modernization for Ships and Buildings redesign and acquire component prototypes of modernized M98 filter housing. Begin development of updated training materials for Collective Protection systems. Initiate redesign of M49 gas filters. FY 2022 Plans: Complete Non-Destructive Production Acceptance Leak Test improvements. Continue redesign of M49 gas filters. Continue M48A1 Filter Redesign. Continue Collective Protection Modernization for Ships and Buildings and conduct system scale lab testing. Continue development of updated training materials for Collective Protection Systems. Begin conducting collective protection system filter surveillance testing to improve system sustainment. FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.	-	7.865	8.442
Accomplishments/Planned Programs Subtotals	5.690	7.865	8.442

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

N/A

Remarks

D. Acquisition Strategy

JOINT EXPEDITIONARY COLLECTIVE PROTECTION (JECP)

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program	Date: May 2021
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Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) C07 / Collective Protection (Op Sys Dev)
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JECP Family of Systems (FoS) (Phase 1 and Phase 2) involves multiple contract types throughout the Engineering and Manufacturing Development (EMD) and Production and Deployment Phases of the program. Having achieved a Full Rate Production (FRP) decision for Phase 1 Systems in December 2016, the program exercised Fixed Price Incentive (FPI) production options in FY17 & FY18 through the now expired contract with Leidos in support of Initial Operational Capability (IOC). A competitive build-to print follow-on production delivery order contract was awarded June 2019 to Production Products Manufacturing and will support the remaining production of Phase 1 Systems to meet Full Operational Capability (FOC). Phase 2 systems will be developed as engineering changes to the Phase 1 systems under a separate competitive delivery order awarded March 2019 to Leidos and undergo limited developmental and operational testing in pursuit of a FRP decision. Production options are included in the delivery order to meet FOC for Phase 2 systems. Additionally, BA7 funding will develop incremental improvements to fielded JECP FoS. BA7 efforts include a range of improvements intended to enhance filtration protection, provide a field leakage test capability and update various fielded Environmental Control Unit (ECU) interface types for use with collective protection. These efforts involve development of designs and prototyping under the Other Transaction Authority (OTA) through the Countering Weapons Mass Destruction (CWMD) Consortium contract as well as exploitation of commercial off-the-shelf items.

MODERNIZATION PROTECTION (MODPROT)

In FY21, MODPROT will be split into three programs to fund three separate Modernization Efforts: Modernization Protection Collective Protection (MODPROT CP), Modernization Protection Decontamination (MODPROT DE), and Modernization Protection Individual Protection (MODPROT IP). The original MODPROT acquisition strategies will continue to be followed after the transition occurs in FY21.

MODERNIZATION PROTECTION COLLECTIVE PROTECTION (MODPROT CP)

MODPROT CP leverages mature technology from contractor developed components to address and replace obsolete components of various fielded collective protection systems. Modernization efforts will also use items developed by the government that have transitioned from lower to higher technology readiness levels that can be inserted into fielded systems. A combination of competitive and sole source contracts to various industry vendors and project orders to various government activities will be used to adapt previously developed components to modernize systems. Robust component and system level testing will validate both government and contractor furnished improvements. The improvements will be added into the specific systems' updated Technical Data Packages (TDPs) to be used in Engineering Change Proposals (ECPs) and provided to the item managers.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) C07 / Collective Protection (Op Sys Dev)
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
JECP - HW C - FLTC, M98 Filter Sets, ECUs, Tent Liner Restraint Systems	Various	Various : Various	2.401	1.091	Nov 2019	0.000		0.000		0.000		0.000	0.000	3.492	0.000
MODPROT - HW C - Compatibility Engineering M93 GPFU/ASZM-TEDA Carbon Dtl Spec FAT Reqmt/M48A1 Filter Redesign/Corrosion Mitigation	MIPR	CCDC CBC : Aberdeen Proving Ground, MD	0.523	2.257	Nov 2019	0.000		0.000		0.000		0.000	0.000	2.780	0.000
MODPROT CP - HW C - Collective Protection Modernization for Ships	Various	TBD : N/A	0.000	0.000		2.273	Nov 2020	3.278	Dec 2021	0.000		3.278	0.000	5.551	0.000
MODPROT CP - HW C - Filter Redesign, Non-Destructive Leak Test, ColPro Training Dev	MIPR	Various : Various	0.000	0.000		2.523	Oct 2020	0.274	Dec 2021	0.000		0.274	0.000	2.797	0.000
Subtotal			2.924	3.348		4.796		3.552		0.000		3.552	0.000	14.620	N/A

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
MODPROT - ES C - Engineering Support	MIPR	Various : Various	0.494	0.422	Nov 2019	0.000		0.000		0.000		0.000	0.000	0.916	0.000
MODPROT CP - ES C - IPT, Technical, Engineering and Logistics Support	MIPR	Various : Various	0.000	0.000		1.021	Nov 2020	1.467	Dec 2021	0.000		1.467	0.000	2.488	0.000
Subtotal			0.494	0.422		1.021		1.467		0.000		1.467	0.000	3.404	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) C07 / Collective Protection (Op Sys Dev)
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Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
JECP - DTE C - Improved M98 Filter Set Developmental Testing	MIPR	Various : Various	0.638	0.487	Nov 2019	0.000		0.000		0.000		0.000	0.000	1.125	0.000
MODPROT - DTE C - M93 GPFU Environmental & EMI Testing/M98 Guard Bed Filter Life Extension/VFP Hose Refresh	MIPR	Various : Various	0.077	0.792	Nov 2019	0.000		0.000		0.000		0.000	0.000	0.869	0.000
MODPROT CP - DTE C - CP Modernization Testing	Various	Various : Various	0.000	0.000		0.869	Oct 2020	2.157	Dec 2021	0.000		2.157	0.000	3.026	0.000
Subtotal			0.715	1.279		0.869		2.157		0.000		2.157	0.000	5.020	N/A

Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
JECP - PM/MS C - Program Management Support	MIPR	Various : Various	2.000	0.377	Nov 2019	0.000		0.000		0.000		0.000	0.000	2.377	0.000
MODPROT - PM/MS C - Program Management Support	Various	Various : Various	0.000	0.264	May 2020	0.000		0.000		0.000		0.000	0.000	0.264	0.000
MODPROT CP - PM/MS C - Program Management Support	MIPR	Various : Various	0.000	0.000		1.179	Mar 2021	1.266	Dec 2021	0.000		1.266	0.000	2.445	0.000
Subtotal			2.000	0.641		1.179		1.266		0.000		1.266	0.000	5.086	N/A

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	6.133	5.690	7.865	8.442	0.000	8.442	0.000	28.130	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) C07 / Collective Protection (Op Sys Dev)

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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
JECP - Field Leakage Tester Limited User Prototype Test	■																											
JECP - Improved M98 Filter Set - Build and test	■	■																										
JECP - Field Leakage Tester Development and Prototype Testing	■	■	■																									
JECP - Finalize Tech Data & Log Products - ECU	■	■	■																									
JECP - Phase 2 Full Rate Production								■																				
JECP - Liner Restraint Development	■	■	■																									
JECP - Finalize Tech Data & Log Products - Liner Restraint	■	■	■																									
JECP - Build and test final selected prototype - Improved M98 Filter Set		■	■																									
MODPROT - M93 GPFU Electro Magnetic Interference	■	■	■																									
MODPROT - Environmental M98 Guard Bed Testing	■	■	■																									
MODPROT - CP DEPMEDS Redesign	■	■	■																									
MODPROT - VFP Hose Refresh	■	■	■																									
MODPROT - Non Destructive (ND) Acceptance Leak Test CP Filters	■	■	■																									
MODPROT - ASZM-TEDA Carbon Dtl Spec FAT Reqmt	■	■	■																									
MODPROT - Next Generation ColPro System	■	■	■																									
MODPROT CP - M93 GPFU Electro Magnetic Interference							■	■																				

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) C07 / Collective Protection (Op Sys Dev)
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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
MODPROT CP - Environmental M98 Guard Bed Testing																												
MODPROT CP - Non Destructive (ND) Acceptance Leak Test CP Filters																												
MODPROT CP - Collective Protection Training Development																												
MODPROT CP - Collective Protection Modernization for Ships and Buildings																												
MODPROT CP - M48A1 Filter Redesign																												
MODPROT CP - M49 Filter Modernization																												
MODPROT CP - Filter Surveillance Testing																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) C07 / Collective Protection (Op Sys Dev)

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
JECP - Field Leakage Tester Limited User Prototype Test	1	2020	1	2020
JECP - Improved M98 Filter Set - Build and test	1	2020	2	2020
JECP - Field Leakage Tester Development and Prototype Testing	1	2020	4	2020
JECP - Finalize Tech Data & Log Products - ECU	1	2020	4	2020
JECP - Phase 2 Full Rate Production	4	2021	4	2021
JECP - Liner Restraint Development	1	2020	4	2020
JECP - Finalize Tech Data & Log Products - Liner Restraint	1	2020	4	2020
JECP - Build and test final selected prototype - Improved M98 Filter Set	2	2020	4	2020
MODPROT - M93 GPFU Electro Magnetic Interference	1	2020	4	2020
MODPROT - Environmental M98 Guard Bed Testing	1	2020	4	2020
MODPROT - CP DEPMEDS Redesign	1	2020	4	2020
MODPROT - VFP Hose Refresh	1	2020	4	2020
MODPROT - Non Destructive (ND) Acceptance Leak Test CP Filters	1	2020	4	2020
MODPROT - ASZM-TEDA Carbon Dtl Spec FAT Reqmt	1	2020	4	2020
MODPROT - Next Generation ColPro System	1	2020	4	2020
MODPROT CP - M93 GPFU Electro Magnetic Interference	1	2021	4	2021
MODPROT CP - Environmental M98 Guard Bed Testing	1	2021	4	2021
MODPROT CP - Non Destructive (ND) Acceptance Leak Test CP Filters	1	2021	4	2022
MODPROT CP - Collective Protection Training Development	1	2021	4	2022
MODPROT CP - Collective Protection Modernization for Ships and Buildings	1	2021	4	2025
MODPROT CP - M48A1 Filter Redesign	1	2021	4	2026
MODPROT CP - M49 Filter Modernization	1	2021	4	2026

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program			Date: May 2021	
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) C07 / Collective Protection (Op Sys Dev)		

Events	Start		End	
	Quarter	Year	Quarter	Year
MODPROT CP - Filter Surveillance Testing	1	2022	4	2026

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 7					R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)				Project (Number/Name) DE7 / Decontamination (Op Sys Dev)			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
DE7: Decontamination (Op Sys Dev)	-	1.414	0.633	1.072	-	1.072	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project addresses obsolescence issues with decontamination equipment and the need to modernize the Joint Services fielded chemical and biological with capabilities meeting or exceeding the Services requirements.

