The Department of Defense Chemical and Biological Defense

ANNUAL REPORT TO CONGRESS

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Executive Summary

The 2019 DoD Chemical and Biological Defense Annual Report to Congress provides the required annual assessment—pursuant to Section 1523, Title 50 United States Code—of the overall readiness of the DoD to fight and win in a chemical-biological (CB) warfare environment during the 2018 Fiscal Year (FY). The threat posed by chemical, biological, radiological, and nuclear (CBRN) weapons is real, evolving, and remains a relevant challenge for the Warfighter and Homeland. The proliferation of knowledge and technology, increased ease of access, challenges to detecting illicit activity, emerging threats, improved delivery capabilities, and our limited ability to anticipate how adversaries might employ Weapons of Mass Destruction (WMD) all heighten the risk of attacks against the U.S. or its allies.

This year, the United Kingdom witnessed the nature and challenge of some of these threats with the Novichok chemical poisoning in Salisbury. In the heart of Africa, we see the continual challenge from the infectious nature of the Ebola virus and remain concerned about its potential for nefarious use. At the same time, we must remain vigilant in preparing and responding to threats from State actors. Advances in biotechnology and the expanding opioid crisis present new threats. We must remain flexible and prepared to address all of these threats, whether known or anticipated.

Airmen perform seal checks on their protective masks at Moody Air Force Base, GA., February 1, 2018, during a CBRN defense class. Air Force photo by Airman Eugene Oliver.

The 2018 National Defense Strategy (NDS) recognizes the threat of WMD within the spectrum of defense challenges and prioritizes efforts to prevent the proliferation of WMD materials, defend the Homeland from WMD threats, manage the consequences of WMD attacks, and develop ways to detect, protect from, and mitigate the effects of emerging threats. The NDS outlines three lines of effort (LOE) to achieve strategic objectives. These LOE include lethality/readiness, partnerships, and reform. Key Departmental CBRN defense activities aligned to these LOE include:

LOE1: Lethality/Readiness

The priority for resources across the Department of Defense (DoD) continues to be on investing in the highest identified operational risk areas and addressing the Services' priority capabilities; for the Chemical and Biological Defense Program (CBDP), this translates to enabling operations through the challenges of a WMD event. In Fiscal Year (FY) 2018, the Army and the Air Force requested and received Congressional approval to address gaps and accelerate modernization for the Pacific theater. These efforts ensure U.S. Forces on the Korean peninsula and Japan are well positioned and ready to address any challenges they may face. The Services also increased the frequency of CBRN defense training, improved training scenarios to align with the NDS, and

developed logistics chain enhancements to sustain a higher level of readiness. Comprehensively, these efforts and resources improved readiness across the Joint Force to operate in a CBRN contaminated environment.

LOE2: Partnerships

This year we provided technical expertise, at the request of allied partners, in response to chemical attacks and regional biological outbreaks. In March and July of 2018, U.S. experts went to the United Kingdom in response to Novichok use. In June of 2018, a team deployed to the Democratic Republic of the Congo to aid with genetic sequencing of the Ebola virus during the recent outbreak. Additionally, the Department is funding a clinical trial capability in Uganda for the use of a CBDP-funded therapeutic should the outbreak spread. These efforts continue to support and build established partnerships while simultaneously improving outcomes and capabilities for the U.S. Government.

Soldiers participate in simulated decontamination operations with mock casualties during a joint training exercise with Miami-Dade County first responders in Miami, FL on January. 11, 2018. The soldiers are assigned to the 414th Chemical Company. Army photo by SPC P.J. Siquig.

LOE3: Reform

For medical prophylaxis, pretreatments, post-exposure prophylaxis, diagnostics, and therapeutics, the Department is using recent legislative changes to expedite delivery of medical products to the military via enhanced collaboration with the Food and Drug Administration (FDA). Additionally, the Department is leveraging acquisition reform efforts, and in 2018 established an Other Transactional Authority (OTA) contract vehicle with the Countering Weapons of Mass Destruction (CWMD) Consortium. This OTA allows the Department of Defense (DoD) and interagency partners to leverage academia and industry with a focus on enhancing CBRN detection, protection, and prevention capabilities.

The Department continues its efforts to address the challenge of CBRN threats and to improve capabilities to prepare for, prevent, protect, respond to, mitigate, and recover from WMD use and effects. These actions are critical enablers in supporting the overall readiness and lethality of the Joint Force, allowing them to execute assigned missions in any corner of the globe.

Table of Contents

Introduction

The threat posed by chemical, biological, radiological, and nuclear (CBRN) weapons remains real and evolving. The Department of Defense (DoD) must be prepared to operate in the most complex and threatening environment since the end of the Cold War. The current environment is fueled by an eroding adherence to protocols regarding chemical weapons use, knowledge proliferation in the areas of advanced biotechnology and unmanned systems, and a diminishing distinction between chemical and biological threats.

The 2017 National Security Strategy underscores the importance of defending against Weapons of Mass Destruction (WMD). Likewise, the 2018 National Defense Strategy (NDS) places an emphasis on reducing and disrupting WMD threats and countering their proliferation. In 2018, the publication of the National Biodefense Strategy (NBS) and the National Strategy for Countering Weapons of Mass Destruction Terrorism continued to identify the importance of WMD threats. Specifically, the NBS highlighted that "Biological threats – whether naturally occurring, accidental, or deliberate in origin – are among the most serious threats facing the United States (U.S.) and the international community."

The 2019 DoD Chemical and Biological Defense Annual Report to Congress provides the required annual assessment—pursuant to Section 1523, Title 50 United States Code—of the overall readiness of the DoD to fight and win in a chemical-biological (CB) warfare environment during the 2018 Fiscal Year (FY). The Department continues to improve the readiness of the Joint Force through focused training and fielding of enhanced capabilities. At the same time, we continue to focus our modernization activities on emerging threats from State and non-State actors to ensure that we are prepared for the future.

Readiness of the Joint Force to Fight in a Chemical-Biological Warfare Environment[1]

Operating in a potentially CB warfare environment impacts the preservation of combat power and freedom of maneuver sought, and typically enjoyed by, U.S. forces. Because of the potentially devastating consequences originating from an attack or accidental CB agent release,

[1] Title 50 U.S. Code 1523 (a)1: The overall readiness of the Joint Force to fight in a chemical-biological warfare environment and shall describe steps taken and planned to be taken to improve such readiness.

active measures to counter or mitigate the impacts of a release of a CB agent were planned, prepared, executed, and assessed during this reporting period to enable the unimpeded operation of the armed forces.

A. U.S. Army (USA)

The USA's CBRN defense efforts are aligned to the 2018 NDS and the USA's 2017 Modernization Strategy priorities to ensure the USA and its Soldiers and units are far more lethal and effective in deterring aggression and prepared to provide Defense Support of Civil Authorities (DSCA) when required. USA CBRN defense forces remain the best trained and equipped that the USA has had, and the USA is building readiness and updating training and doctrine to ensure our Warfighting formations are prepared to operate, fight and win in a contaminated environment. In support of readiness and improved capabilities in the Pacific, the USA requested and received Congressional approval for FY 2018 resources to address gaps and accelerate modernization of decontamination systems, increase and improve collective protection (COLPRO), and expand unmanned CBRN detection capabilities. In support of the domestic CBRN Response Execute Order (EXORD), USA forces support U.S. Northern Command CBRN Response Enterprise (CRE) force structure requirements. Through the Chemical and Biological Defense Program (CBDP) readiness and modernization efforts, the USA continues to increase our Service readiness to fight in a CB warfare environment and to address emerging threats.

In FY 2018, USA readiness improvements were accomplished through the procurement of improved CBRN defense equipment, refined requirements for CBRN defense equipment to meet evolving threats (e.g., Non-Traditional Agents (NTAs)), and more challenging training. The USA is pursuing opportunities to accelerate modernization of critical Joint Force enablers like the Nuclear, Biological, and Chemical (NBC) Reconnaissance Vehicle Sensor Suite Upgrade (NBCRV SSU). The NBCRV SSU will provide increased capability to remotely sense and detect CBRN threats at maneuver speed to support the lethality and mobility of maneuver forces. Also, the USA continues to build capability of CBRN formations through fielding of Dismounted Reconnaissance Sets, Kits, and Outfits (DR SKO). The Chief of Staff of the Army directed an increase in speed and tempo of opposing force operations at Combat Training Centers (CTCs) to further replicate a near-peer enemy. Increased opposing force tempo and the intensive employment of cyber operations, electronic warfare, air attacks, indirect fires, and chemical warfare push units in training to rebuild their capability to operate, fight and win in a contaminated operating environment. USA units meet the challenges of CTC rotations by deploying with all Modified Table of Organization and Equipment chemical defense equipment and training with individual protective equipment (IPE) for all Soldiers. Its medical units remain ready to respond to future CBRN threats in support of deployed commanders and civil authorities at home through the development and administration of pretreatments, employment of diagnostics as far forward as possible, and management of post-exposure treatment and supportive care for casualties. Medical treatment facilities across the battlespace remain prepared to employ protective measures, including COLPRO, to continue performing their core mission tasks during CBRN attacks. In 2018, the USA also initiated a CBRN Survivability

Improvement Program, managed by the U.S. Army Nuclear and Countering WMD Agency, to increase force readiness to survive WMD and sustain operations in contaminated environments.

To maintain our land power dominance, we will concentrate CBDP efforts on our USA priorities—Readiness, Modernization, and Reform—to ensure America's Army is always ready, now and in the future. As the Executive Agent for the CBDP, the USA continues to instill focus and discipline in our efforts to ensure the program meets the highest priorities and addresses the most critical CBRN capability gaps of the Military Departments.

B. U.S. Navy (USN)

In order to ensure that the use or threat of use of CB weapons or radiological contamination against a naval force will be a non-decisive factor in the outcome of any operation or campaign, the USN has set the following strategic goals for our afloat, shore-based and expeditionary units:

1. Equip the maritime force to successfully conduct military operations to prevent, protect from, and respond to CBRN hazards and their effects.
2. Prevent surprise by anticipating CBRN threats and delivering new capabilities for the Warfighter to detect, counter, or avoid emerging threats (e.g., NTAs).
3. Integrate off-board capabilities (wherever feasible) for faster acquisition and improved warning and reaction times.
4. Shape and influence advances in threat agent science and technology to meet current and future CBRN needs for personnel, equipment, and facilities within funding constraints.

Naval logistics integration is a key enabler of our ability to provide and sustain a high-degree of CB readiness for naval forces operating from the high seas. Historically, continuous distant operations have served as the cornerstone of naval deterrence, sea control, power projection, and maritime security. Today, the Naval Sea System Command (NAVSEA) and its dedicated workforce of naval engineers and logistics support personnel have been key in providing the ability to avoid, withstand, operate in, and recover from CB hazards in this domain. From centralized surface ship life cycle maintenance engineering, class maintenance activities, modernization planning, and development of training strategies for each of the core CBRN mission areas, the NAVSEA team of professionals has provided a high-level of naval logistics, acquisition, and technical support throughout FY 2018.

To support the USN's unique sustainment requirements (i.e. the distributed nature in which the Navy operates combined with varying phases of a ship’s deployment cycle and the need for forward stocking of high-priority materiel), the USN has established and maintains a number of programs to ensure a high-level of CB readiness prior to each individual deployment. These programs include Individual Protective Equipment - Readiness Improvement Program (IPE-RIP), CBRN Defense Readiness Assist Visit (CBRND-RAV), and Collective Protection System (CPS) filter change-out efforts.

Historically, maintenance and logistics functions required to maintain a high-level of CB materiel readiness have required an extraordinary number of organizational man-hours to sustain. Pre-deployment readiness visits by NAVSEA IPE-RIP and CBRND-RAV Teams and support by

various In-Service Engineering Agent (ISEA) activity groups significantly relieve shipboard personnel of this burden. IPE-RIP visits not only ensure that afloat forces are provided with properly maintained and accurately fitted chemical, biological, and radiological (CBR) ensembles (e.g., serviceable chemical protective masks, boots, socks and gloves ready for immediate retrieval in response to elevated mission oriented protective postures), but provide support to outside of the continental U.S. installations and deployed expeditionary Sailors as well. Additionally, the IPE-RIP team provides maintenance support/care of ballistic personnel protective equipment for the USN's afloat anti-terrorism/security personnel, personnel protective equipment for damage control men/firefighters, and CBRN equipment for shore-based Fire and Emergency Response personnel. This approach allows for unity of effort and increased synergy across the enterprise, leveraging existing organic resources and logistical support activities. Finally, in recent years, the USN has shifted away from its traditional lifecycle replacement program and implemented a condition-based obsolescence program to improve the readiness of fleet CBRN-defense equipment. The IPE-RIP Teams maintain asset visibility for all fleet-issued IPE, monitor the latest condition status, and proactively schedule replacement in accordance with (IAW) ship or unit availabilities.

