THREAT AGENT DEFEAT MODELING AND TESTING USING WMD SIMULANTS

Flexible And Complementary Operationally Realistic Biodefense Testing

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Background information: Typical testing infrastructure for biological defense purposes, whether it be detection, threat/hazard characterization, contamination and decontamination, environmental persistence and behavior, and other related studies, are inherently limited in capabilities due to safety considerations, size and flexibility constraints to conduct a variety of evaluations, and limited operational realism to test in mission-relevant ways.

Purpose: In support of several stakeholders across the CB defense enterprise, Battelle has developed, demonstrated, and applied a range of flexible and complementary test capabilities that address many of the typical testing infrastructure limitations.

Methods: The combination of the BSL-2 ARCA Chamber, BSL-3 ARCA Chamber, and the Ambient Breeze Tunnel collectively provide unique and complementary test capabilities to support a variety of studies to help deliver mission-effective solutions to the warfighter. Specifically, the combination offers

-The ability to develop, apply, and transition test methods quickly among the test facilities using inert, BSL-1, BSL-2, BSL-3, and select chemical materials and aerosols

-A full range of laboratory, room, and outdoor test scales that allow for evaluation of components, systems, and systems of systems

-Operationally realistic test environments, such as in full-immersion in unfiltered outdoor ambient air and/or intentionally aerosolized constituents and interferents with the flexibility and size to consider CONOPs involving people/analogs, vehicles, drones, and other full-scale test participants.

Results: The complementary test capabilities have been demonstrated to support the CB defense enterprise across the entire materiel acquisition cycle, from basic science and characterization to early and advanced technology demonstrations through live agent developmental testing.

Specific demonstrated test examples include:

-Performance evaluations of biodetection components and systems against surrogate and live agent aerosols in backgrounds consisting of operationally relevant constituents and interferents

-Characterization of threats/hazards posed by personal and ground-based sprayers, aerial sprayers at aircraft wind speeds, military burn pits, re-aerosolization of contaminated water supplies, and outdoor aerosol intrusion into buildings

-Full-scale evaluations of contamination and decontamination scenarios, including decontamination of personnel and civilian/military vehicles and components, evaluation of hazards posed by correct and incorrect doffing of personal protective equipment, and potential for contamination transport as a result of sample collection/retrieval processes.

Conclusions: The combination of the flexible and complementary test capabilities demonstrated and applied by Battelle collectively address many of the limitations of typical biological defense test infrastructure and can be a valuable tool for the CB defense enterprise as it looks to adapt to emerging threats and the need for timely mission-effective solutions.

Impact to the DTRA JSTO mission and Joint Force: Instead of developing single-purpose test capabilities that have limited utility beyond their initial focused purpose, the combined test capabilities offered by Battelle's BSL-2 ARCA Chamber, BSL-3 ARCA Chamber, and Ambient Breeze Tunnel advance the ability to quickly develop and implement test methods that can transition across a range of scales, test material hazards, and operationally relevant CONOPs. The flexibility and range of capabilities lend themselves particularly well to execute the test and evaluation of system of systems applications that may contain disparate and/or similar technologies and require multiple types of individualized and/or integrated testing.