The effort included in this project is:

- (1) Modernization Protection (MODPROT), and
- (2) Modernization Protection Decontamination (MODPROT DE)

MODPROT will be split into three programs in FY21 to fund three separate Modernization Efforts: Modernization Protection Collective Protection (MODPROT CP), Modernization Protection Decontamination (MODPROT DE), and Modernization Protection Individual Protection (MODPROT IP).

MODPROT DE addresses obsolescence and technical data concerns, beginning with the M26 Joint Services Transportable Decontamination System-Small Scale (JSTDS-SS) through validation and verification of Technical Manual (TM) changes as well as technical data for spare and repair parts; the M12A1 Power Driven Decontamination Apparatus (PDDA) by updating technical references and performing the necessary validation and verification before publishing an updated TM; Conduct biological efficacy at relevant environment (i.e. ambient, desert, cold) for Joint Service Equipment Wipe (JSEW) to expand wipe capabilities to include performance against biological agents; and Conduct efficacy of emerging sorbent technologies for M295/M100 to increase reactivity properties against nerve agents. In FY22 the MODPROT DE program will continue updates to technical data for M26 JSTDS-SS Technical Data Package (TDP) and conduct Health Hazard Assessments (HHA) on expired M295/M100.

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

	FY 2020	FY 2021	FY 2022
Title: 1) MODPROT	1.414	-	-
Description: Upgrades, improvements, and modernizations to fielded DE systems			
Title: 2) MODPROT DE	-	0.633	1.072
Description: Upgrades, improvements, and modernizations to fielded DE systems			
FY 2021 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) DE7 / Decontamination (Op Sys Dev)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Complete biological efficacy effort at relevant environment (i.e. ambient, desert, cold) for Joint Service Equipment Wipe (JSEW) to expand wipe capabilities to include performance against biological agents. Continue updates to technical references and validation/verification efforts for M12A1 Power Driven Decontamination Apparatus (PDDA) Technical Manual (TM).</p> <p>FY 2022 Plans: Complete updates to technical data for spares and repair parts for M26 JSTDS-SS Technical Data Package (TDP). Complete updates to technical references and validation/verification efforts for M12A1 Power Driven Decontamination Apparatus (PDDA) Technical Manual (TM). Complete efficacy of emerging sorbent technologies for the M295/M100 to increase reactivity properties against nerve agents. Complete Health Hazard Assessment (HHA) on expired M295/M100 for potential training use.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.</p>			
Accomplishments/Planned Programs Subtotals	1.414	0.633	1.072

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

N/A

Remarks

D. Acquisition Strategy

MODERNIZATION PROTECTION (MODPROT)

In FY21, MODPROT will be split into three programs to fund three separate Modernization Efforts: Modernization Protection Collective Protection (MODPROT CP), Modernization Protection Decontamination (MODPROT DE), and Modernization Protection Individual Protection (MODPROT IP). The original MODPROT acquisition strategies will continue to be followed after the transition occurs in FY21.

MODERNIZATION DECONTAMINATION (MODPROT DE)

MODPROT DE leverages mature technology from contractor developed components to address and replace obsolete components of various fielded decontamination systems. Modernization efforts will also use items developed by the government that have transitioned from lower to higher technology readiness levels that can be inserted into fielded systems. A combination of competitive and sole source contracts to various industry vendors and project orders to various government activities will be used to adapt previously developed components to modernize systems. Robust component and system level testing will validate both government and contractor furnished improvements. The improvements will be added into the specific system's updated Technical Data Packages (TDPs) to be used in Engineering Change Proposals (ECPs) and provided to the item managers.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) DE7 / Decontamination (Op Sys Dev)
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
MODPROT DE - HW C - M26/M295/M100/ Health Hazard Assessment (HHA)	MIPR	Various : Various	0.000	0.000		0.413	Nov 2020	0.837	Dec 2021	0.000		0.837	0.000	1.250	0.000
Subtotal			0.000	0.000		0.413		0.837		0.000		0.837	0.000	1.250	N/A

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
MODPROT - TD/D C - TDP & TM Updates/ Engineering Support	MIPR	Various : Various	0.115	0.474	Nov 2019	0.000		0.000		0.000		0.000	0.000	0.589	0.000
MODPROT DE - ES C - M26 Tech Data Package; Modernization Update / M12A1 TM Update	MIPR	Various : Various	0.000	0.000		0.220	Nov 2020	0.075	Dec 2021	0.000		0.075	0.000	0.295	0.000
Subtotal			0.115	0.474		0.220		0.075		0.000		0.075	0.000	0.884	N/A

Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
MODPROT - OTE C - JSEW Bio Capability Testing	Various	Various : Various	0.000	0.448	Dec 2019	0.000		0.000		0.000		0.000	0.000	0.448	0.000
Subtotal			0.000	0.448		0.000		0.000		0.000		0.000	0.000	0.448	N/A

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) DE7 / Decontamination (Op Sys Dev)

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MODPROT - Technical Data Package (TDP)	1	2020	4	2020
MODPROT - M26 JSTDS-SS TM Update/Modernization Effort	1	2020	4	2020
MODPROT - M12A1 Tech Manual Update	1	2020	4	2020
MODPROT - JSEW Bio Capability Testing	1	2020	4	2020
MODPROT DE - JSEW Bio Capability Testing	1	2021	4	2021
MODPROT DE - M12A1 TM Update	1	2021	1	2022
MODPROT DE - M26 JSTDS-SS TDP	1	2021	1	2022
MODPROT DE - M26 JSTDS-SS Modernization	1	2021	4	2025
MODPROT DE - M295/M100 Efficacy Testing	1	2022	4	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) IP7 / Individual Protection (Op Sys Dev)
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
IP7: Individual Protection (Op Sys Dev)	-	6.364	6.463	11.724	-	11.724	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

The project supports technology refresh of fielded individual protective equipment which enable the warfighter to operate in a contaminated CBR environment with little or no degradation to his/her performance.

Efforts included in this project are:

- (1) Joint Service General Purpose Mask (JSGPM)
- (2) Modernization Protection (MODPROT)
- (3) Modernization Protection Individual Protection (MODPROT IP), and
- (4) Special Purpose Unit Rapid Capability Development and Deployment (SPU RCDD)

The JSGPM program provides for respiratory and ocular protection modernization and enhancements for Toxic Industrial Chemicals (TICs) and Toxic Industrial Materials (TIMs) protection and operational performance in air purifying, powered air purifying, and supplied air functional modes of the JSGPM family of systems. Mask and filter system upgrades will be provided for fielded Protection systems to enhance respiratory and ocular protection. Starting in FY21, JSGPM BA7 transitions to the MODPROT IP program.

MODPROT will be split into three programs in FY21 to fund three separate Modernization Efforts: Modernization Protection Collective Protection (MODPROT CP), Modernization Protection Decontamination (MODPROT DE), and Modernization Protection Individual Protection (MODPROT IP).

The MODPROT IP addresses obsolescence issues with Individual Protective (IP) equipment and the need to modernize fielded IP with capabilities to meet or exceed the Services requirements. MODPROT IP will also conduct modernization efforts and reverse engineering of maintenance and repair procedures for the Joint Services Mask Leakage Tester (JSMLT). MODPROT IP will also provide mask and filter system upgrades and modernization of fielded protection systems to enhance respiratory and ocular protection resulting in an increased lethality of fighter aircraft by mitigating risk due to operationally unsuitable aircrew CBRN masks. In FY22 the MODPROT IP program will conduct shelf life extension testing on Molded Lightweight Chemical/Biological Protective Overboot (MALO) and Joint Service Integrated Suit Technology (JSLIST) Block 2 Glove Upgrade non- Flame Resistant (JB2GU nFR), to determine if storage life may be extended to 20 years from the Date of Manufacture. Testing and analysis with aircraft will fully validate and refine new Tactics, Techniques and Procedures (TTPs) that allow aircrews to operate without restrictive CBRN protective equipment by determining time and techniques required to reduce cockpit hazards to acceptable levels by flushing with clean air.

The SPU RCDD will facilitate rapid response to near-term and emergent chemical and biological (CB) defensive capability requirements from elements of the Joint Special Operations Command (JSOC), select elements from across the Special Operations Forces (SOF) Enterprise and other Joint Force enabling units. SPU RCDD

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) IP7 / Individual Protection (Op Sys Dev)
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mitigates risk across the Chemical Biological Defense Program (CBDP) by creating a portfolio of operationally-relevant CB capabilities that can quickly transition to needed elements and formations of the joint force, in part or in whole, in response to the emergent capability needs of the geographic combatant commanders. These objectives are met by the early transitioning of promising science and technologies (S&T), the focused conduct of combat evaluations and mission-oriented operational assessments to assess technological and mission suitability, and the active leveraging of existing Commercial-Off-The-Shelf (COTS) products along with novel redesign approaches to modernize and optimize existing solutions to new challenges supported by "buy-try-decide-acquire" acquisition strategies. SPU RCDD will provide enhanced CB detection and protection capabilities against new and emerging CB threats through modernized and technologically-mature component and system enhancements to currently fielded host platforms and legacy systems, thereby extending service life, off-setting costs to initiate a new acquisition program, and putting critical CB capabilities in the hands of warfighters by faster acceleration through the acquisition process. In FY22 SPU RCDD initiates efforts such as respiratory breathing systems, biological identification, and modernization of protective Chemical and Biological ensembles that have gone through requirements validation, and continues product enhancement development and technology upgrades on currently fielded SOF equipment to counter emerging threats, conduct limited user evaluations and operational assessment.