Employment of CBRND-RAV acts as a force-multiplier by increasing chemical, biological, radiological, and nuclear defense (CBRND) materiel and Warfighter readiness, all while reducing total operating costs. All deploying USN assets (to include forward deployed ships) receive a full CBRND-RAV prior to deployment. These visits provide units with a full complement of operating CBR equipment, serviceable consumables, and refresher training for increased reliability and equipment availability. CBR systems assessed include all CBR detectors, CPS, and CBR decontamination stations. Capabilities to resolve all shortages are made available to the assessed unit/platform upon the conclusion of the visit from a centrally sustained consumable inventory. A detailed report of the RAV is distributed to the unit's chain of command, ISEAs, Type Commanders, and other cognizant stakeholders. This report provides an accurate "snapshot" of current CBR readiness and is used to track the identification and assignment of correcting activities for the elimination of the discrepancies. Reach-back support is also provided to the fleet by NAVSEA technical advisors through the issuing of technical guidance and publications, fleet notifications, and online troubleshooting advice while forces are deployed around the world. Prior to deployments, proficiency training is made available through on-the-job-training, practical applications, and written exams. As a result, level of knowledge exams have shown a 16% increase in fleet-wide proficiency over previous years. Accomplishments for the CBRND-RAV Teams during FY 2018 include the scheduling and completion of 31 visits (stateside) for deploying ships and 37 visits for forward deployed ships, to include 13 in the Asian Pacific Theatre. One of the primary goals of the RAV Team is to develop shipboard personnel into proficient CBRND specialists through on-the-job-training.

The CPS filter change-out program increases shipboard CBR protection capability while reducing operating costs to the USN. Materials required to perform CPS filter change-out are centrally procured through NAVSEA, vice individually by each ship. The NAVSEA ISEA coordinates with the ship's force, regional maintenance centers, and others to schedule, perform, and complete the change-outs around the ship's busy operating schedule with as little impact to

the ship's force as possible. Following filter installation, the ISEA, with the assistance of the ship's force, conducts a post-installation filter integrity test, sets zone boundaries, and performs zone pressurization and system assessment to identify if a system problem exists on the ship, allowing immediate corrective action to take place, if necessary. On-the-job-training on CPS is provided to damage control personnel to improve system operation and maintenance knowledge. A mid-cycle visit is conducted to check filter integrity, to ensure proper maintenance is being conducted and the system operates as intended, and to provide on-the-job-training, as needed.

NAVSEA promulgated a new certification process for CBRND equipment and systems that is now required for construction of all new ships and conversions of USN ships and craft before they are put into service. This certification ensures compliance with the USN's CBRND requirements by verifying that CBRND equipment and systems are designed, installed, and operated in accordance with military standards and applicable ship specifications.

C. U.S. Air Force (USAF)

The USAF is focused on aligning its CBRN defense efforts with priorities outlined in the 2018 NDS and meeting evolving CBRN threats from potential adversaries. Accordingly, the demand signal from USAF commanders for enhanced CBRN defense capabilities increased significantly in 2018. Throughout FY 2018, the USAF continued aggressively working to improve Full Spectrum Readiness and increase operational readiness. As a result, the USAF is better postured to survive, fight, and operate in a CBRN contaminated environment. The focus of Full Spectrum Readiness continues to be increased training exercises for the base population, CBRN technical professionals, and unit commanders. The ultimate objective of Full Spectrum Readiness is to improve Air Tasking Order generation and/or mission continuation at contested locations.

The USAF is working closely with the CBDP to invest in new research and technologies to reduce operational risks associated with technology gaps in detection, decontamination, and protection capabilities. While identified technical limitations on legacy CB defense systems continue to impact USAF operational capability, several joint programs of record are providing the USAF with near-term capability.

The Joint Service Aircrew Mask (JSAM) – Rotary Wing (RW) provided improved capabilities to USAF Special Operations and Rescue units in 2018. Projected delays in fielding the JSAM-Strategic Aircraft, the next generation of the mask, will result in sustaining current operational risk longer than previously planned. The Joint Program Executive Office for Chemical, Biological, Radiological, and Nuclear Defense (JPEO-CBRND) is exploring contract options to reduce the delay from 12 months to 3 months.

Fielding of the Joint Expeditionary Collective Protection (JECP) Tent Kit 2, which fits in the current USAF Small Shelter System, and the Structure Kit Improved, which is used inside of buildings, began in 2018. At the same time, a thorough review of operational plans resulted in a significant increase in demand for the JECP systems. The USAF is currently working with the forward deployed USAF forces to determine the final requirement and strategy for addressing their JECP needs.

The Next Generation Diagnostic System (NGDS) passed its Developmental Testing and Operational Testing (DT/OT) phase and was fielded to all critical USAF locations to avoid obsolescence issues faced with the legacy Joint Biological Agent Identification and Diagnostics Systems (JBAIDS). The USAF is now working with the JPEO-CBRND to field biological detection/identification modules to fill critical gaps in toxin identification.

The CBDP has fielded the CBRN Information System (CBRN-IS) on the milCloud (DoD's cloud computing infrastructure) and is training airmen in the Pacific and European theaters to ensure Warfighters have rapid, accurate, and actionable information to inform commander decision-making and awareness.

In FY 2018, the USAF developed new tactics, techniques, and procedures (TTPs) and concepts of operation (CONOPs) to increase lethality of aircrew operating in CBRN environments by reducing the time spent in restrictive CBRN protective equipment. The JPEO-CBRND is supporting on-going testing to validate fighter aircraft Environmental Control Systems' ability to purify cockpit air, which underpins the new concept. Additionally, the USAF implemented new guidance that accelerates personnel contamination control area processing and reduces logistics by allowing the reuse of vapor-exposed aircrew flight equipment and ground crew Joint Service Lightweight Integrated Suit Technology over garments.

D. U.S. Marine Corps (USMC)

The USMC is trained and equipped to operate in a CBRN environment. While there remain challenges, reporting indicates an increased focus on CBRND training while conducting Mission Essential Tasks (METs) in a CBRN environment. This resulted in an increased CBRN readiness across the Corps. The Corps implemented a policy to ensure that all commanders are using the same metrics to evaluate and report CBRND readiness. The policy provides a method for automated calculations to inform the commander of the quantified weighted value of individual, team, and unit training. This policy also provides a standard that guides training priorities and allows aggregate readiness to be assessed more effectively.

All three Marine Expeditionary Forces have incorporated CBRN defense into operational inspection programs. USMC Headquarters is revising an existing order to standardize how the USMC conducts CBRND training.

Operational units have increased logistical planning for CBRND equipment deployment. Marine Forces Pacific planned, coordinated, supported, and integrated 16 CWMD Building Partner Capacity theater security cooperation engagements with partner nations, adjacent Military Service components, and agencies. Marine Forces Pacific is fully integrating CBRND and CWMD into planning, coordination, and execution of its training, exercise, and employment plans.

E. National Guard Bureau (NGB)

The Chief, NGB continues to monitor and assist States in organizing, training, and equipping 57 WMD-Civil Support Teams (WMD-CSTs), ten Homeland Response Forces (HRFs), and 17 Chemical, Biological, Radiological, Nuclear, and Explosives (CBRNE) Enhanced Response

Force Packages (CERFP) capable of saving lives and mitigating suffering during a major or catastrophic domestic CBRN incident. WMD-CSTs remain capable of responding to the full spectrum of CBRN incidents. In 2018, supported by the CBDP, the WMD-CST, CERFP, and HRFs have made major improvements in their CBRN capabilities providing critical support to the Department's Domestic CRE requirements as addressed in the NDS.

In 2018, the Deputy Assistant Secretary of Defense for Counternarcotics and Global Threats provided guidance to incorporate into state counterdrug plans "…WMD-CSTs as a resource for supporting law enforcement with the safety challenges posed by the increasing availability of fentanyl, including the handling of suspected samples and investigation of production sites." The large quantities of fentanyl that are present in the Homeland because of illicit drug trafficking represents a real and present danger. Although WMD-CSTs may be supporting Law Enforcement Agencies in the majority of missions that may expose these teams to fentanyl, the detection and identification of fentanyl and other pharmaceutical-based chemical agents are consistent with the WMD-CST's primary mission to prevent or respond to CBRN incidents.

The CBDP also mitigated impending obsolescence of the WMD-CST Analytical Laboratory System (ALS). In response to the Deputy Assistant Secretary of Defense for Chemical and Biological Defense (DASD(CBD)) planning guidance and supported by the Joint Requirements Office for Chemical, Biological, Radiological, and Nuclear Defense (JRO-CBRND), the JPEO-CBRND initiated an ALS Modification Work Order in FY 2018 that will provide a fully modernized ALS for all 57 WMD-CSTs no later than FY 2021.

In FY 2018, NGB also completed testing and evaluation of the National Guard (NG) CBRN Response Enterprise (CRE) Information Management System (NG CIMS) and will begin fielding the CIMS to WMD-CSTs and HRFs/CERFPs in the 1st quarter of FY 2019. NG CIMS will provide the NG CRE forces the capability to share a common operating picture and supports a meshed sensor network, allowing sharing of sensor data across all NG CRE elements in real-time. Also in FY 2018, NGB began the development of CONOPs for the use of Unmanned Aerial Vehicles and initial evaluation of existing technologies that would support remote detection and search and extraction (i.e. rescue) capability requirements.

F. U.S. Special Operations Command (USSOCOM)

In FY 2018, the CWMD Fusion Cell executed several significant activities to advance the Department's ability to prepare for and respond to CBRN and/or WMD threats. Two CWMD Global Coordination Conferences were conducted, one at the DoD-Interagency senior leader level and one at the planner level, which included FIVE-EYES partners and France. Both conferences included interagency representatives and contributed to increased awareness of CBRN and/or WMD threats and coordination of planning efforts. As coordinating authority for CWMD, USSOCOM led the developmental efforts for the DoD Functional Campaign Plan for CWMD, which updates the DoD CWMD campaign and implements the DoD Strategy for CWMD. The central idea driving the CWMD campaign approach is defeating adversary activities along WMD pathways. It also addresses protection of the Joint Force and response to a CBRN and/or WMD event.

The JPEO-CBRND continued to improve the capability of its Joint Handheld Bio-Identifier (JHBI), which provides USSOCOM a rapid and accurate handheld capability to identify organisms at the point of contact. JHBI Increment 1 achieved Full Operational Capability (FOC) for USSOCOM in 2018. JHBI Increment 2, which provides greater capability at lower cost compared to Increment 1, proceeded into the Production and Deployment Phase of the Defense Acquisition Process. This increased capability allows special operation forces (SOF) a greater ability to determine biological threats, thereby increasing their readiness to operate in a biologically contaminated environment.

G. Response to Emerging Threats

The CBDP is addressing Service warfighting gaps against pharmaceutical-based chemical agents through investment in the underpinning science and technology, and through targeted investments in threat agent science, the hazards posed by pharmaceutical-based chemical agents are understood and capability development efforts (e.g., detection, protection, decontamination, modeling, prophylactics, and therapeutics) are focused. Near-term prophylactic and therapeutic solutions have been identified and are working through the acquisition process to get capabilities into the hands of the Warfighter. Additionally, CBDP is directly assisting the Joint Force by supporting table top exercises (TTXs) and field experiments to assess TTPs that mitigate risks by using existing prophylactics, therapeutics, decontaminants, and detection capabilities and to refine capability requirements for future materiel solutions.

Status of Nuclear, Chemical, and Biological Defense Training [2]

A. U.S. Army

U.S. Army leaders at every echelon incorporate CBRN defense in unit training at individual and collective levels as a condition of the battlefield. Conducting individual- and squad-level collective training in a simulated CBRN environment leads to greater confidence and enhances teamwork required to fight and win in a CBRN environment. Unit Decontamination Teams are designated and trained using organic M26 Joint Service Transportable Decontamination Systems. Incorporating decontamination with other collective CBRN defense tasks during training enhances a unit's ability to remove contamination and restore combat power quickly.

Enhanced CBRN defense training of maneuver forces and their enablers, integrated with the unit's METs, were tested at Home Station during Warfighter exercises and CTC rotations to ensure Soldiers, leaders, and units achieve and maintain combat operations proficiency in CBRN conditions. CBRN tasks provide the foundation to enable units to respond and operate within a specified CBRN condition allowing the achievement of their mission.

[2] Title 50 U.S. Code 1523 (b)4: The status of nuclear, biological, and chemical warfare defense training and readiness among the Joint Force and measures being taken to include realistic nuclear, biological, and chemical warfare simulations in war games, battle simulations, and training exercises.

Following the continued fielding of 308 DR SKOs, 83 units successfully completed doctrine and tactics training. After new equipment training, units received doctrine and tactics training to improve small team tactical training, learn doctrinal principles, better understand system employment, and refine individual and collective skills required to effectively conduct dismounted reconnaissance and surveillance with DR SKO.

