CRITICAL RESEARCH/INNOVATION FOCUS AREA DOCUMENT

Improvised Explosive Device (IED) Threat Characterization and Signatures

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Please note that as more details are available, DHS will post updated research/innovation focus area overviews on the FutureTECH website. This is a pre-decisional draft document of the NSTC Subcommittee on Domestic IEDs. Please contact Dr. Ruth Doherty, ruth.doherty@dhs.gov for more information.

Who?

Identify any DHS component stakeholders that contain or represent potential end users. Also name any Capstone IPT(refer to http://www.dhs.gov/xres/programs/gc_1234200779149.shtm and the article entitled "Making it Easier to Work with DHS"), if any, which identified a capability gap related to this research/innovation focus area.

The U.S. Department of Homeland Security (DHS) leads for CIEDs are the Office for Bombing Prevention and United States Secret Service (USSS). The corresponding DHS Science and Technology (S&T) Capstone IPT that identified capability gaps related to this focus area is entitled "Counter-IED."

What?

Describe a required technology/capability. Describe how a technology will provide the capabilities and functional improvements needed to address the DHS need. Do not describe a specific technical solution. Instead, describe a conceptual technology for illustrative purposes. Define typical missions that the proposed technology could be utilized to accomplish.

Our ability to analyze improvised explosive device (IED) threats requires common definitions and lexicon, a detailed process for testing and characterizing the performance of IEDs and IED countermeasures, the ability to simulate IED threats and the development of IED threat models.

A repository of data obtained under controlled conditions is necessary to conduct the analysis required for this characterization and modeling. Collecting data on vehicles used as devices and on devices in vehicles (person-borne, placed, etc.) will require a standard set of procedures for surface sampling to characterize the extent of surface contamination occurring during the IED construction process and an instrumented range to test small vehicles with progression toward larger vehicles.

Analysis of test data will provide an understanding of why and how various components can be used in device construction as well as measurements of the effects of blasts conducted under different physical configurations.

Threat characterization requires analytic tools that incorporate prediction and pattern assessment.

The development of a comprehensive body of common standards can be achieved by searching out the standards that may exist, evaluating their effectiveness, ensuring their consistency and using them to develop additional necessary standards that are missing.

Comprehensive instrumentation and instrumentation protocols and standards for existing testing facilities are needed to provide reliable and well-understood characterizations.

Scientific analysis of accumulated test data can provide an understanding of why and how various components can be used in device construction. Measurements of the effects of blasts conducted under different physical configurations can be used to model the consequences of IED blasts. Correlation of standardized characterizations to post-event forensics and real-time event data will assist in identification of ongoing planning activities by the terrorist.

References:
a. HSPD-19 I-Plan (Draft) Tasks: 3.1.2
b. HSPD-19, Paragraphs 8, 9

Why?

Describe the analysis and rationale for requiring a new technology/capability. Describe why existing technologies cannot meet current or projected requirements. Describe what new technologies/capabilities are needed to address the gap between current capabilities and required capabilities.

The IED community requires an ability to obtain, access and analyze detailed and authoritative performance data on IED threat devices based on the design, assembly and detonation of IED threat devices in a laboratory and/or testing environment.

The following challenges limit our ability to characterize and understand the nature of IED threats: 1) lack of unrestricted access to fully instrumented explosives test ranges has limited the capability to conduct multiple tests of IED devices under controlled conditions and to collect well-understood data; and 2) lack of a common lexicon and data standards for defining measurements, and storing and analyzing data prevents us from comparing and using test results and analyzing previous, current and future test data to determine overall effectiveness of C-IED solutions.

When?

If a technology/capability is intended as a countermeasure to a threat, summarize the threat to be countered and how the technology could be used (i.e., concept of operations). If applicable, provide a schedule/timeframe to capture when the technology/capability is needed in order to address the DHS gap.

To develop the capability to counter IED attacks, we must integrate our understanding of two aspects of the threat – the actor and the tool. Despite the worldwide proliferation of IED attacks, little standardized data exists that can be used to characterize the construction of the IEDs or the resulting blast effects under various conditions and methods of delivery. There is no commonly accepted set of test criteria on IED detonations or a database of recent performance data.

Where?

Describe the projected threat environment in which the technology/capability may be potentially deployed.

A repository of data obtained under controlled conditions is necessary to conduct the analysis required for this characterization and modeling.