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

	FY 2020	FY 2021	FY 2022
<p>Title: 1) JSGPM</p> <p>Description: Prototype Development Testing</p>	1.562	-	-
<p>Title: 2) MODPROT</p> <p>Description: Upgrades, improvements, and modernizations to fielded IP systems.</p>	1.959	-	-
<p>Title: 3) MODPROT IP</p> <p>Description: Upgrades, improvements, and modernizations to fielded IP systems.</p> <p>FY 2021 Plans: Continue modernization of the JSMLT. Initiate Second Generation Filter and NIOSH filter Prototype Developmental Testing (DT).</p> <p>FY 2022 Plans: Initiate M53A1 Hard to Fit Testing. Initiate Overboots, Molded, Lightweight, Chemical/Biological Protective (MALO) shelf life extension testing. Continue modernization of the Joint Service Mask Leakage Tester (JSMLT) and Integrated Footwear System (IFS). Commence shelf life maximum age study for Joint Service Lightweight Integrated Suit Technology (JSLIST) Block 2 Glove Upgrade, Non-Flame Resistant (JB2GU nFR) Glove. Continue Third Generation Filter and National Institute for Occupational Safety and Health (NIOSH) filter Prototype Developmental Testing (DT) and builds. Initiate Fixed Wing Aircraft/Aircrew PPE optimization effort.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to accelerated development effort.</p>	-	3.001	8.327
<p>Title: 4) SPU RCDD</p>	2.843	3.462	3.397

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) IP7 / Individual Protection (Op Sys Dev)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Description: The SCBA-Modernization project will replace the three different SCBA systems currently being used by the customer with a modular system that can be configured to meet their 3 specific mission profiles. The current SCBA systems are made by three different manufactures which creates a logistical burden. The VR Trainer project will allow the Warfighter to interact with specific CBRN equipment through an actual device or with a created 3D version of that device to perform maintenance as well as to load and analyze CB samples using pre-positioned training scenarios.</p> <p>FY 2021 Plans: Initiate product enhancement development and technology upgrades on currently fielded equipment to counter emerging threats, conduct limited user evaluations and operational assessment, and provide program management support.</p> <p>FY 2022 Plans: Initiate efforts such as respiratory breathing systems, biological identification, and modernization of protective Chemical and Biological ensembles that have gone through requirements validation and continue product enhancement development and technology upgrades on currently fielded SOF equipment to counter emerging threats, conduct limited user evaluations and operational assessment.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments.</p>			
Accomplishments/Planned Programs Subtotals	6.364	6.463	11.724

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• JI0003: JOINT SERVICE GENERAL PURPOSE MASK (JSGPM)	13.209	19.802	15.128	-	15.128	-	-	-	-	-	-

Remarks

D. Acquisition Strategy
JS GENERAL PURPOSE MASK (JSGPM)

The JSGPM Advanced Respiratory Protection Initiative (ARPI) allows for continual technology refreshment and development of an improved single mask filter that would be certified for use in both domestic and military operations. Existing Federal Acquisition Regulation (FAR) based contracts and Other Transaction Authority (OTA) contracts will be used to mature technologies transitioned from the Defense Threat Reduction Agency (DTRA) to obtain higher Technology Readiness Level (TRL) that

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program	Date: May 2021
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Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) IP7 / Individual Protection (Op Sys Dev)
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can be inserted into fielded systems. The complexity of maturing these different items requires an evolutionary approach with one prototype iteration governing the approach on the next iteration.

MODERNIZATION PROTECTION (MODPROT)

In FY21, MODPROT will be split into three programs to fund three separate Modernization Efforts: Modernization Protection Collective Protection (MODPROT CP), Modernization Protection Decontamination (MODPROT DE), and Modernization Protection Individual Protection (MODPROT IP). The original MODPROT acquisition strategies will continue to be followed after the transition occurs in FY21.

MODERNIZATION PROTECTION INDIVIDUAL PROTECTION (MODPROT IP)

MODPROT IP leverages mature technology from contractor developed components to address and replace obsolete components of various fielded individual protection systems. Modernization efforts will also use items developed by the government that have transitioned from lower to higher technology readiness levels that can be inserted into fielded systems. A combination of competitive and sole source contracts to various industry vendors and project orders to various government activities will be used to adapt previously developed components to modernize systems. Robust component and system level testing will validate both government and contractor furnished improvements. The improvements will be added into the specific system's updated technical data packages to be used in engineering change proposals and provided to the item managers.

SPU RAPID CAPABILITY DEVELOPMENT AND DEPLOYMENT (SPU RCDD)

Non-traditional projects will be executed for capabilities identified by Joint Special Operations Command (JSOC), select elements from across the Special Operations Forces (SOF) Enterprise, and other Joint Force enabling units. The SPU RCDD BA5 acquisition strategy for developmental efforts will allow rapid prototyping and testing of mission critical capabilities needed to enhance mission success. The SPU RCDD BA7 modernization effort will use technical and functional evaluations of currently-fielded items to introduce and incorporate operationally-relevant system developments. Both efforts will be accomplished by awarding an agreement through the Countering Weapons of Mass Destruction Other Transaction Authority (CWMD OTA) for the procurement of test assets. An OTA contracting approach will be used to procure test prototypes and test articles of possible solutions. The OTA consists of a consortium of all potential industry, research institutions, and non-traditional government that could be potential solvers for the program. Procurement will be through either the OTAs, a Small Business Innovative Research contract, or a more traditional contracting vehicle.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) IP7 / Individual Protection (Op Sys Dev)
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
JSGPM - HW C - Filter Prototypes 3M & Avon/NIOSH Filter procurement	Various	Various : Various	2.197	0.830	Nov 2019	0.000		0.000		0.000		0.000	0.000	3.027	0.000
MODPROT IP - HW C - Filter Prototypes & JSMLT Modernization	Various	Various : Various	0.000	0.000		1.185	Nov 2020	2.378	Dec 2021	0.000		2.378	0.000	3.563	0.000
SPU RCDD - HW C - VR Trainer Product Development	Various	MRIGlobal : Kansas City, MO	0.000	0.000		1.993	Dec 2020	1.963	Dec 2021	0.000		1.963	0.000	3.956	0.000
SPU RCDD - HW C - AP-PPE Product Development	C/CPFF	Battelle Memorial Institute : Columbus, OH	0.000	0.261	Apr 2020	0.000		0.000		0.000		0.000	0.000	0.261	0.000
Subtotal			2.197	1.091		3.178		4.341		0.000		4.341	0.000	10.807	N/A

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
JSGPM - ES C - IPT, Engineering, and Technical Support	MIPR	Various : Various	0.342	0.018	Nov 2019	0.000		0.000		0.000		0.000	0.000	0.360	0.000
MODPROT - ILS C - Logistics Support	Various	Various : Various	0.000	0.435	Dec 2019	0.000		0.000		0.000		0.000	0.000	0.435	0.000
MODPROT IP - ES C - IPT, Engineering, Technical, Logistics Support	MIPR	Various : Various	0.000	0.000		0.301	Nov 2020	0.816	Nov 2021	0.000		0.816	0.000	1.117	0.000
SPU RCDD - ES C - Technical Support	MIPR	Various : Various	0.000	0.250	Nov 2020	0.466	Dec 2020	0.347	Dec 2021	0.000		0.347	0.000	1.063	0.000
SPU RCDD - ES C - AP-PPE Technical Support	MIPR	Combat Capabilities Development Command (CCDC)	0.000	0.363	May 2020	0.000		0.000		0.000		0.000	0.000	0.363	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) IP7 / Individual Protection (Op Sys Dev)
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Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
		Soldier Center : Natick, MA													
SPU RCDD - ES C - Engineering Support	Various	Various : Various	0.000	0.000		0.145	Feb 2021	0.000		0.000		0.000	0.000	0.145	0.000
Subtotal			0.342	1.066		0.912		1.163		0.000		1.163	0.000	3.483	N/A

Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
JSGPM - DTE C - System Filters (CoZZAT)	MIPR	CCDC CBC : Aberdeen Proving Ground, MD	2.639	0.462	Jan 2020	0.000		0.000		0.000		0.000	0.700	3.801	0.000
MODPROT - OTE S - JB2GU Glove Study/ IFS Modernization/Apron Modernization Testing	C/FFP	Various : Various	0.100	0.101	Dec 2019	0.000		0.000		0.000		0.000	0.000	0.201	0.000
MODPROT - OTE S - JSMLT Modernization	C/FFP	Hamilton Associates : DBA Air Techniques Intl., Owings Mills, MD	1.430	1.132	Jan 2020	0.000		0.000		0.000		0.000	0.000	2.562	0.000
MODPROT IP - DTE C - Filter Prototype Testing	MIPR	CCDC CBC : Aberdeen Proving Ground, MD	0.000	0.000		1.005	Nov 2020	0.000		0.000		0.000	0.000	1.005	0.000
MODPROT IP - DTE C - Fixed Wing Aircraft/Aircrew PPE Optimization Effort	MIPR	Various : Various	0.000	0.000		0.000		2.567	Dec 2021	0.000		2.567	0.000	2.567	0.000
MODPROT IP - DTE C - LJPACE Demo, System Filters	Various	Various : Various	0.000	0.000		0.112	Apr 2021	1.317	Dec 2021	0.000		1.317	0.000	1.429	0.000
SPU RCDD - DTE C - Project Wintergreen Test and Evaluation	MIPR	U.S. Army Combat Capabilities Development Command	0.000	0.342	Jun 2020	0.267	Dec 2020	0.555	Dec 2021	0.000		0.555	0.000	1.164	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) IP7 / Individual Protection (Op Sys Dev)
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Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
		(DEVCOM) Chemical Biological Center (CBC) : Aberdeen Proving Ground, MD													
SPU RCDD - DTE C - AP-PPE Test and Evaluation	C/FFP	Battelle Memorial Institute : Columbus, OH	0.000	0.680	Apr 2020	0.000		0.000		0.000		0.000	0.000	0.680	0.000
SPU RCDD - DTE C - Test and Evaluation	Various	Various : Various	0.000	0.000		0.150	Mar 2021	0.000		0.000		0.000	0.000	0.150	0.000
SPU RCDD - OTE S - NAG	MIPR	National Assessment Group : Kirkland, NM	0.000	0.000		0.075	Apr 2021	0.000		0.000		0.000	0.000	0.075	0.000
Subtotal			4.169	2.717		1.609		4.439		0.000		4.439	0.700	13.634	N/A

Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
JSGPM - PM/MS C - Program Management Support	MIPR	Various : Various	2.107	0.252	Nov 2019	0.000		0.000		0.000		0.000	0.000	2.359	0.000
MODPROT - PM/MS C - Program Management Support	MIPR	Various : Various	0.000	0.291	Nov 2019	0.000		0.000		0.000		0.000	0.000	0.291	0.000
MODPROT IP - PM/MS C - Program Management Support	MIPR	Various : Various	0.000	0.000		0.398	Mar 2021	1.249	Nov 2021	0.000		1.249	0.000	1.647	0.000
SPU RCDD - PM/MS C - Program Management Support	Various	Various : Various	0.000	0.947	Feb 2020	0.366	Nov 2020	0.532	Nov 2021	0.000		0.532	0.000	1.845	0.000
Subtotal			2.107	1.490		0.764		1.781		0.000		1.781	0.000	6.142	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program								Date: May 2021			
Appropriation/Budget Activity 0400 / 7			R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)				Project (Number/Name) IP7 / Individual Protection (Op Sys Dev)				
	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract		
Project Cost Totals	8.815	6.364	6.463	11.724	0.000	11.724	0.700	34.066	N/A		

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) IP7 / Individual Protection (Op Sys Dev)
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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
JSGPM - Prototype Development (M61 Second Generation and NIOSH)	██████████																											
JSGPM - Prototype Testing (M61 Second Generations and NIOSH)	██████████																											
JSGPM - MOF Integration into M61	██████████																											
MODPROT - JSMLT Modernization	██████████																											
MODPROT - JB2GU Glove Study/ IFS Modernization	██████████																											
MODPROT IP - Second Generation Filter & NIOSH DT					████████████████████																							
MODPROT IP - JSMLT Modernization					██																							
MODPROT IP - MALO Shelf Life Extension Testing									████████																			
MODPROT IP - M53A1 Hard to Fit Testing									████████																			
MODPROT IP - Fixed Wing Aircraft/Aircrew PPE Optimization Effort									██																			
MODPROT IP - Maximum Age Study for JB2GU nFR Glove									████████████████																			
MODPROT IP - Second Generation Filter ECP													████████															
MODPROT IP - Third Generation Filter Prototype DT													██															
MODPROT IP - Third Generation Filter Technology ECP																					████████							
SPU RCDD - Modernization Efforts	██																											
SPU RCDD - AP-PPE Modernization	██																											
SPU RCDD - VR Trainer					██																							

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Chemical and Biological Defense Program							Date: May 2021				
Appropriation/Budget Activity 0400 / 7				R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)				Project (Number/Name) IP7 / Individual Protection (Op Sys Dev)			

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026							
	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				
SPU RCDD - SCBA Modernization																																

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) IP7 / Individual Protection (Op Sys Dev)
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
JSGPM - Prototype Development (M61 Second Generation and NIOSH)	1	2020	4	2020
JSGPM - Prototype Testing (M61 Second Generations and NIOSH)	1	2020	4	2020
JSGPM - MOF Integration into M61	1	2020	4	2020
MODPROT - JSMLT Modernization	1	2020	4	2020
MODPROT - JB2GU Glove Study/ IFS Modernization	1	2020	4	2020
MODPROT IP - Second Generation Filter & NIOSH DT	1	2021	4	2022
MODPROT IP - JSMLT Modernization	1	2021	4	2026
MODPROT IP - MALO Shelf Life Extension Testing	1	2022	2	2022
MODPROT IP - M53A1 Hard to Fit Testing	1	2022	2	2022
MODPROT IP - Fixed Wing Aircraft/Aircrew PPE Optimization Effort	1	2022	4	2026
MODPROT IP - Maximum Age Study for JB2GU nFR Glove	2	2022	4	2022
MODPROT IP - Second Generation Filter ECP	1	2023	2	2023
MODPROT IP - Third Generation Filter Prototype DT	3	2023	4	2025
MODPROT IP - Third Generation Filter Technology ECP	1	2026	2	2026
SPU RCDD - Modernization Efforts	1	2020	4	2026
SPU RCDD - AP-PPE Modernization	2	2020	4	2021
SPU RCDD - VR Trainer	1	2021	2	2022
SPU RCDD - SCBA Modernization	2	2021	1	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 7					R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)				Project (Number/Name) IS7 / Information Systems (Op Sys Dev)			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
IS7: Information Systems (Op Sys Dev)	-	15.773	3.234	15.281	-	15.281	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project provides for the upgrade and modernization of fielded Information Systems. During this phase efforts will execute modernization, bug fixes, provide support at fielded locations, and maintain training and logistics support.

Efforts included in this project are:

- (1) Global Biosurveillance Portal (G-BSP)
- (2) Joint Effects Model 2 (JEM 2),
- (3) Joint Warning and Reporting Network 2 (JWARN 2)
- (4) Software Support Activity (SSA)
- (5) Chemical Biological Radiological Nuclear Information Systems (CBRN IS)
- (6) Modernization Chemical Biological Radiological Nuclear Information Systems (MOD CBRN IS)

The G-BSP program provides a web-based enterprise environment that facilitates collaboration, communication, and information sharing in support of the detection, management, and mitigation of man-made and naturally occurring biological events. G-BSP Provides a central access point for biosurveillance information and situational awareness for DoD, interagency and allied partners supporting the early identification and response to biological events. G-BSP provides an integrated suite of web-based components designed to support public health officers, environmental officers, clinicians, physicians, and CBRN personnel as they maintain their situational awareness of local, regional, and global biological threats to the force. G-BSP does not duplicate existing DoD capabilities, but rather leverages existing tools and technologies to provide users across multiple organizations and disciplines with a centralized "one-stop shop" for all of their biosurveillance resources. The G-BSP will transition to USSOCOM for sustainment in FY23.

The JEM 2 program is a software application that provides the Department of Defense (DoD) with the only operationally tested and accredited tool to model and simulate the effects of CBRN weapon strikes and incidents that is approved for use by operational warfighters. JEM 2 applies advanced physics using weather, terrain, and agent characteristics to predict the time-phased impact of CBRN and Toxic Industrial Chemical/Material (TIC/TIM). JEM 2 displays hazard information on the Common Operational Picture (COP) and allows commanders to assess risk and take steps to mitigate the effects of Weapons of Mass Destruction (WMD) on operational forces. The BA7 JEM 2 program will be moved into the BA7 MOD CBRN IS program starting in FY22.

The JWARN 2 Program is a software application that provides the DoD with a warning and reporting system that enables an immediate and integrated response to threats of contamination by WMD, CBRN, and TIM incidents. JWARN 2 provides a digital display of CBRN reports on the COP, presented through Service-provided Command and Control systems resident at all echelons of command. Enhanced situational battlespace awareness provides Commanders the ability to support

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program	Date: May 2021
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Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) IS7 / Information Systems (Op Sys Dev)
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warfighter battle management and continuity of operations in a contaminated environment. The BA7 JWARN 2 program will be moved into the BA7 MOD CBRN IS program starting in FY22.

The SSA program provides for enterprise services in the areas of software development, system/network architectures, cybersecurity, information Assurance, standards and policies and interoperability. The SSA emphasizes development of reference implementations to guide Government and industry system and software developers to ensure that their products meet risk management framework compliance and common interoperability standards such as the Integrated Sensor Architecture (ISA). BA7 SSA efforts will be moved into the BA7 MOD CBRN IS program starting in FY22.

The CBRN IS program provides a collaborative Cloud hosted environment that allows users to collect and disseminate CBRN warning and reporting data, provide detailed CBRN hazard predictions, aid in decision support, and make relevant CBRN defense information available in near-real time. CBRN IS provides an environment that supports the implementation of Integrated Early Warning (IEW) capabilities that allow users to access netted sensor information, data fusion, disease modeling, biosurveillance data, source term estimation data, incident management tools, and planning and analysis capabilities. The CBRN IS enterprise makes CBRN decision aids readily accessible from any desktop through a web browser simplifying interoperability, reducing integration and deployment costs and increases cybersecurity protection. The BA7 CBRN IS program will be moved into the BA7 MOD CBRN IS program starting in FY22.

The MOD CBRN IS program allows for the management of the separate lines of effort which were CBRN IS, Joint Effects Model (JEM), Joint Warning and Reporting Network (JWARN) and the Software Support Activity (SSA) under one family of systems. MOD CBRN IS will provide for the continuous engineering and developmental efforts to modernize and conduct post production and deployment support to fielded CBRN software information systems and capabilities. This project supports software applications and information systems that help shape and inform the battlespace against CBRN threats. MOD CBRN IS encompasses the processes, procedures, people, material and information required to support and modernize fielded CBRN information systems and applications. Activities include: software code updates and modernization to correct deficiencies, comply with Joint and Service C2 system architectural changes, cybersecurity, test and evaluation, configuration management, software redistribution, documentation, and training.

