

CRITICAL RESEARCH/INNOVATION FOCUS AREA DOCUMENT

Improvised Explosive Device (IED) Assessment and Diagnostics

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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.

Technologies and techniques that require the technician to approach the device should allow the operator to safely collect useful information while minimizing the time required in close proximity to the device. Furthermore, for a technology to be useable near an improvised explosive device (IED), consideration must be given to its functionality in an electronic countermeasures (ECM) environment.

Personnel protective equipment necessary for working near an IED limits not only movement, but vision and hearing as well. All equipment should be easy to operate while the technician/operator is in a bomb suit regardless of proximity to the device. The logistical burden associated with the tools and techniques for assessment and diagnosis of the IED should be kept to a minimum.

With respect to the detection of potential explosives contained within a device, special consideration should be given to identification of improvised explosives because of their potential sensitivity to influences such as heat, shock, friction and static discharge.

The development of advanced assessment and diagnostic tools/techniques in the following areas is desired:

- Novel imaging approaches to identify the precise location of IEDs whether by detection of the explosive filler, energized or un-energized circuitry, or some other yet to be identified signature
- Approaches to stand-off diagnostics
- Identification of characteristics of IEDs that provide information that can be used in the selection of an approach for defeating the IED
- Approaches to assessment and diagnosis suitable for use by responders who may not have the scientific or technical background to interpret quantitative data, and will therefore be dependent on qualitative information

References:

- a. HSPD-19, paragraphs 4 (b, c, d), 9;
- b. HSPD-19 I-Plan Tasks: 3.2.1, 3.2.2, 3.2.3, 3.2.4, 3.2.5
- c. National Guidelines for Bomb Technicians (Revised 4/06)

Please note that as more details are available, DHS will post updated research/innovation focus 2 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.

- d. National Strategy for U.S. Bomb Squads (December 2007), page 13, Section 7.
- e. FBI Special Technicians Bulletin 2007-3: Vehicle Borne Improvised Explosive Device Response Bomb Squad Readiness
- f. Bomb Squad Response to Suicide Bombers and Vehicle Borne Improvised Explosive Devices: Categories of Situations and Strategies for Each Category

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.

Bomb makers do not normally choose a “best design” to meet their needs; they adapt what already exists. The ability to analyze IED firing systems and circuitry (diagnostics) and evaluate not only the potential for destruction but likelihood of detonation (assessment) is critical to developing appropriate IED response plans and render safe procedures. Technologies for assessment and diagnostics performed on IEDs must undergo a sustained development, testing, evaluation and improvement process in order to mitigate the impact of new and emerging IED threats, and offset the technological adaptations and defeat countermeasures developed by the enemy.

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.

The makeup of an IED is no longer limited to conventional explosives such as trinitrotoluene (TNT). Devices designed and built by bomb makers today can incorporate improvised explosives and detonators, modified ordnance and hazardous materials such as industrial toxic chemical, radiological materials or substances that enhance the effect of the explosive materials. In addition, IED designs may span the range of simple pressure-plate devices to systems which use micro-processor controlled sensor circuitry. Assessment and diagnostic tools that provide qualitative and quantitative information on the threat is critical for planning access and defeat procedures.

Where?

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

Assessment and diagnostic procedures should be performed outside the blast and fragmentation range of the IED in order to keep bomb technicians out of harms way.

Please note that as more details are available, DHS will post updated research/innovation focus 3 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.