The U.S. Army CBRN School (USACBRNS) at Fort Leonard Wood, Missouri, continues to train, educate, and develop the best qualified CBRN Warriors and civilian specialists for the Nation and its international partners. In FY 2018, USACBRNS hosted and conducted more than 80 resident and non-resident CBRN courses, graduating students from all Military Services and more than 12 countries. The USACBRNS, in collaboration with the JRO-CBRND, conducted a two-week CWMD Senior Staff Planner's Course in April 2018 that provided Senior CBRN Officers, Non-Commissioned Officers, and Civilian personnel continuing professional education in CWMD. The course focused on providing Service-specific CBRN organizational capabilities, real-time threat and plans briefings, protection, environmental concerns, CWMD, homeland security information sharing, planning at division and higher headquarters, and existing intelligence on the current threat. With the threat response transitioning from Counterinsurgency Operations, the Commandant saw this as an opportunity to discuss Large Scale Ground Combat Operations (LSGCO). This in turn influenced the Chemical Corps' vision to enable the Army to fight and win in a contaminated environment as part of LSGCO. These efforts are directed at transforming the Army culture to view the presence of CBRN as a unique opportunity to seize, retain, and exploit the initiative. Aligning with these efforts, the focus of the vision was adjusted towards developing Soldiers and leaders with the right tools and skills to enable expeditionary movement and maneuver; counter WMD; defend the Homeland and rapidly respond to the needs of the Warfighter. The vision additionally emphasized the development of future capabilities that will allow units to "assess hazards at a distance, protect the force in order to preserve freedom of action, and mitigate hazards in stride."

To strengthen alignment with the Chemical Corps' vision, the USACBRNS took the opportunity to establish critical training requirements by conducting two Critical Task Site Selection Boards. The CBRN Warrant Officer Board was conducted September 2017, and the Enlisted Board was conducted in August of 2018. The board members were charged with selecting all 74D critical tasks for skill levels 1-4 and selecting all the critical tasks for the Warrant Officer Professional Military Education. This process will shape the future of the Chemical Corps at its most basic level, and the decisions made during the boards will impact the USA's future force and the Chemical Corps in far-reaching and significant ways.

The expertise in CB research and development at the United States Army Medical Research and Materiel Command laboratories, the U.S. Army Medical Research Institute of Chemical Defense (USAMRICD), and the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID), was leveraged to support operational activities by providing medical training and education to thousands of DoD health care providers and support individuals. Training is provided for CB casualty care, hospital management, field identification of biological warfare

(BW) agents, and other specialized courses to military units and individuals from the Joint Forces, as well as interagency and international partners.

B. U.S. Navy

In FY 2018, the USN reviewed and updated several new Navy Training System Plans for enhanced NBC defense and took proactive measures in updating the course curricula for the USN's Shipboard CBR Defense Operations and Training Specialists and training sections of the Damage Control Assistant Senior Enlisted Course. A number of CBR operational and system specific computer-based training modules were made available to Sailors through the "My Navy Portal" with topics related to the following CBR systems: Joint Biological Point Detection System (JBPDS); USN Shipboard COLPRO; Personnel Casualty Treatment; and many others. In addition, an interactive CB defense Preventive Maintenance System video library is in development and expected to be disseminated to fleet units during FY 2019. This library will provide Sailors with additional assistance in performing preventative maintenance on CB defense equipment, which will help ensure systems are operationally available and ready for use.

A team consisting of personnel from NAVSEA and Joint Project Manager (JPM) Information Systems (IS) employed and demonstrated the enhanced CBRN passive defense capabilities of the Joint Effects Model (JEM) and the Joint Warning and Reporting Network (JWARN) programs during the Humanitarian Assistance/Disaster Relief portion of this year's Rim of the Pacific 2018 Exercise. The team utilized the JEM and JWARN capabilities to augment situational awareness and to inform operational planning and execution activities undertaken by the Vice Commander, Combined Task Force and the First Naval Construction Regiment. The simulated incidents included ruptured and leaking industrial chlorine and ammonia storage tanks and mustard gas released from a damaged weapons storage bunker.

C. U.S. Air Force

USAF CBRN defense training is designed so that each Airman has a basic understanding of tasks required to operate and perform their mission in a CBRN environment. Highlighting the importance of their mission, the USAF 368th Training Squadron at Fort Leonard Wood, Missouri was established as a standalone unit to provide the requisite CBRN defense skill training to USAF personnel who attend the 50-day Emergency Management Course and the 11-day CBRN Responder Course. Other CBRND training takes place at Airman Basic Training and at the installation level. In FY 2018, the USAF provided basic CBRN defense survival skills training to Airmen and CBRND awareness training to military personnel and civilians. USAF Medical Services incorporated CBRN training into Expeditionary Medical Support and Public Health Emergency Management. The Public Health Emergency Management Course supported training for Airmen (Public Health Emergency Officers and Medical Emergency Managers). USAF members are also Public Health Emergency Management Course instructional cadre, teaching personnel from the USA, USN, and U.S. Coast Guard. Finally, USAF technicians attended over 22 different CBRND-related courses.

In FY 2018, the USAF made a concerted effort to reverse the perceptible decline in the frequency and consistency with which CBRN events were included in wargames, simulations,

and training exercises. The USAF is working on installation-focused CBRN defense scenarios for Phase I and/or II operations, where simulations in wargames and battle simulations may be considered to ensure the USAF is appropriately trained to operate and perform its wartime mission in a CBRN environment. The USAF's Ability to Survive and Operate training also includes CBRN events. Where it was removed from regional SILVER FLAG exercises, CBRN conditions and events are being reinserted based on a realistic analysis of potential hazards.

D. U.S. Marine Corps

CBRND for the USMC is incorporated into planning and exercises starting at the Marine Forces level, and subsequently directed to subordinate commands, to include the incorporation of conducting METs in a CBRND environment.

Marine Forces Reserve incorporated CBRN training objectives and readiness goals into training plans across the Force. It implemented a Mobile Training Team program that utilizes Active Reserve personnel to provide instruction and certification to subordinate units nationwide. It also plans to add CBRN Consequence Management Platoons to the 4th Marine Division and the 4th Marine Aircraft Wing beginning in FY 2019. Aviation units have increased integration of CBRND operations into flight operations.

USMC is integrating CBRND into its exercises, including SPARTAN FURY and SPARTAN DAWN. During the initial implementation, USMC identified a gap in the training augmentation force and consequently adjusted the structure of these exercises to address the gap. The USMC Logistics Operations Group exercise, Operation ASSURED RESOLVE, is conducted with a CBRN threat and requires the training audience to conduct detailed planning for CBRND logistics and force protection. Additionally, the USMC continues to incorporate CBRND into the USMC premier combat arms exercise, the INTEGRATED TRAINING Exercise.

E. National Guard Bureau

The Chief, NGB is sustaining training of NG forces of the CRE to meet mission requirements, and continues to develop, improve, and adapt individual and joint collective training venues, such as Chief, NGB VIGILANT GUARD, to address systemic training issues and emerging threats. To enhance WMD-CST, HRF, and CERFP operational capabilities, NGB coordinated the development and establishment of individual training courses, such as Advanced Decontamination; Advanced CBRN TALON IV Robot Training; and Advanced Equipment Capabilities in a radiological and/or nuclear environment. In coordination with U.S. Northern Command (USNORTHCOM), the Chief, NGB has included elements of the USNORTHCOM's Command and Control CBRN CRE (C2CRE) into NGB HRF and CERFP joint exercise programs to enhance interoperability. In FY 2018, NGB continued supporting beta testing to integrate Department of Energy recommended simulants and the Virtual Radiation Training/Virtus System into HRF and CERFP exercise training programs and external evaluations.

Status of Research, Development, and Acquisition Programs [3/4]

The research, development, and acquisition capabilities provided by the CBDP sustain and modernize capabilities of the Joint Force to detect, diagnose, protect, and mitigate current and emerging threats. These activities are focused on developing and fielding modernized protective capabilities to protect Service members, developing systems to mitigate exposure to CBR threats, improving delivery of prophylactics and therapeutics by optimizing the development approach, enabling increased situational awareness of CBR weapons and hazards, and fielding better detection and identification systems to improve decision-making and situational understanding. Developing and fielding these capabilities increases Joint Force lethality through force protection enabling the Joint Force to continue the mission in any WMD threat environment. Enclosure A includes all CB-related capabilities[5] fielded to the Joint Force in FY 2018.

Requirements Integration[6]

The JRO-CBRND continues to establish a common analytic baseline to enable risk informed decisions for CBDP research, development, and acquisition. These efforts span the functional activities of intelligence and threat analysis, capabilities assessment, threat agent sciences, and operational risk. Two notable examples include the culmination of the Joint Concept for Preventing the Use or Transfer of WMD, which resulted in a Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, Facilities, and Policy (DOTMLPF-P) Change Recommendation (DCR) and the development of a Joint Concept for Operating in a CBRN Environment. This year, the Integrated Early Warning (IEW) DCR was initiated to define requirements. The IEW portfolio characterizes the value of networked sensor concepts for tactical ground forces, addresses shortfalls in detect-to-warn for biological hazards, and addresses shortfalls for CB detection on the move and at a distance. The IEW efforts will enhance the commander's ability to make decisions and enable successful operations in a CBRN contaminated environment.

In addition, the JRO-CBRND is assessing operational risk to the Joint Force associated with biological and toxic pathogens. The Countering BW Pathogens Capabilities Based Assessment (CBA) addresses the military challenges affecting the Joint Force associated with infectious

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[3] Title 50 U.S. Code 1523 (a)2: Requirements for the chemical and biological warfare defense program, including requirements for training, detection, and protective equipment, for medical prophylaxis, and for treatment of casualties resulting from use of chemical or biological weapons.

[4] Title 50 U.S. Code 1523 (b) 2: The status of research and development programs, and acquisition programs, for required improvements in chemical and biological defense equipment and medical treatment, including an assessment of the ability of the Department of Defense and the industrial base to meet those requirements.

[5] Title 50 U.S. Code 1523 (b)1: The quantities, characteristics, and capabilities of fielded chemical and biological defense equipment to meet wartime and peacetime requirements for support of the Joint Force, including individual protective items.

[6] Title 50 U.S. Code 1523 (b) 3: Measures taken to ensure the integration of requirements for chemical and biological defense equipment and material among the Armed Forces

pathogens used as BW agents. The CBA identifies gaps associated with risk to mission or force and considers potential solutions based on the pathogen's Medical Countermeasure (MCM) CONOPs.

The Countering Toxic Threats with MCMs CBA will address the future requirements for MCMs, to protect the force from the challenges of applicable toxic threats, which can include traditional and emerging chemical agents, toxins of biological origins and potentially other compounds of a toxic nature that can be weaponized for battlefield use.

Pharmaceutical-based chemical agents are of particular concern to the CBDP. The JRO-CBRND assessed operational risk associated with this threat by hosting a TTX, which included international and interagency partners as observers, to determine requirements for the Joint Force.

The JRO-CBRND continues to address the NDS focus of defeating priority adversaries, deterring secondary threats, and providing homeland defense with the development of the Force Planning Construct. The construct represents the minimum quantity for each CBRND procurement item required to field a modernized force that could meet peak demands presented by a combination of key strategic scenarios.

In FY 2018, the JRO-CBRND continued requirements support for a multitude of joint programs spanning the spectrum of CBRN defense operations. Of note, the JRO-CBRND processed two capability documents and three capability drops for validation through the Joint Capabilities Integration and Development System. These included the Aerosol and Vapor Chemical Agent Detector (AVCAD) Capability Development Document, a NGDS Increment 1 Capability Development Document, and the JWARN and JEM capability drops for the NGB and USN.

In FY 2018, the JRO-CBRND continued to support doctrine, training, leadership and education, and exercise development. Revisions to the Joint Publications were completed, including the October 29, 2018 publication of Joint Publication 3-11, Operations in Chemical, Biological, Radiological, and Nuclear Environments. Additionally, doctrine and TTPs were developed to address the emerging threat of NTAs. Further study and advancement in the areas of IEW and Pathway Defeat are being addressed through DCRs and CBAs. The new DoD Functional Campaign Plan to CWMD has been approved and published, describing defeating adversary activities along WMD pathways.

The JRO-CBRND continued to support education efforts at all levels of Professional Military Education and career field courses enhancing CBRN training for mid to senior level members across the whole of Government. The JRO-CBRND co-chairs the Education Consortium for CWMD, linking academia and the DoD to discuss and develop CWMD strategies supporting national defense priorities. JRO-CBRND supported a significant number of Chairman of the Joint Chiefs of Staff exercises and Combatant Command events with CBRN-focused vignettes and subject matter expertise. In addition to these events, the JRO-CBRND executed pandemic influenza and infectious disease TTXs for the National Center for Medical Intelligence and U.S. European Command Counter Biological Cell. International exercise efforts included support to allied nations' ability to integrate a CBRN control center cell into a Combined Joint Task Force

headquarters staff. The JRO-CBRND continues efforts through U.S. Northern Command to enhance CBRN training while certifying and validating homeland defense and CBRN response at the operational and strategic levels.