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
Title: 1) Global-BSP Description: Modernization Efforts and Support	4.374	-	-
Title: 2) JEM 2 Description: Modernization Efforts	4.686	-	-
Title: 3) JWARN 2 Description: Modernization Effort	4.598	-	-
Title: 4) SSA	0.077	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) IS7 / Information Systems (Op Sys Dev)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
Description: SSA Policies, Standards and Guidelines				
Title: 5) SSA		0.092	-	-
Description: Integrated Architecture				
Title: 6) SSA		0.144	-	-
Description: Chemical, Biological, Radiological, Nuclear Data Model				
Title: 7) SSA		-	1.177	-
Description: Enterprise Services				
FY 2021 Plans: Support the Chemical Biological Radiological and Nuclear Defense (CBRND) enterprise through continuous engagement to assist with acquisition products for the modernization and sustainment of fielded products to ensure system compatibility, interoperability, and integration. Provide subject matter expertise in the areas of software development, network architecture, cybersecurity, information assurance, and standards and policies.				
FY 2021 to FY 2022 Increase/Decrease Statement: Program/project funding transferred to another funding line. Program funding transferred to BA7 in the MOD CBRN IS portfolio beginning in FY22.				
Title: 8) CBRN IS		1.802	2.057	-
Description: Modernization Efforts				
FY 2021 Plans: Continue to modernize fielded capabilities throughout the lifecycle of the program to ensure compatibility with Service architectures, cloud-hosted environments, and system security requirements. Continue to update system with new technology and capability sets ensuring compliance with cyber security and net centric policies.				
FY 2021 to FY 2022 Increase/Decrease Statement: Program/project funding transferred to another funding line. Program funding transferred to MOD CBRN IS portfolio beginning in FY22.				
Title: 9) MOD CBRN IS		-	-	15.281

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) IS7 / Information Systems (Op Sys Dev)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Description: CBRN Information Systems Modernization</p> <p>FY 2022 Plans: Perform management, preplanned product improvements and continuous engineering efforts to modernize currently fielded capabilities of JEM, JWARN and CBRN IS hosted on cloud and Joint Service Command and Control (C2) systems. Update host architectures, operating systems, cyber security requirements and NATO standards in order to maintain interoperability, efficiency and functionality and compliance. Continue Government developmental and operational testing on software updates and modernization efforts. Provide program/financial management, costing, contracting, scheduling and acquisition oversight. Provide product support for software redeployment and training to operational forces.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program/project funding transferred from another funding line. MOD CBRN IS combines CBRN IS, JEM, JWARN, and SSA under one program beginning FY22.</p>			
Accomplishments/Planned Programs Subtotals	15.773	3.234	15.281

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

N/A

Remarks

D. Acquisition Strategy

BIOSURVEILLANCE PORTAL (BSP)

The Global Biosurveillance Portal (G-BSP) program is using the SOFCIDS (Special Operations Capabilities Integration and Development System) requirements approach and the JROC IT Box acquisition construct which allows fielding of operational capabilities while continued R&D matures technology required for follow-on versions. IT Box enables programs to tailor the incrementally fielded software program model in the DODI 5000.02 to conduct multiple iterative fielding events in lieu of a single fielding event, and field products to the warfighter utilizing an incremental delivery approach. G-BSP will achieve Full Operational Capability in 2020. G-BSP will transition to Total Package Fielding in 2021-2022 prior to USSOCOM Sustainment beginning in FY23. In FY21 and beyond, the Defense-Wide Review (DWR) reduced this program for higher priorities.

JOINT EFFECTS MODEL (JEM)

JEM 2 acquisition utilizes Agile software development practices, employing the incrementally fielded software program model in the DODI 5000.02 to conduct multiple, more frequent fieldings in lieu of a single fielding event. As part of the strategy, an over-arching MS B was approved by the MDA. JEM Requirements Definition packages have been approved along with Capability Drops (CD) that define capability sets to be developed, tested, and fielded operationally. These CDs are additive in

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program	Date: May 2021
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Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) IS7 / Information Systems (Op Sys Dev)
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nature, increasing the total capability of JEM 2 that was originally scheduled to be completed in FY22. However, funding in FY21 and beyond was reduced through the Defense-Wide Review (DWR) and the program will be moved to sustainment in FY21 and managed through MOD CBRN IS beginning 1QFY22.

JOINT WARNING & REPORTING NETWORK (JWARN)

JWARN 2 acquisition utilizes Agile software development practices, employing the incrementally fielded software program model in the DODI 5000.02 to conduct multiple, more frequent fieldings in lieu of a single fielding event. As part of the strategy, an over-arching MS B and Build Decision for Requirements Definition Package 1 (RDP-1) were approved by the MDA in Q4 FY14. Subsequent RDPs have been approved along with Capability Drops (CD) that define capability sets to be developed, tested, and fielded operationally. These CDs are additive in nature, increasing the total capability of JWARN that was originally scheduled to be completed in FY22. However, funding in FY21 and beyond was reduced through the Defense-Wide Review (DWR) and the program will be moved to sustainment in FY21 and managed through SSA and MOD CBRN-IS beginning Q1FY22.

SOFTWARE SUPPORT ACTIVITY (SSA)

Software Support Activity (SSA) is a non-acquisition, service organization that provides professional subject matter expertise support throughout the CBDP Enterprise. These services are provided by government and contract personnel with expertise in software development, network architecture, cybersecurity, technology transitions, information assurance, and standards and policies compliance, and are provided throughout the lifecycle of programs within the CBDP portfolio. These efforts facilitate the efficient development, transition, fielding, modernization, and sustainment of interoperable and integrated CBRN capabilities. In FY22, SSA efforts will transition to Modernization CBRN Information Systems (MOD CBRN IS).

CBRN INFORMATION SYSTEMS

CBRN IS acquisition utilizes a Family-of-Systems (FoS) approach to align multiple capabilities to the CBRN-IS architecture and operational environment. CBRN IS leverages the concepts of CBRN Hazard Awareness and Understanding and DISA Enterprise Services to integrate current CBRN capabilities, and other information and intelligence services, applications, and systems to provide increased situational awareness and decision support to commanders for CBRN defense. The strategy supports the implementation of integrated early warning capabilities by incorporating mature science and technology products and emerging technologies from existing advanced technology demonstrations (ATD) and experimental capability demonstrations (ECD). CBRN IS utilizes the Agile software development process to provide for the spiral development and fielding of modular capability packages. CBRN IS will transition to MOD CBRN IS beginning 1QFY22.

MODERNIZATION CBRN INFORMATION SYSTEMS (MOD CBRN IS)

MOD CBRN IS combines CBRN IS, Joint CBRN Hazard Effects Modeling and Warning and reporting (JEM and JWARN) and the Software Support Activity under one portfolio. The acquisition strategy utilizes a managed portfolio approach to align multiple capabilities in support of modernization of CBRN Information Systems. MOD CBRN IS leverages the concepts of CBRN Hazard Awareness and Understanding and the DISA milCloud Enterprise Services to integrate current CBRN capabilities and intelligence services, applications, and systems to provide increased situational awareness and decision support to commanders for CBRN defense. This strategy

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)
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provides an integration platform and supports the implementation of Integrated Early Warning (IEW) and other emerging technologies from advanced technology demonstrations (ATD) and experimental capability demonstrations (ECD). MOD CBRN IS provides for the continuous engineering and modernization of fielded information systems for Joint CBRN Hazard Effects Modeling and Warning and Reporting. MOD CBRN IS utilizes the Agile software development, IT Box and DOD Software Acquisition Pathway to provide for the continuous spiral development, and fielding of modular capability packages.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) IS7 / Information Systems (Op Sys Dev)
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
BSP - SW S - Global-BSP Modernization	MIPR	Various : Various	4.091	2.904	Dec 2019	0.000		0.000		0.000		0.000	0.000	6.995	0.000
JEM - SW S - Increment 2 - Modernization	C/CPAF	General Dynamics Information Technologies : Fairfax, VA	11.127	2.532	Jan 2020	0.000		0.000		0.000		0.000	0.000	13.659	0.000
JWARN - 1-SW S- Modernization	C/CPAF	DCS Corps : Alexandria, VA	0.000	0.601	Dec 2019	0.000		0.000		0.000		0.000	0.000	0.601	0.000
JWARN - 2- SW S - Modernization Follow-On	C/CPAF	DCS Corps : Alexandria, VA	2.361	2.589	Dec 2019	0.000		0.000		0.000		0.000	0.000	4.950	0.000
SSA - SW S - Development Services	MIPR	Space and Naval Warfare (SPAWAR) Systems Center : San Diego, CA	4.091	0.144	Feb 2020	0.529	Feb 2021	0.000		0.000		0.000	0.000	4.764	0.000
MOD CBRN IS - SW S - MOD CBRN IS- Modernization	Various	Various : Various	0.000	0.000		0.000		10.868	Oct 2021	0.000		10.868	0.000	10.868	0.000
Subtotal			21.670	8.770		0.529		10.868		0.000		10.868	0.000	41.837	N/A

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
BSP - ILS C - Training and Logistics Support	Various	Various : Various	0.234	1.162	Dec 2019	0.000		0.000		0.000		0.000	0.000	1.396	0.000
JEM - ILS C - Training and Logistics Support	Various	Various : Various	1.009	1.675	Dec 2019	0.000		0.000		0.000		0.000	0.000	2.684	0.000
JWARN - 1&2 - ES S - Modernization	MIPR	Various : Various	1.211	0.704	Oct 2019	0.000		0.000		0.000		0.000	0.000	1.915	0.000
SSA - TD/D C - Information Assurance Activities	MIPR	Space and Naval Warfare (SPAWAR) Systems Center : San Diego, CA	3.875	0.134	Feb 2020	0.494	Feb 2021	0.000		0.000		0.000	0.000	4.503	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) IS7 / Information Systems (Op Sys Dev)
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Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CBRN IS - ES S - milCloud support	MIPR	Various : Various	2.543	1.802	Dec 2019	2.057	Dec 2020	0.000		0.000		0.000	0.000	6.402	0.000
MOD CBRN IS - ES S - MOD CBRN IS- milCloud Support	MIPR	Various : Various	0.000	0.000		0.000		1.977	Oct 2021	0.000		1.977	0.000	1.977	0.000
Subtotal			8.872	5.477		2.551		1.977		0.000		1.977	0.000	18.877	N/A

Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
JWARN - 1- OTE S - FOT&E	MIPR	Various : Various	4.581	0.050	Nov 2019	0.000		0.000		0.000		0.000	0.000	4.631	0.000
JWARN - 2- OTE S	MIPR	Various : Various	1.019	0.185	Dec 2019	0.000		0.000		0.000		0.000	0.000	1.204	0.000
MOD CBRN IS - OTH S - MOD CBRN IS - System Testing	MIPR	Various : Various	0.000	0.000		0.000		0.803	Oct 2021	0.000		0.803	0.000	0.803	0.000
Subtotal			5.600	0.235		0.000		0.803		0.000		0.803	0.000	6.638	N/A

Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
BSP - PM/MS C - Program Management Support	Various	Various : Various	0.000	0.308	Dec 2019	0.000		0.000		0.000		0.000	0.000	0.308	0.000
JEM - PM/MS C - Program Management Support	Various	Various : Various	0.415	0.479	Dec 2019	0.000		0.000		0.000		0.000	0.000	0.894	0.000
JWARN - PM/MS S - Program management	MIPR	Various : Various	2.565	0.469	Dec 2019	0.000		0.000		0.000		0.000	0.000	3.034	0.000
SSA - PM/MS C - Program Management Support	Various	Various : Various	0.133	0.035	Feb 2020	0.154	Feb 2021	0.000		0.000		0.000	0.000	0.322	0.000

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) IS7 / Information Systems (Op Sys Dev)
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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
JEM Increment 2 - RDP 4 Approval					■																							
JEM Increment 2 - FD 4 USMC			■																									
JEM Increment 2 - Govt DT / OT / V&V	■	■	■	■																								
JWARN Increment 2 - Govt DT / OT / UFEs / OAs / FOTs	■	■	■	■																								
JWARN Increment 2 - Modernization and Update	■	■	■	■																								
JWARN Increment 2 - Product Development	■	■	■	■																								
SSA - Provide Information Assurance Site Compliance Testing	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
SSA - Provide Integration and Test, M&S, VV&A Certification and Accreditation	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
SSA - Provide Enterprise Architecture Products and Services	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
SSA - Provide Information Assurance Certification/Acceptance products/services, including compliance testing	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
SSA - Provide Modeling, Simulation, VV&A, Integration/Test support and interoperability demonstrations.	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
SSA - Sustain Common Components products, process and services	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
SSA - Develop and provide CBRN Data Model implementation guidance, including reference implementations	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
SSA - Provide CBRN Interface Standards, including reference implementations, e.g. Common CBRN Sensor Interface	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) IS7 / Information Systems (Op Sys Dev)

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
JEM Increment 2 - RDP 4 Approval	1	2021	1	2021
JEM Increment 2 - FD 4 USMC	3	2020	3	2020
JEM Increment 2 - Govt DT / OT / V&V	1	2020	4	2020
JWARN Increment 2 - Govt DT / OT / UFEs / OAs / FOTs	1	2020	4	2020
JWARN Increment 2 - Modernization and Update	1	2020	4	2020
JWARN Increment 2 - Product Development	1	2020	3	2020
SSA - Provide Information Assurance Site Compliance Testing	1	2020	4	2021
SSA - Provide Integration and Test, M&S, VV&A Certification and Accreditation	1	2020	4	2021
SSA - Provide Enterprise Architecture Products and Services	1	2020	4	2021
SSA - Provide Information Assurance Certification/Acceptance products/services, including compliance testing	1	2020	4	2021
SSA - Provide Modeling, Simulation, VV&A, Integration/Test support and interoperability demonstrations.	1	2020	4	2021
SSA - Sustain Common Components products, process and services	1	2020	4	2021
SSA - Develop and provide CBRN Data Model implementation guidance, including reference implementations	1	2020	4	2021
SSA - Provide CBRN Interface Standards, including reference implementations, e.g. Common CBRN Sensor Interface	1	2020	4	2021
CBRN IS - Product Development	1	2020	4	2021
CBRN IS - Operational Assessments	1	2020	4	2021
CBRN IS - Total Package Fielding	1	2020	4	2021
MOD CBRN IS - Modernization	1	2022	4	2026
MOD CBRN IS - MOD CBIRN IS- Continuous Engineering/SW Codes Updates	1	2022	4	2026

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) IS7 / Information Systems (Op Sys Dev)
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Events	Start		End	
	Quarter	Year	Quarter	Year
MOD CBRN IS - Cyber Security Compliance	1	2022	4	2026
MOD CBRN IS - Operating system architecture updates	1	2022	4	2026
MOD CBRN IS - Configuration Management and Test and Evaluation	1	2022	4	2026
MOD CBRN IS - Validation, Verification and Accreditation	1	2022	4	2026

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 7					R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)				Project (Number/Name) MB7 / Medical Biological Defense (Op Sys Dev)			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
MB7: Medical Biological Defense (Op Sys Dev)	-	2.663	2.308	3.833	-	3.833	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The project supports technology refresh of fielded medical diagnostic systems and associated capabilities (e.g., assays) that contribute to the layered medical defenses against biological warfare agent threats facing U.S. Forces in the field. As well as, the upgrade and modernization of fielded medical nerve agent treatment system that contribute to the layered medical defenses against chemical warfare agent threats facing U.S. Forces in the field.

Efforts in this project include:

- (1) Modernization Medical (MOD MED)
- (2) Next Generation Diagnostic System (NGDS)

The MOD MED program supports improvements to fielded systems and supports post-fielding FDA requirements for devices and combination products. In FY22 two programs transition to MOD MED; (1) Alternative Autoinjector Manufacturer Capability (AUTOINJ) and (2) Next Generation Diagnostic System (NGDS). In FY22, program efforts include FDA required post-marketing commitments and requirements for combination products (AUTOINJ) and system hardware and software upgrades for fielded NGDS that are required to maintain the capability for CBR threat and infectious disease identification and FDA-cleared diagnostics in order to inform individual patient treatment and CBR situational awareness and disease surveillance.

The NGDS program is a family of systems providing increments of diagnostic capabilities over time that address varied chemical, biological, and radiological (CBR) threats across the different echelons of the Combat Health Support System. The mission of the NGDS is to provide CBR threat and infectious disease identification and Food and Drug Administration (FDA) cleared diagnostics to inform individual patient treatment and CBR situational awareness and disease surveillance. NGDS 1 provides deployable and laboratory-based combat health support units with FDA cleared biological warfare agent (BWA) and infectious disease in vitro diagnostic (IVD) assays on an existing commercial diagnostic device with a well-established FDA regulatory history and pipeline of commercial non-BWA infectious disease diagnostic tests. In FY22, NGDS program efforts will be moved to the MOD MED (Project MB7) program.

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

	FY 2020	FY 2021	FY 2022
Title: 1) NGDS 1	2.663	2.308	-
Description: System Upgrades & Support			
FY 2021 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021		
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) MB7 / Medical Biological Defense (Op Sys Dev)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
Continue development of additional assays and sample validation protocols. Continue annual cyber security updates and management of hardware and software configurations. FY 2021 to FY 2022 Increase/Decrease Statement: Program/project funding transferred to another funding line.				
Title: 2) MOD MED (NGDS 1) - System Upgrades & Support Description: System Upgrades & Support FY 2022 Plans: Continue development of additional assays and sample validation protocols. Continue annual cyber security updates and management of hardware and software configurations. FY 2021 to FY 2022 Increase/Decrease Statement: Program/project funding transferred from another funding line. NGDS 1 (MB7) will transition to MOD MED (MB7) starting in FY22.		-	-	2.204
Title: 3) MOD MED (AUTOINJ) - Post Marketing Commitments Description: Initiate Food and Drug Administration (FDA) Post-Marketing Commitments FY 2022 Plans: Initiate Food and Drug Administration (FDA) Post-Marketing Commitments. FY 2021 to FY 2022 Increase/Decrease Statement: Program/project funding transferred from another funding line. AUTOINJ (MC7) will transition to MOD MED (MB7) starting in FY22.		-	-	1.279
Title: 4) MOD MED (AUTOINJ) - Regulatory Description: Regulatory Activities FY 2022 Plans: Initiate Regulatory Support for Army Office of the Surgeon General (OTSG)-sponsored fielded products. FY 2021 to FY 2022 Increase/Decrease Statement: Program/project funding transferred from another funding line. AUTOINJ (MC7) will transition to MOD MED (MB7) starting in FY22.		-	-	0.350
Accomplishments/Planned Programs Subtotals		2.663	2.308	3.833

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program	Date: May 2021
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Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)</i>	Project (Number/Name) MB7 / <i>Medical Biological Defense (Op Sys Dev)</i>
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C. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

D. Acquisition Strategy
NEXT GENERATION DIAGNOSTICS SYSTEM (NGDS)

The NGDS 1 program was a MS A to MS C - acquisition strategy, with MS C approval granted in Dec 2016. NGDS 1 replaces the legacy Joint Biological Agent Identification and Diagnostic System (JBAIDS). NGDS 1 Full Rate Production was approved in Aug 2018.

