U.S. Army CBRN Capability Development Update

By Colonel Scott D. Kimmell (Retired)

o fight, survive, and win in operations against 21st-century adversaries, we must leverage ingenuity and technology to develop comprehensive solutions. These solutions should provide situational understanding of potential chemical, biological, radiological, and nuclear (CBRN) hazards; ensure protection with efficient protective equipment; and mitigate the consequences of contamination with limited time and resources. Developing capabilities to achieve these ends requires a comprehensive approach that encompasses all warfighting functions, including protection, and these capabilities must be integrated across doctrine, organization, training, materiel, leadership and education, personnel, facilities, and policy (DOTMLPF-P). In coordination with the entire CBRN enterprise, the U.S. Army Chemical Regiment continues to make progress toward delivering the required capabilities to the warfighter. This article presents an update on five of the programs designed to do that within and across our three core functions of assess, protect, and mitigate and provides a glimpse into future CBRN defense capabilities.

Assess

The Compact Vapor Chemical Agent Detector (CVCAD) is a networked, wearable capability designed to detect and presumptively identify vapor hazards; it could potentially replace the Joint Chemical Agent Detector. Initial prototyping of the CVCAD was recently completed, with the results used to provide input for the joint requirement. The CVCAD will be demonstrated at a Soldier touchpoint at Fort Carson, Colorado, and the feedback will be used to narrow potential solutions that are most likely to meet the capability needs of the joint force.

While the Army strategy for biological defense continues to evolve, development of the Joint Biological Tactical Detection System—a networked biological detection capability designed to provide warning—is nearing completion. The plan is for production systems to be included in a multi-Service operational test event next year and then to go on to full-rate production and fielding beginning in 2026.

Protect

Shielding the individual Soldier from CBRN hazards has always been a top priority for the Army and the Chemical Regiment. Current percutaneous protection is effective, but cumbersome and physiologically burdensome. The Uniform Integrated Protection Ensemble (UIPE) is being developed to decrease the degradation of an individual Soldier's combat power. The UIPE is a two-piece, lightweight, chemically protective combat uniform that is made of air-permeable material and has an aerosol liner treated with liquid repellent. It is slated to replace the Joint Service Lightweight Integrated Suit Technology. The UIPE is in the final stages of development. Production-representative suits continue to be tested to determine where further improvements on the design and durability can be made. Limited production of this capability is expected in 2025. Once the suit meets the requirements necessary to support its intended use by the warfighter, fullrate production will begin.

Mitigate

In December 2023, the U.S. Army Chemical, Biological, Radiological, and Nuclear School (USACBRNS) Commandant commissioned a decontamination working group consisting of representatives across all major commands to assess current decontamination capabilities across DOTLMPF-P and determine how to best immediately improve readiness.

While still in the early stages of science and technology development, the Automated Decontamination System (ADS) program is exploring potential robotic integration and capability to reduce time and manpower requirements for CBRN hazard contamination mitigation. These efforts, coupled with a complete assessment across DOTMLPF-P, are focused on how decontamination should be executed in 2040. Permission to move the ADS program into continued analysis and to research and gather information on potential solutions and estimated costs for achieving ADS capability has been granted. The next major milestone will be the receipt of permission for the materiel developers to begin prototyping and testing solutions that have been identified to fulfill the ADS requirement.

Enable Capability Across Core Functions

Chemical, Biological, Radiological, and Nuclear Support to Command and Control (CSC2) is a joint effort that is underway to integrate CBRN awareness and understanding across the common operating picture. This networked capability will be designed to synchronize and integrate CBRN data and information into the commander's common operating picture at all levels from battalion to joint task force, allowing commanders to make proactive risk-based decisions in CBRN environments. CSC2 is expected to undergo an operational assessment before the end of 2024, with expected delivery to the Army in 2026. After its initial release, subsequent software updates will occur every 3 months in order to improve the capability.

Way Ahead

The successful modernization of the CBRN defense capability is dependent on a better understanding of CBRN hazards and the consequences of contamination and exposure in operational environments. Neither dated Cold War era field studies nor present-day laboratory experiments correlate well with future operating concepts or environments. Science-based studies are imperative in ensuring appropriate input for future solutions. As with other battlespace hazards faced by Soldiers, there are no absolutes with CBRN-only varying degrees of probability and consequences (expressed by risk). But, while CBRN is one of the eight forms of enemy contact, CBRN hazards are frequently misunderstood and generally neglected, but widely feared. Why do CBRN considerations differ from those of other enemy contact forms? Simply put, they carry the stigma of being in the "too hard to do" box and/or are assumed to be unlikely threats. Neither is true, and perceptions must change.

Commanders must be enabled to make proactive, riskbased decisions in CBRN environments based on a better understanding of the impacts of those decisions in time and space. Capability modernization is contingent on integration of the three core functions, providing leaders with the ability to reduce—not eliminate—risks. The development of capabilities across the core functions of assess, protect, and mitigate, woven together by DOTMLPF-P integration, provides the foundation for successful operations in future CBRN environments.

Conclusion

Dismissing the CBRN myths of the past and replacing them with an understanding of CBRN environments and potential hazards is crucial to modernization. (Because the elimination of CBRN risk is unachievable, attempts at completely removing the risk are a waste of resources and time.) If we can provide a better understanding of the threat, train and equip our force to operate in its proximity, and mitigate the CBRN hazard risk to acceptable levels, then CBRN modernization will be achievable in the not-so-distant future. As with all forms of enemy contact, CBRN risk is inherent but manageable. We must enable our leaders and their formations to manage that inherent risk in future CBRN environments.

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