A. Advances in Science and Technology (S&T)

The Department maintains a robust portfolio of innovative S&T projects balanced between CB traditional and emerging threats to support delivery of capabilities to the Joint Force. These efforts maximize our collaboration with partners and stakeholders, including those across the Department and the U.S. interagency to achieve our mission within a "Whole of Government" approach and with long-standing strategic international partners and new global partners, both in the public and private sectors. Additionally, the S&T investments are a key component to sustaining the core physical and intellectual CB defense infrastructure of the Department that supports delivery of capabilities, assessment of emerging threats, and the ability to surge unique capabilities to respond to a CB event.

Ebola Response/Medical Countermeasures (MCMs)

In response to an Ebola outbreak involving over 28,000 infected individuals and over 11,000 deaths in West Africa between 2013 and 2016, the DoD successfully sequenced samples from the region and leveraged the data to assess probability of detection with the current assay portfolio. The Joint Science and Technology Office for Chemical and Biological Defense (JSTO-CBD) Translational Medical Division, JPEO-CBRND, and USAMRIID developed the Bioprotection Systems (now Merck) V920 VSV-EBOV vaccine. The vaccine has now been administered to over 100,000 people and has demonstrated efficacy approaching 100% in vaccination studies of healthcare workers and contacts with infected individuals. Merck V920 is now the first vaccine to demonstrate efficacy in the successful prevention of Ebola infection and disease in humans and has been authorized for use under an investigational new drug protocol in humans by the FDA. Merck is planning to complete the FDA licensure of the vaccine in 2020 for endemic exposure and has already stockpiled over 250,000 doses. The vaccine was once again called into use in 2018 by the World Health Organization in response to an outbreak of Ebola in a remote and unstable region of the Democratic Republic of the Congo that included two cities. The now well-established efficacy and safety data of the vaccine represents a significant step forward in developing a capability to protect the Warfighter against endemic exposure to this deadly pathogen.

The JSTO-CBD and JPEO-CBRND co-funded the Advanced Development of Antibody Manufacturing Technologies (ADAMANT) project which demonstrated the successful intramuscular administration of a six monoclonal antibody cocktail that protects against >50 times the lethal dose of botulinum toxin. The studies were conducted by the DoD's new Advanced Development and Manufacturing Center at Ology Biosciences in Alachua, FL. In animal models, the antibodies reached concentrations in the bloodstream far beyond that previously seen with other FDA-approved anti-botulinum products in less than 24 hours. The center also completed FDA-compliant cell banking and process development activities that will enable the filing of an investigational new drug application in the next year. The demonstration

of the successful intramuscular administration of monoclonal antibodies has opened an entirely new realm of possibilities in the development of capabilities to protect the Warfighter.

Detection/Diagnostics

CBDP S&T efforts in physiological detection sciences have shown substantial promise in the ability to pre-symptomatically indicate Warfighter exposure to CB threat agents. Exploratory detection algorithms originally based on animal exposure studies are being expanded to apply to military and civilian populations. This is being accomplished by leveraging human exposure data sets in partnership with the military academies, DoD laboratories, and large health-focused private industry partners with access to vast patient record information. Once completed, these detection algorithms will be available for integration into off-the-shelf physiological status monitoring devices (e.g., heart rate monitors) to provide indication of CB exposure prior to or early in the onset of symptoms, thereby allowing for early countermeasure interventions. With the potential threats associated with advanced biotechnology, these devices provide the best initial detection capability for a biological attack with a genetically modified pathogen.

In FY 2018, JSTO-CBD completed a multiyear project focused on developing a novel medical diagnostic test to predict whether a Warfighter would become "septic" after possible exposure to a biological agent. Sepsis is a life-threatening condition caused by the body's response to an infection and requires immediate medical attention. The medical diagnostic test developed by JSTO-CBD demonstrated the ability to predict the development of sepsis in ill patients three days prior to the onset of sepsis with 94% accuracy between sepsis and comparator patients. Beginning in FY 2019, JSTO-CBD will develop the test for use on readily available and fielded diagnostic platforms and initiate a pre-clinical study to validate the test. Such a diagnostic test would be the first-of-its-kind that can predict the onset of a syndrome (e.g., sepsis) before any symptoms appear. By identifying those who will become septic after exposure to a biological agent, treatment and supportive care can be provided early, thereby increasing the likelihood of survival. Ultimately, results from the test can be used to differentiate Warfighters who may require less medical attention from those who will require hospitalization resulting in information to support critical decisions in force readiness.

In FY 2018, the USA Combat Capabilities Development Command Chemical Biological Center (CCDC CBC), formerly known as the Edgewood Chemical Biological Center, collaborated with USAF and USN Research Labs to pursue development of a new paper-based sensor platform using cell-free synthetic biology to detect broad-spectrum CBRNE threats in the field. Prototype tickets for biological and explosives detection have been demonstrated, and work continues to improve performance and expand available analytes. CCDC CBC invested in workforce development to enhance collaboration between biologists and material scientists with the goal of identifying biologically-derived materials with high potential for CBD applications. Research efforts to inform chemical agent filtration and degradation applications include bio-production of novel precursors for metal-organic frameworks and phage-templated materials.

The USAMRICD's invention titled "Point-of-Care In-vitro Diagnostic Device for the Amperometric Detection of Cholinesterase (ChE) Activity in Whole Blood for Indication of

Exposure to ChE Inhibiting Substances" was approved for U.S. patent filing. Immediately following possible exposure, the device will provide a real-time quantitative assessment of ChE enzymatic activity for indication of exposure to ChE inhibiting substances (e.g., chemical warfare nerve agents). This invention will allow assessment of a blood sample during the pre-symptomatic window, providing early warning of a suspected exposure and a possible trigger-to-treat with a therapeutic.

Decontamination

The JSTO-CBD, along with CCDC CBC, completed sprayable slurry high-fidelity and operationally-relevant efficacy testing (Scale-Up Phase) and testing for the inactivation of *Bacillus anthracis* endospores (biological efficacy). An Operational Needs Statement and the opportunity to leverage technological breakthrough success allowed both efforts to accelerate technology transition by two years to meet Warfighter needs. The results of these tests confirmed the sprayable slurry's effectiveness against chemical agents on complex surfaces. These successes should allow for the transition to advanced development at a Technology Readiness Level of 7. Sprayable slurry greatly simplifies the logistical burden of decontamination by its single-step process and minimizing or eliminating the need for water. Sprayable slurry can greatly reduce the time and overhead of restoring combat power after a chemical or biological attack and thus enhances force lethality.

B. Defense Advanced Research Projects Agency (DARPA) Coordination[7]

In order to maintain coordination and integration with the CBDP, the DARPA regularly collaborates with the CBDP Enterprise. DARPA provides programmatic updates, technology transition opportunities, and technical expertise to the CBDP in the areas of threat reduction, biodefense, diagnostics, viral forecasting, regulatory reviews, biosurveillance, and MCM development. DARPA hosted and attended joint meetings with USSOCOM, the Naval Special Warfare Development Group, Naval Air Warfare Center – Weapons Division, JSTO-CBD of the Defense Threat Reduction Agency, JPEO-CBRND, USAMRIID, USAMRICD, Office of Naval Research, CCDC CBC, Combating Terrorism Technical Support Office, Joint Program Committee-7, and Defense Health Agency. To further promote coordination with the CBDP, DARPA participates in the Armed Services Biomedical Research Evaluation and Management Community of Interest.

The ongoing relationship between JPEO-CBRND Platforms for Rapid Integrated Solutions for Medical Countermeasures (PRISM) Office and DARPA has advanced DoD's ability to respond

[7] Title 50 U.S. Code 1523 (b) 10: A description of the coordination and integration of the program of the DARPA on basic and applied research and advanced technology development on chemical and biological warfare defense technologies and systems under section 1522(c)(2) of this title with the overall program of the Department of Defense on chemical and biological warfare defense, including—(A) an assessment of the degree to which the DARPA program is coordinated and integrated with, and supports the objectives and requirements of, the overall program of the Department of Defense; and (B) the means by which the Department determines the level of such coordination and support.

rapidly to an infectious disease crisis and effectively assist the interagency response. The PRISM Office and DARPA partnered with the National Institutes of Health (NIH) National Institute of Allergy and Infectious Diseases (NIAID) Vaccine Research Center to rapidly transition the manufacturing process for the anti-Ebola monoclonal antibody mAb-114 to the DoD Advanced Development and Manufacturing Facility. This effort supports the generation of additional biologic drug substance, which can assist the NIAID Vaccine Research Center if needed in response to the ongoing outbreak in the Democratic Republic of Congo.

C. Advanced Development and Procurement

In FY 2018, the enterprise made significant advancements in medical and physical CBRND capabilities for the Joint Force. These resources provide materiel solutions as part of an integrated and layered capability to enable CWMD missions ranging from combat operations to DoD support to domestic incident prevention and response. Developing advanced capabilities and providing them rapidly to our Joint Force is critical to improving near-term readiness for the highest Department, Joint Service, and Combatant Command CWMD priorities.

Detection

In January 2018, the JPEO-CBRND authorized the AVCAD program, formerly Next Generation Chemical Detector (NGCD) Increment 1, to proceed to the Engineering and Manufacturing Development Phase of the Defense Acquisition Process. The JRO-CBRND submitted the AVCAD Capabilities Development Document (CDD) for validation in May 2018. This submission included the revised Army Acquisition Objective quantity and reallocated the program Acquisition Category Level from II to III. The Joint Capabilities Board validated the AVCAD CDD in July 2018. Once fielded, these detectors will fill Military Service capability gaps in aerosol and vapor chemical threat detection.

The Enhanced Maritime Biological Detection (EMBD) program, which entered the Engineering and Manufacturing Development Phase of the Defense Acquisition Process in June 2018, is partnering with industry to develop an EMBD retrofit kit for the JBPDS. The JBPDS is already fielded to the USN, and the EMBD will address challenges related to reliability, obsolescence, and sustainment costs. The EMBD program will increase the USN's ability to detect and identify biological threats, while lowering support costs as currently incurred with the JBPDS.

The JPEO-CBRND continued fielding the DR SKO to the Services during FY 2018, thereby increasing the Services' full spectrum CBRN dismounted reconnaissance capability. DR SKO provides detection and identification of volatile organic compounds, toxic industrial chemicals and materials, chemical warfare agents, BW agents, oxygen levels, and combustible gases. The system also provides individual personal protective equipment, decontamination equipment, and capabilities for marking, sampling, and reporting of CBRN threats. Since the start of fielding in FY 2014, the JPEO-CBRND has provided Initial Operational Capability (IOC) for the USMC, USN, and USA CBRN forces as well as FOC for the USMC CBRN force. In addition, the JPEO-CBRND updated fielded equipment with more current technologies and expanded the detection and identification libraries to include NTAs.

Protective Equipment

In FY 2018, the JPEO-CBRND continued to field the Uniform Integrated Protection Ensemble (UIPE) Increment 1 protective suits to USSOCOM. The UIPE Increment 1 program attained IOC for USSOCOM during FY 2016 and is on track to achieve FOC in FY 2022. Because it is a lightweight protective garment, the UIPE Increment 1 improves the readiness of SOF to operate in chemical or biological contaminated environments by reducing burdens associated with the weight, bulk, thermal strain, and encumbrance of wearing CBRN protective equipment.

The JPEO-CBRND continued delivering the Joint Service General Purpose Mask (JSGPM) to the Services in FY 2018. JSGPM provides the Warfighter with face, eye, and respiratory protection from battlefield concentrations of CB agents, toxins, toxic industrial materials and radiological particulate matter. This mask replaces the M40, M42, MCU2/P series masks and the M45 mask in the Land Warrior Program. The JSGPM effort is on schedule to attain FOC for the USA by the end of calendar year 2019. The JSGPM will increase the readiness of the Services to operate in chemical or biological contaminated environments as its components are specifically designed to minimize the impact on the wearer's performance in combat.

The JPEO-CBRND's JSAM-RW program achieved IOC for the USAF during FY 2018. The JSAM-RW protective mask is the first to provide a 'don in-flight' capability. The JSAM-RW program is on track to meet IOC for the USA, USN, and USMC during FY 2019. By making it much easier for joint aircrews to protect themselves as threats emerge during missions, the continued fielding of JSAM-RW increases the readiness of the Services to meet their respective aviation requirements.

The JPEO-CBRND continued fielding JECP systems during FY 2018. It provides modular, transportable, and versatile COLPRO capabilities to the Services, designed for quick set up with components sized to minimize the need for handling equipment. Continued fielding of JECP to the Services increases the readiness of the Joint Force to operate in chemically or biologically contaminated environments. The program is on track to meet IOC in FY 2021.

Decontamination

In FY 2018, the JPEO-CBRND continued to field the Joint Sensitive Equipment Wipe to the Joint Force. It provides an immediate, operational decontamination capability for sensitive and non-sensitive equipment exposed to traditional and non-traditional chemical contaminants. The program achieved IOC in FY 2018 and is on track to meet FOC in FY 2020. Because it is sized for Service members to carry in the pocket of their protective over-garments, it increases the readiness of the Services to operate in chemically contaminated environments.