NGDS 2 will employ a family of systems approach to bridge identified capability gaps for man-portable diagnostics, immunoassay diagnostics, and chemical diagnostics systems. NGDS 2 continued the technology maturation and risk reduction of a man-portable diagnostic capability in FY18 and transitioned to engineering and manufacturing development phase in FY19. NGDS 2 initiated prototyping of a chemical diagnostic capability in FY18. Separate decisions will be utilized to proceed with further development and production for each capability, based on individual determinations of technology maturity to meet user requirements. Development efforts are cost-plus awards using Other Transactions Authority (OTA) agreements to take advantage of nontraditional Defense contractor offerings. NGDS 2 will transition into NGDS 2 CHEMDx and NGDS 2 MPDS starting in FY21.

MODERNIZATION MEDICAL (MOD MED)

Next Generation Diagnostic System (NGDS)

For the Next Generation Diagnostic Systems (NGDS), MOD MED will continue to ensure system upgrades for both hardware and software track to latest updates for commercial systems from original equipment manufacturer. MOD MED will also fund development of new assays (i.e. tests) for fielded systems, to address emerging biological threats and diseases.

Alternative Autoinjector Manufacturer Capability (AUTOINJ)

The Alternative Autoinjector Manufacturer Capability (AUTOINJ) will identify an alternative source(s) to develop and provide required Food and Drug Administration (FDA) approved autoinjector delivered nerve agent antidote and treatment capabilities to the Department of Defense (DoD). Currently, a single DoD source provides all of these capabilities. The AUTOINJ effort leverages novel technologies and industrial base expansion in order to develop the autoinjector products. AUTOINJ uses contracts and Other Transactional Agreements (OTAs) in which the performer shall be responsible for conducting development and testing activities consistent with current FDA regulations. The contractor shall sponsor the drug to the FDA and hold all approvals and/or licenses. Upon FDA approval, purchases for product sustainment will be made by the Defense Logistics Agency. AUTOINJ (MC7) Post marketing commitments and requirements are anticipated as a result of the FDA approval and will be the responsibility of the contractor and the government. AUTOINJ (MC7) will transition to Modern Medicine (MOD MED) MB7 in FY22. Currently fielded Office of the Surgeon General (OTSG) sponsored nerve agent antidote treatment systems require OTSG involvement for maintaining regulatory files and FDA reporting activities.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) MB7 / Medical Biological Defense (Op Sys Dev)
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
NGDS - NGDS 1 - HW C - Assay Development	C/CPFF	BioFire Dx : Salt Lake City, UT	16.835	0.698	Dec 2019	0.400	Dec 2020	0.000		0.000		0.000	0.000	17.933	0.000
NGDS - HW C - Assay Development	MIPR	Battelle Memorial Institute : Aberdeen, MD	0.952	0.000		0.127	Dec 2020	0.000		0.000		0.000	0.000	1.079	0.000
NGDS - HW C - Assay Development #2	MIPR	Various : Various	1.022	0.000		0.150	Dec 2020	0.000		0.000		0.000	0.000	1.172	0.000
MOD MED - Autoinjector - Regulatory	MIPR	USAMRMC - Office of Regulated Activities (ORA) : Ft. Detrick, MD	0.000	0.000		0.000		0.319	Dec 2021	0.000		0.319	0.000	0.319	0.000
MOD MED - HW C - Assay Development	C/CPFF	BioFire Dx : Salt Lake City, UT	0.000	0.000		0.000		0.628	Dec 2021	0.000		0.628	0.000	0.628	0.000
MOD MED - Autoinjector - Post Marketing Commitments	C/CPFF	Emergent Biosolutions : Gaithersburg/ Rockville, MD	0.000	0.000		0.000		1.025	Dec 2021	0.000		1.025	0.000	1.025	0.000
Subtotal			18.809	0.698		0.677		1.972		0.000		1.972	0.000	22.156	N/A

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
NGDS - ES S - Engineering Support	MIPR	Various : Various	2.226	0.000		0.058	Mar 2021	0.000		0.000		0.000	0.000	2.284	0.000
NGDS - ES S - Engineering Support #2	C/CPFF	BioFire Dx : Salt Lake City, UT	0.727	0.215	Jun 2020	0.192	Dec 2020	0.000		0.000		0.000	0.000	1.134	0.000
Subtotal			2.953	0.215		0.250		0.000		0.000		0.000	0.000	3.418	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) MB7 / Medical Biological Defense (Op Sys Dev)
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Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
NGDS - DTE S - Test & Evaluation Support	MIPR	Various : Various	5.699	0.415	Jun 2020	0.000		0.000		0.000		0.000	0.000	6.114	0.000
Subtotal			5.699	0.415		0.000		0.000		0.000		0.000	0.000	6.114	N/A

Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
NGDS - PM/MS S - Program Management (JPM) Support	Various	JPM CBRN Medical : Ft. Detrick, MD	6.938	0.239	Dec 2019	0.236	Dec 2020	0.000		0.000		0.000	0.000	7.413	0.000
NGDS - PM/MS C - Program Management (Dx) Support	MIPR	Edgewood Chemical Biological Center (ECBC) : Aberdeen Proving Ground, MD	0.780	0.000		0.240	Dec 2020	0.000		0.000		0.000	0.000	1.020	0.000
NGDS - PM/MS S - Program Management (Dx)	Various	JPM CBRN Medical : Ft. Detrick, MD	5.854	0.861	Dec 2019	0.597	Dec 2020	0.000		0.000		0.000	0.000	7.312	0.000
NGDS - PM/MS C - PM/MS - Program Management (JPEO) Support	Various	JPEO Chem/Bio Defense (JPEO-CBD) : Aberdeen Proving Ground, MD	1.147	0.235	Dec 2019	0.308	Dec 2020	0.000		0.000		0.000	0.000	1.690	0.000
MOD MED - PM/MS C - Program Management (JPEO)	Various	JPEO Chem : Bio, Rad, and Nuc Defense (JPEO-CBRND)	0.000	0.000		0.000		0.402	Dec 2021	0.000		0.402	0.000	0.402	0.000
MOD MED - PM/MS C - Program Management (JPM) Support	Various	JPM CBRN Medical : Ft. Detrick, MD	0.000	0.000		0.000		0.268	Dec 2021	0.000		0.268	0.000	0.268	0.000
MOD MED - PM/MS C - Product Management	Various	JPM CBRN Medical : Ft. Detrick, MD	0.000	0.000		0.000		1.191	Dec 2021	0.000		1.191	0.000	1.191	0.000
Subtotal			14.719	1.335		1.381		1.861		0.000		1.861	0.000	19.296	N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) MB7 / Medical Biological Defense (Op Sys Dev)

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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

NGDS - System Upgrades & Support	[REDACTED]																											
MOD MED - Autoinjector Regulatory Activities	[REDACTED]																											
MOD MED - Autoinjector Post Marketing Commitments	[REDACTED]																											
MOD MED - NGDS System Upgrades & Support	[REDACTED]																											

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) MB7 / Medical Biological Defense (Op Sys Dev)

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
NGDS - System Upgrades & Support	1	2020	4	2021
MOD MED - Autoinjector Regulatory Activities	1	2022	4	2026
MOD MED - Autoinjector Post Marketing Commitments	4	2022	4	2025
MOD MED - NGDS System Upgrades & Support	1	2022	4	2026

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) MC7 / Medical Chemical Defense (Op Sys Dev)
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
MC7: Medical Chemical Defense (Op Sys Dev)	-	1.222	1.817	1.336	-	1.336	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

This project provides for the upgrade and modernization of fielded medical nerve agent treatment system that contribute to the layered medical defenses against chemical warfare agent threats facing U.S. Forces in the field.

The effort included in this project are:

- (1) Alternative Autoinjector Manufacturer Capability (AUTOINJ)
- (2) Improved Nerve Agent Treatment System (INATS), and
- (3) Improved Nerve Agent Treatment System Centrally Acting (INATS CA)

The AUTOINJ program provides for FDA approved alternative source(s) for autoinjectors that deliver DoD nerve agent antidote and treatment capabilities to the warfighter; thereby mitigating capability fielding and operational readiness risks. This program augments legacy autoinjectors, ATNAA, 2-PAM, and Convulsant Antidote for Nerve Agents (CANAs) by providing alternative commercial sources which include Dual Drug Delivery Device (D4), the Atropine Auto-Injector, and an anti-convulsant autoinjector. This program also provides enduring regulatory support for fielded nerve agent antidote treatment systems sponsored by Army Office of the Surgeon General (OTSG). AUTOINJ (MC7) will transition to Modernization Medical (MOD MED) MB7 starting in FY22.

The INATS - Soman Nerve Agent Pre-Treatment Pyridostigmine (SNAPP) program is a modernization effort for pyridostigmine bromide (PB) tablet requirements from the joint service users for the Food and Drug Administration (FDA) approved SNAPP product. Funding ends in FY20. Effort will continue in FY21 as INATS CA.

The INATS CA program provides a Centrally Acting anticholinergic agent to increase survivability and decrease morbidity after exposure to toxic nerve agent threats. Scopolamine was selected for development after an extensive analysis of alternatives and review of data by the Science and Technology community. Added to the currently fielded system, the INATS-CA program will improve overall medical outcomes and will be utilized as both a vial for use at definitive care and a stand-alone auto-injector for use in the field. In FY22 INATS CA continues studies on the FDA-approved Soman Nerve Agent Pretreatment Pyridostigmine (SNAPP), a medical pre-treatment against nerve agent poisoning to upgrade its joint service utility and ensure its continued safety and efficacy.

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

	FY 2020	FY 2021	FY 2022
Title: 1) Alternative Autoinjector Manufacturer Capability (AUTOINJ)	-	0.200	-
Description: Food and Drug Administration (FDA) Post-Marketing Commitments			

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) MC7 / Medical Chemical Defense (Op Sys Dev)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>FY 2021 Plans: Initiate Post-Marketing Commitments</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Program/project funding transferred to another funding line. Post-Marketing Commitments and Regulatory Activities are moving to the MOD MED (MB7) line.</p>			
<p>Title: 2) INATS</p> <p>Description: SNAPP - Shelf Life Modernization - Studies required by the FDA and/or users to modernize or upgrade medical chemical defense countermeasures.</p>	1.222	-	-
<p>Title: 3) INATS - CA</p> <p>Description: Studies required by the FDA and/or users to modernize or upgrade medical chemical defense countermeasures.</p> <p>FY 2021 Plans: Continue studies (from INATS FY20) on the FDA-approved Soman Nerve agent Pretreatment Pyridostigmine (SNAPP), a Pyridostigmine Bromide (PB) medical pre-treatment against nerve agent poisoning to upgrade its joint service utility and ensure its continued safety and efficacy.</p> <p>FY 2022 Plans: Continue studies on the FDA-approved Soman Nerve Agent Pretreatment Pyridostigmine (SNAPP), a Pyridostigmine Bromide (PB) medical pre-treatment against nerve agent poisoning to upgrade its joint service utility and ensure its continued safety and efficacy.</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Minor change due to routine program adjustments. Due to OTA agreement, number of samples required decreased.</p>	-	1.617	1.336
Accomplishments/Planned Programs Subtotals	1.222	1.817	1.336

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

N/A

Remarks

D. Acquisition Strategy

ALTERNATE AUTOINJECTOR MANUFACTURER CAPABILITY (AUTOINJ)

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program	Date: May 2021
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Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)
0400 / 7	PE 0607384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)</i>	MC7 / <i>Medical Chemical Defense (Op Sys Dev)</i>

The Alternative Autoinjector Manufacturer Capability (AUTOINJ) post marketing commitments and requirements are anticipated as a result of the FDA approval and will be the responsibility of the contractor and the government. However, currently fielded Office of the Surgeon General (OTSG) sponsored nerve agent antidote treatment systems require Office of the Surgeon General (OTSG) involvement for maintaining regulatory files and FDA reporting activities. AUTOINJ will transition to the Modern Medical (MOD MED) program in Project MB7 in FY22.

IMPROVED NERVE AGENT TREATMENT SYSTEM (INATS)

The INATS (MC7) line initiates in FY20 and transitions to INATS Centrally Acting (CA) (MC7) in FY21. Oxime advanced development ceases in FY20 due to Defense Wide Review (DWR) and Limitation of Funds referenced in ADM 24 March 2020.

IMPROVED NERVE AGENT TREATMENT CENTRALLY ACTING (INATS CA)

In the Technology Maturation and Risk Reduction (TM&RR) phase, close collaborations will occur with the science/ technology, and user communities to assess technical viability, capability delivery options, and to refine operational concepts; the Government will be the systems integrator overseeing the conduct of centrally acting formulation development efforts, nonclinical toxicology and efficacy studies and clinical safety studies. In the Engineering and Manufacturing Development (EMD) phase, the Government will engage with commercial partner(s) to ensure that development and manufacture is in accordance with Food and Drug Administration (FDA) regulations.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) MC7 / Medical Chemical Defense (Op Sys Dev)
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
AUTOINJ - Regulatory Support	MIPR	USAMRMC - Office of Regulated Activities (ORA) : Ft. Detrick, MD	0.000	0.000		0.200	Dec 2020	0.000		0.000		0.000	0.000	0.200	0.000
INATS - HW C - Shelf Life Modernization	Various	CMC Pharma : Cleveland, OH	0.000	0.940	Aug 2020	0.000		0.000		0.000		0.000	0.000	0.940	0.000
INATS CA - HW C - Shelf Life Modernization	C/CPFF	CMC Pharma : Cleveland, OH	0.000	0.000		1.322	Aug 2020	1.148	Oct 2021	0.000		1.148	0.000	2.470	0.000
Subtotal			0.000	0.940		1.522		1.148		0.000		1.148	0.000	3.610	N/A

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
INATS - ES C - Office of Regulated Activities Support - (ORA)	MIPR	USAMRMC - Office of Regulated Activities (ORA) : Ft. Detrick, MD	0.000	0.156	Feb 2020	0.000		0.000		0.000		0.000	0.000	0.156	0.000
Subtotal			0.000	0.156		0.000		0.000		0.000		0.000	0.000	0.156	N/A

Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
INATS - Program Management (JPEO) Support	Various	JPEO Chem : Bio, Rad, and Nuc Defense (JPEO-CBRND)	0.000	0.091	Dec 2019	0.000		0.000		0.000		0.000	0.000	0.091	0.000
INATS - Program Management - (JPM) Support	MIPR	JPM CBRN Medical : JPEO-CBRND, Fort Detrick, MD	0.000	0.035	May 2020	0.000		0.000		0.000		0.000	0.000	0.035	0.000

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) MC7 / Medical Chemical Defense (Op Sys Dev)

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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
AUTOINJ - Regulatory Activities																												
INATS - SNAPP Shelf-Life Modernization																												
INATS CA - SNAPP Shelf Life Modernization																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Chemical and Biological Defense Program		Date: May 2021
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / <i>CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)</i>	Project (Number/Name) MC7 / <i>Medical Chemical Defense (Op Sys Dev)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
AUTOINJ - Regulatory Activities	1	2021	4	2021
INATS - SNAPP Shelf-Life Modernization	2	2020	4	2020
INATS CA - SNAPP Shelf Life Modernization	1	2021	4	2026

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Chemical and Biological Defense Program **Date:** May 2021

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607384BP / CHEMICAL/BIOLOGICAL DEFENSE (OP SYS DEV)	Project (Number/Name) TE7 / Test & Evaluation (Op Sys Dev)
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
TE7: Test & Evaluation (Op Sys Dev)	-	5.280	0.000	0.000	-	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

This Project supports the revitalization of existing instrumentation and technology upgrades to equipment in support of their Chemical and Biological (CB) test mission. Included in this Project is the BioTesting Division (BTD) Chemical Biological Center (CBC) at Dugway Proving Ground (DPG), a Major Range and Test Facility Base (MRTFB) and the West Desert Test Center (WDTC).

Efforts included in the project are:

- (1) BioTesting Division T&E Upgrade (BTD UPGRADE), and
- (2) T&E Upgrades (T&E UPGRADE)

The BTD UPGRADE program supported the MRTFB test mission of the BioTesting Division (BTD) Chemical Biological Center (CBC) at DPG through instrumentation revitalization and technology upgrades to aging and obsolete equipment. These efforts maintained readiness at BTD, which is the MRTFB's only laboratory equipped to test with biological select agent and toxins (BSAT) and microorganisms up to Risk Group 3 under operationally relevant conditions. BTD test mission requires cutting-edge biological laboratory and field testing capabilities to ensure the ability of the Department of Defense to test state-of-the-art materiel under development against emerging and unknown biological threats. Essential instrumentation requires periodic revitalization and modernization due to technological obsolescence.

The T&E Upgrade program supported upgrades to equipment for field testing, the major test chambers Materiel Test Facility (MTF), and the Combined Chemical Test Facility (CCTF). Field test equipment includes all dissemination and field referee equipment and will include all upgraded test grid equipment transitioned from advanced development. The MTF houses chambers and fixtures for chemical agent and non-traditional agent (NTA) testing, including the secondary containment modules (SCMs) and chemical agent vapor (CAVs) chambers. The Combined Chemical Test Facility (CCTF) is a laboratory campus that houses labs and chambers for chemical agent and non-traditional agent testing. Laboratories are equipped with chemical analytical equipment, including a nuclear magnetic resonance (NMR) spectrometer, gas chromatographs (GC), GC-mass spectrometers (GC-MS), MS triple quads, Miniature Chemical Agent Monitoring System (MINICAMS), and liquid chromatographs MS (LCMS). The majority of the laboratory hood space at WDTC is in the CCTF. The CCTF houses test fixtures such as the small item decontamination (SID) fixture, mask, boot and glove, filter and swatch test fixtures.

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

	FY 2020	FY 2021	FY 2022
Title: 1) BTD UPGRADE	0.731	-	-
Title: 2) WDTC - MRTFB	0.977	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
Description: Major Test Chambers (MTF and Building 4165)			
Title: 3) WDTC - MRTFB	1.108	-	-
Description: CB Test Grid			
Title: 4) WDTC - MRTFB	2.464	-	-
Description: Combined Chemical Test Facility (CCTF)			
Accomplishments/Planned Programs Subtotals	5.280	-	-

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

N/A

Remarks

D. Acquisition Strategy

BIO TEST BRANCH T&E UPGRADE (BTB UPGRADE)

The BioTesting Division Test and Evaluation Range Instrumentation/Technology Upgrades program provided for technical upgrades to BioTesting Division (Chemical Biological Center) capabilities for Biological testing of DoD CB materiel, and biological detection systems from concept through production. Technical and Facility upgrades utilized full and open competition as appropriate through Mission Installation Contracting Command, Army Contracting Command, Military Interdepartmental Purchase Requests, and other procurement resources. In FY21 and beyond, the Defense-Wide Review (DWR) reduced this program, within the Chemical Biological Defense Program (CBDP), for higher priorities.

T&E RANGE INSTRUMENT/TECH UPGRADE (T&E UPGRADE)

The Test and Evaluation Range Instrumentation/Technology Upgrades program provides for technical upgrades to WDTC capabilities for Chemical and Biological testing of DoD CB materiel, weapons, and weapons systems from concept through production. Upgrades will utilize Military Interdepartmental Purchase Requests (MIPR) and contracts. In FY21 and beyond, the Defense-Wide Review (DWR) reduced this program, within the Chemical Biological Defense Program (CBDP), for higher priorities.

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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
BTB UPGRADE - LSTF Instrumentation & Equip Upgrades, CBC	1	2020	4	2020
T&E UPGRAD - Modernization of Major Test Chambers, WDTC	1	2020	4	2020
T&E UPGRAD - Revitalize & Upgrade Instrumentation & Equipment at Combined Chemical Test Facility, WDTC	1	2020	4	2020
T&E UPGRAD - Enhance Instrumentation & Equipment at Chemical Biological (CB) Test Grids, WDTC	1	2020	4	2020