Medical

During FY 2018, the CBDP Enterprise, through the Office of the Assistant Secretary of Defense for Health Affairs (OASD(HA)), procured 1,478,530 MCM doses of anthrax and smallpox vaccines from the Strategic National Stockpile to implement biological defense vaccination programs. The CBDP Enterprise managed, administered, and distributed the doses, as needed, to support operations.

The CBDP Enterprise is leveraging the OASD(HA)-led implementation of Public Law (PL) 115-92 to expedite delivery of medical products to the military via enhanced collaboration with the FDA. The OASD(HA), IAW DoD policy, has oversight of the use of unapproved medical products for Force Health Protection, and PL 115-92 enables increased focus on DoD priority medical products in development for military emergencies or to meet urgent needs. These efforts also align with the Middle Tier Acquisition concept. The CBDP has gained additional insight from the FDA through these efforts under PL 115-92 for several vaccine development programs and achieved successes, such as the atropine autoinjector.

The Army Health System remains ready to respond to future CBRN threats to support civil authorities at home and abroad through the development and administration of pre-treatments; the employment of diagnostics as far forward on the battlefield as possible; and managing post-exposure treatment and supportive care for casualties. Role I, II, and III medical treatment facilities will be prepared in advance to employ protective measures in the form of COLPRO to continue performing core mission tasks during CBRN attacks. Naturally occurring biological threats, as well as weaponized CBRN threats, will continue to evolve, and medical advancements and countermeasures are required to mitigate risk to the force. The Army Health System will drive medical solutions across DOTMLPF-P domains to identify, isolate, and treat CBRN threats.

The NGDS Increment 1 completed and passed DT/OT, providing a system that is operationally effective for the analysis of environmental samples and analysis of clinical samples to confirm the presence of BW agents. The NGDS Increment 1 was also found to be operationally suitable, exceeding both the reliability and availability requirements, as the system is considered easy-to-use, survivable against cyber threats, and represents a smaller logistics footprint than the legacy JBAIDS. In addition, the NGDS Increment 1 Team recently achieved Diagnostic FOC to the USAF, with additional fielding planned for the USA and USN. The NGDS Increment 1 will replace all JBAIDS systems by FY 2021, providing the Military Services an improved capability to rapidly diagnose U.S. troops in the event of BW agent exposure.

In FY 2018, the USAF continued to train on the 33 NGDS Film Array V2.0G systems fielded in FY 2017. Total Package Fielding included the BW Agent “Warrior Panel,” fielded in 2018, which is the first FDA-cleared test for the medical diagnosis of hemorrhagic fever caused by the Ebola and Marburg viruses. The “Warrior Panel” also tests for the traditional biological agents Anthrax, Plague, Tularemia, and Q-Fever.

Along with interagency and industry partners, the JPEO-CBRND successfully broadened the nerve agent antidote autoinjector industrial base to ensure continued chemical defense of the Warfighter. The JPEO-CBRND funded and led the collaboration to develop the Atropine Injection, 2mg/0.7mL, Single-Dose Autoinjector, which received FDA approval on July 9, 2018. The device had previously received an Emergency Use Authorization from FDA in April 2017. Full FDA approval of this device reduces the likelihood the Services will face the risk of having a reduced chemical defense capability due to an insufficient industrial base.

Dependable diagnostics in the right place at the right time are critical to DoD's ability to protect the Joint Force against both naturally occurring and man-made biological threats. During FY 2018, the JPEO-CBRND demonstrated the capability to generate and deliver near real-time viral whole genome sequences from a cluster of Ebola cases in Sub-Saharan Africa. The rapid sequencing was possible because of the equipment JPEO-CBRND placed at the Institut National de Recherche Biomédicale in the Democratic Republic of the Congo. In less than two weeks of the beginning of the second outbreak, the DoD successfully sequenced samples from the region, leveraged the data to assess probability of detection with the current assay portfolio, and determined that the outbreaks were two separate events. This activity increased the readiness of the Services to respond to this second outbreak during FY 2018.

Threat Warning/Awareness

Reliable, secure, and easily accessible information capabilities in a cloud-hosted environment provide CBRN threat warning and reporting and CBRN modeling data, which are critical to the Military Services in avoiding CBRN threats within the modern battlespace. On August 17, 2018, the JPEO-CBRND approved fielding the JEM II and JWARN II on Defense Information Systems Agency (DISA) milCloud for access by the Military Services. DISA milCloud provides a commercial-like hosting capability in a secure environment. It allows the Warfighter to access capabilities without having to individually receive, download, and manage various versions of software. The JPEO-CBRND fielding decision was preceded by the successful Initial Operational Test & Evaluation of JEM and JWARN on the DISA milCloud. Ultimately, this fielding decision increases the effectiveness of the Services by simplifying interoperability, reducing integration and deployment costs, increasing cybersecurity protection, and reducing logistical and management burdens associated with reliable access to CBRN threat warning, reporting, and modeling.

D. Test and Evaluation

The Deputy Under Secretary of the Army – Test and Evaluation (DUSA-TE) continued to sponsor, develop and refine the Chemical and Biological Knowledgebase (CBK) which provides the test and evaluation (T&E) community a database, composed of a series of discrete modules that containing parsed, normalized, and curated data, of current and historical CB medical, production, characterization, and threat data sets. The CBK provides all entities within the CBDP a user-friendly repository with analytical tools to support a broad range of user specific threat analysis.

DUSA-TE coordinated multiple bilateral international CB T&E collaborations in FY 2018, which focused on advancing Technology Readiness Levels of field detection capabilities for improved battlefield awareness, and on developing of TTPs for enhanced interoperability of the Warfighter in a shared CB environment. Additional T&E collaborative efforts occurred in relation to the development of novel deployable aerosol detection technologies for characterization of operationally relevant aerosol background conditions and battlefield interferents. Ongoing work continued under a multi-lateral agreement for characterizing chemical compound phenomenology to inform development of defensive countermeasures for

emerging threats. Each participating country contributed unique subject matter expertise and technology for the benefit of the global CB community. In the area of personal protection, DUSA-TE worked collaboratively with a foreign partner to validate their unique CB test capability against U.S. test requirements. This capability is being used to obtain critical data for a U.S. acquisition program. The collaboration resulted in improved T&E methodologies; increased cost sharing; cooperation and data exchange; and helped to ensure cross-national expertise for the enduring CB mission.

No individuals have been used as subjects of any CB agent tests in the U.S. since 1975. Human biological agent testing ended on November 25, 1969, and human chemical agent testing ended on July 25, 1975. The OASD(HA) continues to work with the Department of Veterans Affairs to identify and locate previous human test subjects so they can receive appropriate attention. To provide the public with the information on human exposures related to historic CB testing, the OASD(HA) maintains CB exposure databases for the DoD and updates the CB exposures sections of the Environmental Exposures website (http://www.health.mil/Military-Health-Topics/Health-Readiness/Environmental-Exposures), as needed.[8]

E. Industrial Base (IB)

A healthy manufacturing and defense IB and resilient supply chain are essential to U.S. economic strength and national security. The ability of the U.S. to maintain readiness and the ability of the DoD to surge in response to an emergency directly relates to the capacity, capabilities, and resiliency of our manufacturing and defense IB and supply chains. To determine if sufficient capacity, capability, and resiliency exists, an annual IB assessment was conducted.

The most recent IB assessment determined that the CBRN manufacturing sector is currently stable when assessed at the overall capability area level. However, areas of concern were identified within most of the capability areas at the manufacturer or system level. It was found that certain IB capabilities are deteriorating due to reductions in Service requirements, extensions to the service life of items, and increasing reliance on single-source manufacturers. This continuous evolution demands proactive situational awareness of the IB community.

The two critical commodities identified during this year's assessment were carbon and rubber. The quality of carbon that is needed for chemical filtration presents a serious concern because there is only one approved manufacturer for military grade carbon. The continued support of the Defense Production Act Title III effort will mitigate this risk once completed. Title III is a joint Government and private sector enhancement of a critical IB capability. Raw materials for butyl rubber originate from Association of Southeast Asian Nations (i.e. Vietnam, Indonesia, and Malaysia) members. Although relations have been excellent since inception (per the Department of State), continued monitoring of these countries' trade status and political stability is recommended, along with the development of composite alternatives.

[8] Title 50 U.S. Code 1523 (b) 9: A description of any program involving the testing of biological or chemical agents on human subjects that was carried out by the Department of Defense during the period covered by the report.

Additionally, a small number of manufacturers are critical suppliers on numerous CBRN systems and across the CBDP Enterprise. Ongoing reductions in CBRN-related procurements have created areas of concern that must be integrated into IB-related decisions. These areas require continual monitoring to ensure the availability of critical CBDP systems and items and of the manufacturing base through commercial or organic means.

The sustainability of the CB IB continues to be impacted by diminishing manufacturing and material sources due to fluctuating CB requirements and funding. This increases risk in sustaining capabilities and supporting Warfighter readiness (i.e. having the right equipment at the right time in the right condition). Organic critical manufacturing capabilities are helping to ensure that the DoD can respond to emergencies and obtain products and services it could not otherwise acquire from private industry in an economical and timely manner.

The CBDP Enterprise is reviewing the operational need and requirement for a Joint Chemical Biological Defense Logistics Center. A fully supported center would improve stability through consistent programs, projects, sustainment requirements and funding. This will increase performance, shorten schedules, and reduce cost, thereby improving CBDP readiness.

Developing and maintaining a long-term IB sustainment strategy (e.g., commercial and/or organic) remains a critical component to ensuring a healthy manufacturing and defense IB essential to U.S. economic strength and national security. Therefore, continued IB assessments with actionable mitigation recommendations is a critical national security imperative.

F. Chemical and Biological Defense Infrastructure

In FY 2018, the CBDP advanced CBD infrastructure management across the Department through two key activities – a CBDP Infrastructure Working Integrated Product Team and CBDP infrastructure studies. These activities are described below:

CBDP Infrastructure Working Integrated Product Team - Infrastructure Monitoring

The CBDP Infrastructure Working Integrated Product Team consists of key DoD stakeholders from across the CBDP Enterprise. The team continued to expand its efforts, which began in FY 2017, to monitor the laboratory and test center infrastructure supporting CBDP efforts. This was accomplished using the existing tool, which documents and monitors laboratory and other infrastructure supporting CBDP efforts at DoD, interagency, industrial, academic, and international DT/OT facilities. This ongoing effort helps to identify capabilities within the enterprise, as well as other technical capabilities that may exist at universities or in industry. The Office of the Assistant Secretary of Defense for Nuclear, Chemical, and Biological Defense Programs/Chemical and Biological Defense (OASD(NCB/CB)) currently monitors chemical and biological laboratory and test center infrastructure supporting the CBDP at DoD, Other Government Agency, industrial, academic, and international partner facilities.

CBDP Infrastructure Studies

CBDP continues to build on two existing and foundational infrastructure studies, the U.S. Army Research, Development, Test, and Evaluation Composition and Disposition Study for the CBDP

and the JSTO-CBD-led Core Competency Study of the DoD Service Laboratories. Information and approaches from these studies proved to be a useful foundation for FY 2018, as the CBDP embarked on additional infrastructure management tasks that connected enterprise-wide capabilities with specific physical infrastructure at the CBDP laboratories. The Department continues to integrate these assessments to deliver the most thorough appraisal of CBDP capabilities to date.

In addition, the ODASD(NCB/CB) directed the four largest CBD facilities to track indirect cost expenditures in the Army's General Fund Enterprise Business System. This effort increases traceability of CBDP funds and supports critical infrastructure analyses to inform resourcing decisions and help with predictions for recapitalization of assets.

G. Chemical Weapons Convention and Inspection Readiness[9,10]

Besides working with international partners and the Organization for the Prohibition of Chemical Weapons (OPCW), the DoD continues to provide support around the world to reduce chemical weapon threats in compliance with Article X of the Convention. In FY 2018, the CCDC CBC Forensic Analytical Center, one of two OPCW-designated laboratories in the U.S. and the only DoD-designated laboratory, successfully passed the 23rd OPCW Proficiency Test, once again achieving an "A" score. In addition, the Center passed the 2018 OPCW Biomedical Proficiency test, also with a score of "A."

[9] Title 50 U.S. Code 1523 (b) 7: A description of the chemical warfare defense preparations that have been and are being undertaken by the Department of Defense to address needs which may arise under article X of the Chemical Weapons Convention.

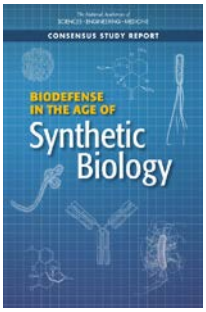
[10] Title 50 U.S. Code 1523 (b) 8: A summary of other preparations undertaken by the Department of Defense and the On-Site Inspection Agency to prepare for and to assist in the implementation of the convention, including activities such as training for inspectors, preparation of defense installations for inspections under the convention using the Defense Treaty Inspection Readiness Program, provision of chemical weapons detection equipment, and assistance in the safe transportation, storage, and destruction of chemical weapons in other signatory nations to the convention.

Management Initiatives[11]

The Department continues to implement measures that are focused on improving overall management, integration and coordination of the CBDP Enterprise. Specifically, the OASD(NCB/CB) is leading CBDP Enterprise components to integrate and align activities toward fulfillment of the CBDP mission through leading CBDP Enterprise-wide initiatives and efforts. In FY 2018, the CBDP continued to use the Enterprise Review process to streamline problem identification and decision-making for high-level concerns and items of interest across the program. Other initiatives are outlined below.

National Academies Study on "Biodefense in the Age of Synthetic Biology"

The June 2018 study develops a "framework to guide an assessment of the security concerns related to synthetic biology, assess the levels of concern warranted for such advances, and identifies options that could help mitigate those concerns." The report concluded that "While addressing the potential concerns posed by synthetic biology will remain a challenge for scientists and for the Nation's defense, there is reason for optimism that, with continued monitoring of biotechnology capabilities and strategic biodefense investments, the U.S can foster fruitful scientific and technological advances while minimizing the likelihood that these same advances will be used for harm." As the Department continues to address potential emerging threats enabled by advanced biotechnology, the CBDP, in close collaboration with the Office of the Under Secretary of Defense for Research and Engineering, aims to employ this report to guide assessments of risk and identify investment priorities. The National Academies hosted a final, classified workshop in the Fall of 2018 for invitees to prioritize areas of risk for countermeasure investments.



U.S. Forces Korea (USFK) CBRN Support & Materiel Assessment

In FY 2018, the Department enhanced force protection on the Korean Peninsula by addressing an Operational Needs Statement. Specifically, the CBDP is addressing the identified needs for integrated early warning, decontamination, COLPRO, and WMD characterization and elimination. Also, the Department has initiated efforts to conduct an assessment, as directed by the FY 2019 National Defense Authorization Act, of the operational requirements and shortfalls for USFK to respond to any potential CB threat. This assessment will be conducted in collaboration with USFK and other partners to support a response to Congress by March 2019.

Opioids/Pharmaceutical-Based Chemical Agents Research and Development

This year the CBDP worked with the NGB WMD-CSTs to ensure current detection and analytical systems are capable of identifying opioids to protect them from these compounds. Additionally, collaborations with international partners resulted in developmental efforts for an improved Rapid Opioid Countermeasure System to enhance the treatment of an exposed individual to operationally relevant levels of pharmaceutical-based chemical agent threats.

The CBDP also supported open air tests at Dugway Proving Ground with the purpose of understanding Warfighter risk by characterizing and correlating pharmaceutical-based chemical agent threat behavior in a battlefield environment. As a result of these efforts, models, studies, and CONOPs are being updated.

Declassification of Fourth Generation Agents

In FY 2018, the Department led interagency efforts to declassify information on fourth generation agents, also referred to as Novichoks, improving readiness for warfighters and first responders. Subject matter experts from the Department participated in National Security Council working groups to create standard protocols for first responders, law enforcement, and civilian medical clinicians for recognizing, treating, and protecting oneself from exposures. These communities previously had limited to no access to information on these hazards.

CWMD OTA

In November 2017, an OTA contract vehicle was established with the CWMD Consortium to leverage academia and industry to deliver CWMD capabilities. This effort improved the DoD and interagency acquisition efforts to improve delivery of CBRN detection, protection, and prevention capabilities and built on the established Medical CBRN Defense Consortium.

Agile Medical Paradigm (AMP) Strategic Framework

The CBDP continued AMP strategic framework implementation efforts to optimize MCM delivery. In FY 2018, the AMP Task Force developed a framework implementation roadmap that included policy and technology-based solutions to address the root causes of MCM development inefficiencies, as well as indicators for assessing solution execution progress. AMP strategic framework implementation will address two key area: 1) achieving rapid and efficient delivery of capabilities by ensuring that the CBDP MCM development process is in-line with DoD, FDA, and industry best practices; and 2) ensuring that CBDP MCM programs are responsive to operational risks and priorities by building a sustainable portfolio of capabilities that can be quickly adapted to address threats.

[11] Title 50 U.S. Code 1523 (b) 5: Measures taken to improve overall management and coordination of the chemical and biological defense program.

Issues Encountered or Areas for Improvement[12]

The focus of the DoD for the past decade has been on readiness that has come at the expense of modernization. The CBDP, like the rest of the Department, must adjust its focus from providing just the next incremental solution to the Warfighter to truly modernizing the way the Warfighter can fight and win within a CBRN environment. In response to adversary WMD capability growth, a new challenge is not sacrificing CBRN survivability as we seek to accelerate modernization through rapid acquisition solutions. Modernization requires finding ways for CBRN equipment to be integrated into the Warfighter's daily environment and enabling the use of CBRN technologies with little to no additional effort on the part of the Warfighter.

The DoD and the CBDP continued response efforts to the incomplete inactivation and shipments of Bacillus anthracis (i.e. anthrax) spores by the Life Sciences Division at Dugway Proving Ground in 2015. The Secretary of the Army moved the Life Sciences Division from the functional control of the U.S. Army Test and Evaluation Command to CCDC CBC effective July 1, 2016. The Life Sciences Division, renamed the BioTesting Division as part of CCDC CBC, relinquished its Centers for Disease Control and Prevention (CDC) registration that allowed work at the Biosafety Level (BSL)-3 work in order to improve processes and procedures that led to the 2015 incident. The new registration package was submitted to the CDC in March 2018, and the CDC preliminary site-inspection was conducted in September 2018. The Secretary of the Army as the DoD Executive Agent for biosafety and biosecurity, continued work with DoD labs to implement the recommendations from multiple U.S. Government Accountability Office and DoD Inspector General investigations to enhance the program.

In May 2018, USAMRIID suspended BSL-3 and BSL-4 operations due to significant flooding and irreparable damage to the legacy (circa. 1953) Fort Detrick Steam Sterilization Plant (SSP) that processes waste water. Following this voluntary suspension, the Centers for Disease Control and Prevention Division of Select Agents and Toxins (CDC-DSAT) issued a formal cease and desist letter. Based on USAMRIID's interim solutions, CDC-DSAT lifted the cease and desist order on February 6, 2019, allowing USAMRIID to resume BSL-3/4 activities. The suspension from May 2018 to February 2019 resulted in a delay of FY18 and early FY19 BSL-3/4 funded research. USAMRIID developed a four-phased approach to bring BSL-3/4 activities back online, with each phase progressively increasing effluent decontamination capacity. The first phase, which has been active since December 2018, employed in-laboratory decontamination procedures and enabled USAMRIID to perform non-animal BSL-3 research. The second phase employs a Chemical Effluent Decontamination System (CEDS), which enables USAMRIID to perform BSL-3/4 work and includes animal studies on a limited scale. This phase has been active since February 14, 2019.

[12] Title 50 U.S. Code 1523 (b) 6: Problems encountered in the chemical and biological warfare defense program during the past year and recommended solutions to those problems for which additional resources or actions by the Congress are required.

The third phase will employ a Thermal Effluent Decontamination System (TEDS) to provide additional effluent decontamination capacity and expand the amount of BSL-3/4 work. TEDS is planned to be operating at full capacity by August 2019. All backlogged FY18 and FY19 work is expected to be completed by the end of FY19. The fourth (long-term) phase entails repairs to the replacement of the Steam Sterilization Plant, which has been non-operational since completion in 2014. USAMRIID continues to work with the U.S. Army Corps of Engineers, U.S. Army Medical Research and Materiel Command, U.S. Army Medical Command Health Facilities Planning Agency, and U.S. Army Materiel Command on the long-term solution to repair the replacement Steam Sterilization Plant.

Conclusion

Recent incidents across the globe concerning CB agents not only illustrate the reality we face, but also undermine the norms that protected civilians and Warfighters from these weapons for decades. Proliferation of technology, increased ease of access, challenges to detecting illicit activity, and limited ability to anticipate how adversaries might employ WMD all heighten the risk of unforeseen and unattributable attacks against the U.S. or its allies and partners. New chemical compounds were discovered and advances in biology have rapidly increased. The Department must remain at the leading edge of innovation and developing technologies to address the threats of today and of the future.

In FY 2018, the Department continued to prioritize and address the CBRN defense of the Joint Force. These efforts will continue as the Department pursues opportunities to modernize CBRN defense capabilities and enhance training. The Warfighter must maintain the readiness and lethality for any assigned mission and be prepared to address any current or emerging threats.

ENCLOSURE A: FY 2018 FIELDING QUANTITIES

JPEO-CBRND Element	Product/System	Total Fielded to the Warfighter (Services and/or Combatant Commands)
JPM NBC Contamination Avoidance (CA)	Dismounted Reconnaissance Sets, Kits and Outfits (DR SKO)	77
JPM NBC CA	Improved (Chemical Agent) Point Detection System – Lifecycle Replacement (IPDS-LR)	10
JPM NBC CA	M4A1 Joint Chemical Agent Detector (JCAD)	387
JPM NBC CA	Joint Biological Point Detection System (JBPDS)	3
JPM NBC CA	CBRN Talon IV	4
JPM Medical Countermeasure Systems (MCS)	Next Generation Diagnostic System (NGDS)	56
JPM MCS	Joint Biological Agent Identification and Diagnostic System (JBAIDS) Assay Kits	576
JPM MCS	Antidote Treatment - Nerve Agent, Auto-Injector (ATNAA)	438,857
JPM MCS	Soman Nerve Agent Pretreatment Pyridostigmine	36,000
JPM Protection (P)	Joint Service Aircrew Mask (JSAM), Rotary Wing (RW), MPU5 variant	931
JPM P	Joint Service General Purpose Mask (JSGPM), M50/M51 variants	173,295
JPM P	Uniform Integrated Protection Ensemble (UIPE) Increment 1	135,907
JPM P	Chemical-Biological Protective Shelter, M8E1 variant	53
JPM P	Joint Expeditionary Collective Protection (JECP)	45
JPM P	Joint Service Equipment Wipe (JSEW)	75,000
JPM Information Systems (IS)	Joint Warning and Reporting Network (JWARN) I & II	Continuously updated software product
JPM IS	Joint Effects Model (JEM) I & II	Continuously updated software product

JPM IS	CBRN Information System (CBRN-IS) on DISA milCloud	Continuously updated software product
JPEO-CBRND Experimentation Directorate	Enabling NBC Threat Awareness Understanding and Response (CENTAUR) Point Sensor Enclosures (PSEs)	28
Total Products/Systems Fielded		**861,228**
JPM MCS	Anthrax Vaccine Adsorbed (Doses)	631,030
JPM MCS	Smallpox Vaccine (Doses)	847,500
Total Vaccine Doses Acquired from the Strategic National Stockpile		**1,478,530**

ENCLOSURE B: FY 2018 CWMD AND CBRN RESPONDER TRAINING AND EDUCATION

JRO-CBRND Sponsored Leader Development and Education Courses	Attendees
Joint and Combined Warfighting School CWMD Focus Study and Purple Guardian CBRN Response/Defense Support to Civil Authorities (DSCA) Seminar	140
USA Command and General Staff College CWMD and CBRN Response Modules	140
USA Chemical, Engineer, Military Police Captains Career Courses CBRN Response Module & DSCA Phase II Certification	245
Engineer Warrant Officer Active Component CBRN Response Module	28
Joint Senior Leaders' Course	100
Joint and Service War College Joint Land Aerospace and Sea Simulation CWMD Academics TTX	121
Joint Special Operations University Combatting Terrorism Course CWMD Module	53
USMC Command and General Staff College National Response to Catastrophic and Disruptive Threats CBRN Response Course	190
USMC Staff Planners' Course	16
USMC CBRN Warrant Officers Course CBRN Response Module	11
CWMD Senior Staff Planners' Course	24
USA Nuclear and CWMD Agency Functional Area 52 Transition Course CB 101 Module	24
FY 2018 Total Number of Students	**1,092**

Defense Medical Readiness Training Institute Courses	Attendees
Emergency Preparedness Response Course (EPRC) - Clinicians Course (distance learning)	25,501
EPRC - Operator/Responder Course (distance learning)	21,649
EPRC - Basic Awareness Course (distance learning)	46,209
EPRC -Executive/Commander's Course (distance learning)	3,326
EPRC - Clinicians Course (on-site)	49
EPRC – Executive/ Commander's Course (on-site)	28
FY 2018 Total Number of Students	**96,762**

Armed Forces Radiobiology Research Institute Courses	Attendees
Medical Effects of Ionizing Radiation	685
FY 2018 Total Number of Students	**685**

NGB Sponsored Leader Development and Education Courses	Attendees
Advanced Decontamination	48
Chemical Warfare Agent/Biological Warfare Agent	110
Emerging Threats	291
Advanced Applied Science (Chemical)	10
Advanced Applied Science (Biological)	15
Applied Radiological Response Technique Level 1	376
Survey Equipment Capabilities Course (formerly Basic Survey Equipment)	119
Applied Radiological Response Techniques Level 2	40
Advanced Radiological Detection Training	142
Advanced HAPSITE ER Training (formerly GCMS)	84
Basic Defense Readiness Capabilities	40
Communication Intermediate Course	96
WMD-CST Confined Space Awareness	44
Robotics Course	114
Advanced Equipment Capabilities Course (CCDC CBC)	19
HAZMAT Awareness	376
Federal Emergency Management Agency (FEMA) Independent Study (IS) 700.a Introduction to the National Incident Management System	376
FEMA IS 100.b Introduction to Incident Command	376
FEMA IS 200.b Incident Command Systems (ICS) for Single Resources	376
FEMA IS 300 Intermediate ICS	478
FEMA IS 400 Advanced ICS	102
FEMA IS 800.b National Response Framework	376
Civil Support Skills Course	176
WMD-CST Pre-Command Course	35
Improvised Explosive Device Awareness	148
Analytical Laboratory System Operators Course	20
Advanced Shimadzu (formerly Advanced GCMS)	42
Basic Microscopy	26
Advanced Microscopy	21
CST Operations Course	33
Field Identification of Biological Warfare Agents (FIBWA)	22
CompTIA Boot Camp (Network Technician I)	36
Unified Command Suite (UCS) Basic	15
Cisco Certified Entry Networking Technician (CCENT) (Network Technician II)	38
Windows Microsoft Certified Solutions Associate MCSA (Network Admin I)	37
Windows Server (Network Admin II)	38
UCS Intermediate Information Technology (IT) Course	17
UCS Intermediate Radio Course	7
Additional Duty 1SG Seminar	31
Emergency Vehicle Operations	376
JEM 2.0	130
Physiological System Monitoring	122

NGB Sponsored Leader Development and Education Courses	Attendees
DR SKO Fielding	51
CBRN Talon IV Robot	93
Man-Portable Radiological Detection System	224
HRF/CERFP Search and Extraction Course	460
HRF/CERFP Mass Casualty Decontamination Course	464
HRF/CERFP WMD Command Post Operations Course	426
FY 2018 Total Number of Students	**7096**

USACBRNS Courses	Attendees
USACBRNS Distance Learning Courses	
CBRN Specialist	112
CBRN Captains Career (Reserve Component (RC)) Phase 1	87
CBRN Captains Career (RC) Phase 3	39
USACBRNS Resident Courses	
CBRN Basic Officer Leader-Branch	242
CBRN Captains Career	85
CBRN Captains Career (RC) Phase 2	40
CBRN Captains Career (RC) Phase 4	30
CBRN Warrant Officer Basic	13
CBRN Warrant Officer Advanced	16
Basic Radiological Safety	69
Advanced Radiological Safety	29
Radiological Packaging	22
CBRN Reconnaissance for Brigade Combat Teams	239
CBRN Pre-Command	17
Decontamination Procedures (Non-U.S.)	117
Biological Integrated Detection System	112
Joint Senior Leader	97
CBRN Specialist	1,601
Civil Support Team Operations	33
Civil Support Team Pre-Command Course	32
Civil Support Skills	180
CBRN Responders	1125
CBRN Responders Technician	416
CBRN Dismounted Reconnaissance	80
Technical Escort	222
Analytical Laboratory System Operator	25
Unified Command Suite Operator	15
Shipboard CBR-D Operations & Training Specialist (USN)	61
NBC Defense (USMC)	181
CBRN Basic Warrant Officer (USMC)	12
CBRN Planner (USMC)	21
Emergency Management Craftsman (USAF)	36

USACBRNS Courses	Attendees
Emergency Management Apprentice (USAF)	117
CBRN Advanced Leader Course (ALC) Phase 1	148
CBRN ALC Phase 2	164
CBRN ALC Phase 3	168
CBRN Senior Leader Course (SLC) Phase 1	93
CBRN SLC Phase 2	62
CBRN SLC Phase 3	61
USACBRNS, USA Engineering School, USA Military Police School Reserve Component Course	
Resident RC/ National Guard CBRN Response Module & DSCA	233
Module Training CBRN Response Module & DSCA Phase II Certification	133
FY 2018 Total Number of Students	**6,585**

U.S. Army Medical Department Center and School Courses	Attendees
Veterinary Food Inspection Specialist (68R)	122
Animal Care Specialist (68T)	75
Army Medical Basic Officer Leader Course (C20B)	1,199
Principles of Military Preventive Medicine (6A-F5)	44
Medical Logistics Officer Course (70K)	39
Combat Medic Specialist (68W)	5,822
Medical Laboratory Specialist (70K)	339
Preventive Medicine Specialist (68S)	178
Health Physics Specialist (68SN4)	11
Radiological Hazards Operator Course (6H-F45)	43
Practical Nurse Course (68C)	589
Health Services Plans, Operations, Intelligence, Security and Training (70H)	145
FY 2018 Total Number of Students	**8,606**

USAF Institute of Technology Courses and Global Challenge	Attendees
USAF Institute of Technology Course CBRN Response and DSCA Module (Mid-Career)	32
USAF Institute of Technology Course CBRN Response and DSCA Module (Senior Level)	16
Air War College Global Challenge-18 CWMD Module	240
FY 2018 Total Number of Students	**288**

USAF CBRN Defense Courses	Attendees
BioCapture 650	37
CBRN Contamination Control Area	102
CBRN Fundamentals	91
Contamination Control Station	121
Dry Filter Unit	52
FirstDefender™ RMX Handheld Chemical Identification Analyzer	58
M4A1 Joint Chemical Agent Detector	118
M4 Joint Chemical Agent Detector	151
MultiRAE Plus	22
MultiRAE Pro	42
Plume Modeling	82
Principles of CBRN Detection Technology	15
True Defender FTX	48
USAF Emergency Management Program	12,441
AERO First and Emergency Responder	4,902
CBRN Defense Awareness	46,911
Contamination Control Team	180
Control Center Operations	5,163
Emergency Operations Center	3,136
Shelter Management Team	572
Unit Emergency Management Representative	2,495
Response Task Force	221
Emergency Medical Support	1,123
FY 2018 Total Number of Students	**77,083**

USAF, 368th Training Squadron, Fort Leonard Wood, MO	Attendees
Emergency Management Craftsmen	117
Emergency Management Apprentice	187
FY 2018 Total Number of Students	**304**

USN Courses	Attendees
Shipboard CBR Defense Operations and Training Specialist Course	97
Damage Control Assistant Senior Enlisted – CBRND (San Diego)	108
Damage Control Assistant Senior Enlisted – CBRND (Norfolk)	82
JEM & JWARN operators trained at USFF, COMTHIRDFLT, and COMPACFLT Maritime Operations Center	18
JBAIDS Schoolhouse (Navy-Shipboard, NEPMU & FST)	21
NGDS Schoolhouse (Navy-NEPMU & BDRD/NMRC)	13
FY 2018 Total Number of Students	**339**

USAMRICD Courses	Attendees
Field Management of CB Casualties (FCBC) Course	288
Medical Management of CB Casualties (MCBC) Course	329
Hospital Management of CBRNE (HM-CBRNE)	68
Off- Site (Andersen AFB, Guam)	43
Off- Site (Camp Pendleton, CA)	39
Off- Site (Eielson AFB, AK)	47
Off- Site (Bangkok, Thailand)	58
Off- Site (Kadena AB, Japan)	80
Off- Site (Yokota AB, Japan)	150
Off- Site (Wright Patterson AFB, OH)	36
Off- Site (Elmendorf AFB, AK)	41
Off- Site (Camp Douglas, WI)	62
Off- Site (Ft. Campbell, KY)	78
Off- Site (Aberdeen Proving Ground-South, MD (Andrews AFB))	96
Off- Site (Camp Arifjan, Kuwait)	50
Off- Site (Fairchild AFB, WA)	72
Off- Site (Schofield Barracks, HI)	71
Off- Site (Nellis AFB, NV)	99
Off- Site (Ft. Bragg, NC (724th Special Tactical Group))	18
Off- Site (Langley AFB, VA)	69
Off- Site (Ft. Benning, GA)	39
Off- Site (Travis AFB, CA)	179
Off- Site (Misawa AB, Japan)	49
Off- Site (Ft. Lewis, WA)	47
Off- Site (Kunsan AB, Korea)	67
Off- Site (Osan AB, Korea)	63
Off- Site (Ft. Bragg, NC (82nd ABN Division))	52
Off- Site (Hurlburt AFB, FL)	37
Off- Site (Ft. Bragg, NC (75th Rangers))	35
Off- Site (Keesler AFB, MS)	230
Off- Site (Eglin AFB, FL)	9
Off- Site (Landstuhl, Germany)	38
Off- Site (Lackland AFB, TX)	430
Off- Site (APG-S, MD (MARSOC))	11
Off- Site (Ft. Bragg, NC (1st Special Forces Group))	108
Classified	142
FY 2018 Total Number of Students	**3,335**

USAMRIID Courses	Attendees
FIBWA - Civil Support Team (CST)	35
FIBWA - Manager's Course	45
FIBWA - Chemical, Biological Incident Response Force (CBIRF)	10
FCBC Course	329
Medical Management of CB Casualties Course	288
HM-CBRNE Incidents Course	68
Outbreak Response Course (Health and Human Services & DoD)	56
Medical Management of Biological Casualties DL Course - DHA US-071(29hrs)	18,319
Off- Site (Andersen AFB, Guam)	200
Off- Site (Camp Pendleton, CA)	40
Off- Site (Eielson AFB, AK)	200
Off- Site (Bangkok, Thailand)	30
Off- Site (Kadena AB, Japan)	80
Off- Site (Yokota AB, Japan)	150
Off- Site (Wright Patterson AFB, Dayton OH)	36
Off- Site (Joint Base Elmendorf-Richardson, AK)	41
Off- Site (Camp Douglas, WI)	62
Off- Site (Ft. Campbell, KY)	78
Off- Site (APG-S, MD)	96
Off- Site (Fairchild AFB, Spokane WA)	72
Off- Site (Schofield Barracks, Oahu HI)	71
Off- Site (Nellis AFB, Las Vegas NV)	99
Off- Site (Ft. Bragg, NC)	18
Off- Site (Langley AFB, Hampton VA)	69
Off- Site (Ft. Benning, GA)	39
Off- Site (Travis AFB, CA)	179
Off- Site (Joint Base Lewis-Mcchord, Ft. Lewis, WA)	47
Off- Site (Kunsan AB, Korea)	67
Off- Site (Osan AB, Korea)	63
Off- Site (Ft. Bragg, NC)	52
Off- Site (Hurlburt AFB, FL)	37
Off- Site (Ft. Bragg, NC)	35
Off- Site (Keesler AFB, Biloxi, MS)	230
Off- Site (Eglin AFB, FL)	9
Off- Site (Landstuhl, Germany)	38
Off- Site (Lackland AFB, San Antonio, TX)	430
Off- Site (APG-S, MD)	11
Off- Site (Ft. Bragg, NC)	108
FY 2018 Total Number of Students	**21,837**

CCDC CBC Courses	Attendees
Biological Agents/Small Scale Production	66

Chemical Agents/Small Scale Production	70
Advanced CBRNE for CSTs	20
Emerging Threats	506
CBRN Planner Course	36
Chemical Biological Agent Topics	52
Chemical Warfare Agents/Biological Warfare Agents	48
Advanced Chemical Biological	82
Target Recognition Course	114
Decontamination Topics	32
Advanced Sampling	70
CST Survey Operations Course	43
Advanced Field Equipment Detection Course	28
Single Day Field Training Exercises	902
FY 2018 Total Number of Students	**2,069**

ENCLOSURE C: FY 2018 SCIENCE & TECHNOLOGY TRANSITIONS FROM JSTO-CBD

Transition Partner	Project Title	Project Description
JPEO-CBRND - Medical Countermeasure Systems (MCS)-Diagnostics (Dx) Defense Biological Product Assurance Office (DBPAO)	Molecular Transition Packages (MTPs) for Real-time (RT) polymerase chain reaction (PCR) Assays Set B	Primary objective is to focus on performing and supporting research that target capability gaps for bio-threat diagnosis and protection of the Warfighter. To accomplish this, several key areas within the diagnostics portfolio will be addressed. This includes sequencing, genotyping, annotation, improvement and associated phenotypic analysis as resources to support transformative diagnostic research in biological defense. Deliverables include a number of MTP for various Biological Select Agents and Toxins to assist JPEO-CBRND with developing diagnostic assays.
JPEO-CBRND - DBPAO	MTP for Optimized EBOV Real-time PCR Assay (Signature Erosion)	Due to the rapid mutation rate of viruses, the possibility exists that current assays will not be able to fully detect future isolates. Rapid sequencing of clinical isolates from the recent Ebola virus outbreak identified multiple sequence variants within the Emergency Use Authorization assay EZ1. These findings, along with the concerns about the assays failing to detect current Ebola virus isolates, required efforts to identify when assays would have to be re-designed. This effort will result in evaluation of viral quasi-species on RT-PCR assay function and the novel development of degenerate assays to predict genomic erosion, resulting in a MTP for an optimized EBOV RT-PCR assay.
	Empowering the Development of Genomics Expertise Test Demonstration	Technology/products will be delivered to the test location of Institut Pasteur de Dakar in Senegal. Test demonstration bioinformatics will be evaluated in the first quarter of FY 2019. After the conclusion of this demonstration, JSTO-CBD and DBPAO will highlight gaps and needs for development in a subsequent technology demonstration to best support CBDP.
JPEO-CBRND – MCS - Dx	Systematic Analysis of Host-Based Biomarker Research	To systematically analyze host-based biomarker research efforts designed to diagnose exposure to chemical or BW agents, mine human and non-human primate host-based biomarker studies to a defined set of studies/host insults and identify biomarkers for potential clinical military applications in far forward medical environments, including wearable sensors. The specific objectives for this effort are to: 1) conduct systematic reviews and analyses of host-response biomarker studies and methods; 2) perform meta-analyses of data; and 3) translate results to inform the development of host-based biomarker approaches and technologies for military applications.
JPM Guardian – JPM NBC CA	End-to-End Whole Genome Sequencing Diagnostic System	Sample-to-Sequence workflow, addressing sample preparation, next generation sequencing, and improved bioinformatics was optimized to reduce time and user steps. Technology Transition Agreements were signed by JPM Guardian and an Interagency Partner (IC) in the third quarter of FY 2018.
JPEO-CBRND SOF-RCDD - JPM NBC CA	Advanced Biological Sampling Efforts	Three JHBI sample preparation devices were transitioned to meet the unique sensitive site exploitation needs of a USSOCOM customer for integration into the JHBI Program under the JPEO-CBRND, SOF-RCDD. The transitioned devices will allow USSOCOM users to effectively collect environmental samples and prepare the samples for analysis on the JHBI platform as well as preserve the biological material for transport.

Transition Partner	Project Title	Project Description
JPEO-CBRND – JPM NBC CA	High Pressure Mass Spectrometry Technology	The Micro Gas Analyzer Program matured technology that is capable of operating closer to atmospheric pressure, thereby enabling significant reductions in detector size, weight, and power. The technology platform was commercialized by 908 Devices, Inc. and was incorporated into the NGCD/AVCAD Program.
	Initial Survey of Color-changing Indicators for Liquid Chemical Identification	This effort is developing colorimetric sensor array technology to detect and presumptively identify chemical warfare agents and other toxic materials in the field. Color-changing indicator chemicals were tested against chemical warfare agents, toxic industrial chemicals, and common battlefield interferents to determine unique responses to specific chemicals. The data was provided in support of the Reactive-Chemistry Orthogonal Surface and Environmental Threat Ticket Array Program.
JPEO-CBRND – JPM P	Integrated Protective Fabric System	Whole-system sulfur mustard (i.e. HD) vapor testing was completed for the Joint Service Lightweight Integrated Suit Technology, CB lightweight improved thermal ensemble, and CB Flame Resistant Army Combat Uniform, and Enhanced Flame Resistance Army Combat Uniform-Chemical Biological Undergarments on a manikin in the United Kingdom.
JPEO-CBRND – JEM/JPM IS	JEM Science and Technology Prototype 6.5 - Includes enhancements to previously transitioned capabilities and Capability Maturity Model Integration-compliant Missile Intercept Module	Software for atmospheric modeling and transport and hazard prediction. Includes enhancements to urban models, CB source term models, and new material data files.
JPEO-CBRND – JPM-Guardian	IEW Advanced Technology Demonstration (ATD) Expeditionary Analytics Data Management Demonstration	Provided a chemical sample management application for sensitive site exploitation and/or assessment missions. Additionally, as resources permit, develop and demonstrate, supporting technologies and CONOPs for specialized CBRN units.
JPEO-CBRND – JPM IS	IEW ATD Sensing/Decision Management Baseline Demonstration	Integrated an initial set of applications to provide an enhanced, integrated sensor data info-sharing and situational awareness with advanced decision logic signal processing and early warning of potential biological threats.
JPEO-CBRND - JPM MCS-BDTx JPM MCS-JVAP	Novel Mechanism Antibacterial for Gram Negative Bio-threats Establishing FDA Indications for Omadacycline in Treatment of Nonhuman Primate Animal Models of Infection (Anthrax and Plague Indications).	Drug repurposing of Omadacycline for inhalational Plague (sNDA).
JPEO-CBRND – Global Biosurveillance (G-BSP)/JPM-IS	Select Biosurveillance (BSVE) Ecosystem Capabilities - Technology Drop (TD) 4	JSTO-CBD completed transition of BSVE TD4, including several new analytic applications: 1) The Public Health Processor, which now includes below country notifiable disease data for Australia, Canada, Finland, France, Germany, Hong Kong, Iraq, Israel, Japan, Norway, Russia, Singapore, and Sweden; 2) The Severity Meter, which adjusted the severity assignments using additional events and more accurately reflects public reaction; 3) EpiViz which now allows analysts to bin epidemiological data by geographic regions; and 4) Event Tracker, which calculates a standard epidemiological week from symptom onset date and assigns a latitude / longitude to place names. BSVE uses the agile development method, which allowed the G-BSP development team to integrate all of this technology within the same quarter as delivery.

Transition Partner	Project Title	Project Description
	Select Biosurveillance Ecosystem Capabilities - TD 5	JSTO-CBD completed transition of BSVE TD5, including several enhancements to the Software Developers Kit: 1) Search Application Programming Interface enhancements now permit a) G-BSP to submit a bounding box query of any size; and b) return analyst verified tags to G-BSP; 2) Scheduled jobs allow G-BSP to execute BSVE code on a predetermined schedule; and 3) Improved Data Services now support full native and restful interfaces for NoSQL and Relational databases, which significantly enhances support for large data sets. BSVE uses the agile development method, which allowed the G-BSP development team to integrate all of this technology within the same quarter as delivery.
OSD – ODASD (CBD)	IEW ATD Service Common Operating Environment Analysis	Provide an "as in" architecture and initial assessment of each Service's Operating Environment regarding early warning. By the request of the OASD(NCB/CB) IEW Terms of Reference.
JPEO-CBRND – JPM NBC CA	IEW ATD Unmanned Aerial Vehicle Assessment Report	Provided a comprehensive assessment of the Perceptive Dragon series of demonstrations toward increased early warning capabilities, i.e. harvesting real-time CBRN-related information threads and distributing them among the Joint Forces' common operating environment.
	IEW ATD Host Based CB Exposure Monitoring Data Management Integration	Demonstrated the passage of physiological data from a wearable sensor into ATAK/Nett Warrior and incorporated a prototype Leaderboard that illustrated levels of heat strain for a team of Warfighters
USMC – Knowledge Product Transfer to the Warfighter	Warfighter Training	Provided NTA briefing to USMC CWO Course at Ft. Leonard Wood and via SVTC.
USACMLS Joint Senior Leaders Course - Knowledge Product Transfer to the Warfighter		Provided NTA briefing at JSLC, Ft. Leonard Wood.
USAF - Knowledge Product Transfer to the Warfighter		Provided NTA briefing at USAF CBRNE Threat Day
Intelligence Community NGIC / DIA - Knowledge Product Transfer to the Warfighter	Agent Characterization Reporting	Syntheses of EA6192, EA6187, and EA6195. ECBC technical report by Carilyn Torruellas-Pagan.
ECBC Report for IC NGIC / DIA - Knowledge Product Transfer to Warfighter		Persistence and Effective Half Life of Chemical Warfare Agent VX on Grass Foliage. ECBC technical report.
JRO JPEO - Knowledge Product Transfer to Warfighter		Translational Human Health Assessment of Carfentanil Using an Experimentally Refined PBPK Model. ECBC technical report by Michael Feasel, Richard Lawrence, Robert Kristovich, Ariane Wohlfarth, and Marilyn Huestis

ENCLOSURE D: ACRONYM LIST

ACRONYM	DEFINITION
ALS	Analytical Laboratory System
AMP	Agile Medical Paradigm
ATD	Advanced Technology Demonstration
AVCAD	Aerosol and Vapor Chemical Agent Detector
BSL	Biosafety Level
BSVE	Biosurveillance
BW	Biological Warfare
CA	Contamination Avoidance
CB	Chemical and Biological
CBA	Capabilities Based Assessment
CBDP	Chemical and Biological Defense Program
CBK	Chemical and Biological Knowledgebase
CBRN	Chemical, Biological, Radiological, and Nuclear
CBRND	Chemical, Biological, Radiological, and Nuclear Defense
CBRND-RAV	Chemical, Biological, Radiological, and Nuclear Defense Readiness Assist Visit
CBRNE	Chemical, Biological, Radiological, Nuclear, and Explosives
CBRN-IS	Chemical, Biological, Radiological, and Nuclear Information System
CCDC CBC	Combat Capabilities Development Command Chemical Biological Center
CDC	Centers for Disease Control and Prevention
CERFP	Chemical, Biological, Radiological, Nuclear, and Explosives Enhanced Response Force Package
ChE	Cholinesterase
CIMS	CBRN Response Enterprise (CRE) Information Management System
COLPRO	Collective Protection
CONOP	Concept of Operation
CPS	Collective Protection System
CRE	Chemical, Biological, Radiological, and Nuclear Response Enterprise or Chemical, Biological, Radiological, and Nuclear Response Elements
CTC	Combat Training Center
CWMD	Countering Weapons of Mass Destruction
DARPA	Defense Advanced Research Projects Agency
DBPAO	Defense Biological Product Assurance Office
DISA	Defense Information Systems Agency
DoD	Department of Defense
DOTMLPF-P	Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, Facilities, and Policy
DR SKO	Dismounted Reconnaissance Sets, Kits and Outfit
DT/OT	Developmental Testing and Operational Testing
DUSA-TE	Deputy Under Secretary of the Army – Test and Evaluation

ACRONYM	DEFINITION
Dx	Diagnostic
ECBC	Edgewood Chemical Biological Center
EMBD	Enhanced Maritime Biological Detection
FDA	Food and Drug Administration
FOC	Full Operational Capability
FY	Fiscal Year
G-BSP	Global Biosurveillance
HRF	Homeland Response Force
IAW	In Accordance With
IB	Industrial Base
IEW	Integrated Early Warning
IOC	Initial Operational Capability
IPE	Individual Protective Equipment
IPE-RIP	Individual Protective Equipment - Readiness Improvement Program
IS	Information Systems
ISEA	In-Service Engineering Agent
JBAIDS	Joint Biological Agent Identification and Diagnostics System
JBPDS	Joint Biological Point Detection System
JECP	Joint Expeditionary Collective Protection
JEM	Joint Effects Model
JHBI	Joint Handheld Bio-Identifier
JPEO-CBRND	Joint Program Executive Office for Chemical, Biological, Radiological, and Nuclear Defense
JPM	Joint Project Manager
JRO-CBRND	Joint Requirements Office for Chemical, Biological, Radiological, and Nuclear Defense
JSAM	Joint Service Aircrew Mask
JSGPM	Joint Service General Purpose Mask
JSTO-CBD	Joint Science and Technology Office for Chemical and Biological Defense
JWARN	Joint Warning and Reporting Network
LOE	Line of Effort
LSGCO	Large Scale Ground Combat Operations
MCM	Medical Countermeasure
MCS	Medical Countermeasure System
MET	Mission Essential Task
MTP	Molecular Transition Package
NAVSEA	Naval Sea System Command
NBC	Nuclear, Biological, and Chemical
NDS	National Defense Strategy
NG	National Guard
NGB	National Guard Bureau
NGCD	Next Generation Chemical Detector

ACRONYM	DEFINITION
NGDS	Next Generation Diagnostics System
NTA	Non-Traditional Agent
OASD(HA)	Office of the Assistant Secretary of Defense for Health Affairs
OASD(NCB/CB)	Office of the Assistant Secretary of Defense for Nuclear, Chemical, and Biological Defense Programs/Chemical and Biological Defense
OPCW	Organization for the Prohibition of Chemical Weapons
OTA	Other Transaction Authority
P	Protection
PCR	polymerase chain reaction
PL	Public Law
RT	Real-Time
RW	Rotary Wing
SOF	Special Operations Forces
T&E	Test and Evaluation
TD	Technology Drop
TTP	Tactics, Techniques, and Procedures
TTX	Table Top Exercise
U.S.	United States
UIPE	Uniform Integrated Protection Ensemble
USA	U.S. Army
USACBRNS	U.S. Army Chemical, Biological, Radiological, and Nuclear School
USAF	U.S. Air Force
USAMRICD	U.S. Army Medical Research Institute of Chemical Defense
USAMRIID	U.S. Army Medical Research Institute of Infectious Diseases
USFK	United States Forces Korea
USMC	U.S. Marine Corps
USN	U.S. Navy
USSOCOM	U.S. Special Operations Command
WMD	Weapons of Mass Destruction
WMD-CST	Weapons of Mass Destruction-Civil Support Team