

# **CRITICAL RESEARCH/INNOVATION FOCUS AREA DOCUMENT**

## **Detect and Defeat Waterborne Improvised Explosive Devices (WBIEDs)**

**Dr. Ruth Doherty  
Counter Improvised Explosive Devices (C-IED)  
U.S. Department of Homeland Security, Science and  
Technology (S&T) Directorate**

**May 4, 2009  
Version 1.0**

*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](mailto: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](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). In addition, the United States Coast Guard (USCG) is the Federal organization most responsible for domestic maritime security. 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.*

Domestic response is not the U.S. Navy Explosive Ordnance Disposal's (EOD) primary mission and nearly 70% of its forces are currently deployed in support of other missions, reducing domestically stationed detachments to the minimum manning levels permissible to maintain operational status.

The USCG is the Federal organization most responsible for domestic, maritime security. In addition to its normal shore stations, USCG maintains thirteen terrorism-focused Maritime Safety and Security Teams, established through the Maritime Transportation Security Act that possess explosives detection canine teams. It has consolidated its diving resources into two Deployable Operations Groups (DOG) located in Norfolk, VA and San Diego, CA. The USCG has some UHD search capability, but limited maritime or underwater explosive device preparedness and response capability.

In a number of areas of the country, public safety dive teams (PSDT) and their bomb squad counterparts have moved to develop local solutions to the need represented by issues previously described. Today, none of those programs has produced the capability that can replace a U.S. Navy EOD team in the WBIED render-safe role. Further, the responsibility for render-safe of waterborne military ordnance will likely continue to reside primarily with the U.S. Navy.

The response community in the maritime domain today expands to include those who have the daily responsibility for port security diving; their bomb technician diver counterparts who have ultimate local responsibility for handling render-safe issues within their areas of operation; and the U.S. Navy EOD technicians who will likely always remain the ultimate reach-back capability for WBIED response.

DHS must develop technology and associated training for public safety divers, bomb technician divers, and other dive resources who may respond to domestic UHDs, since DHS cannot expect U.S. Navy EOD technicians to continue as the sole providers of assistance to conventional dive

*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](mailto:ruth.doherty@dhs.gov) for more information.*

teams possessing minimal render-safe capabilities. The ability to locate and validate possible threats is the minimum acceptable level of response.

Desired technology will provide capabilities to detect, diagnose and disrupt or disable IEDs by remote, semi-remote, or manual means in a maritime environment. Technology must address IEDs attached to ship hulls at depth and devices attached to small crafts afloat that may be used themselves as explosive devices.

Where such IED placements affect maritime traffic, including shipping and passenger cruise ships, critical infrastructure/key resources (CI/KR), national security activities, etc., technology must address devices emplaced where the presence of water changes the buried or ground-emplaced characteristics of a classic device, e.g., in drainage conduits, wetlands, shallow areas of fresh or saltwater, on bridge supports, etc.

Technology development should provide material for developing threat characterizations, tool performance testing and standards.

## 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.*

Over two billion tons of domestic cargo move through U.S. ports annually and a significant portion of domestically produced commodities and products are shipped by water. Nearly two-thirds of all U.S. wheat and wheat flour, one-third of soybean and rice, and almost two-fifths of domestic cotton production is exported via U.S. ports. Records indicate that approximately 4.2 million passenger cars, vans, SUVs and light trucks pass through U.S. seaports annually.

More than four million Americans work in port-related jobs that generate \$44 billion in annual personal income and \$16.1 billion in Federal, State and local taxes. Port activity also contributes more than \$723 billion annually to the Gross Domestic Product. Additionally, public ports serve national security functions. The DoD routinely uses public ports for the mobilization, deployment and re-supply of U.S. armed forces. Many naval installations are based in U.S. ports, creating a unique set of cross-sector challenges.

Within the Public Safety Dive Teams (PSDT) community there is a lack of national standards in both the equipment and training necessary to provide an effective response throughout U.S. ports, which puts both the diver and port at risk. A response must be successful in adverse operational conditions that may include unstable vessels or platforms, cold water, offshore locations, poor visibility and the possibility that a device or hazard is entirely submerged.

Each of the various conditions under which bomb technician divers operate requires them to possess specific skills, tools and standard operating procedures that currently do not exist nationally. To complicate this mission further, many PSDTs are created as a collateral duty responsibility, and therefore divers are often multi-tasked within their respective departments. Recognized standards for tools and operating procedures do exist nationally for bomb technicians involved in non-waterborne render-safe procedures. The development of those tools and

*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](mailto:ruth.doherty@dhs.gov) for more information.*

procedures falls under the purview of the staff at the Federal Bureau of Investigation's (FBI) Hazardous Devices School (HDS). While HDS staff work in coordination with the Department of Defense and the NBSCAB to set standards, develop tools and train render-safe personnel, this is the only such school or organization with responsibility for this function within the entire United States.

In recognition of the value of this existing set of national tools and standards, which are rare in any other public service, the FBI has initiated a process to begin to assess the training or actual deployment techniques currently being used by bomb squad divers across the United States. The FBI, in collaboration with DHS, has simultaneously developed and implemented a nationally consistent training process to equip PSDTs with the skills and procedures they need to operate more safely in the WBIED environment and to seamlessly integrate with bomb squad assets during a WBIED event.

To develop a national standard for WBIED operations, there is a need to develop a set of tools and operating standards that may become the subject of enhanced training for bomb squad divers at the FBI's HDS. This new set of tools and procedures will be integrated with existing and/or enhanced training for public safety dive teams in order to provide a single, vertically integrated approach to WBIED incidents in U.S. ports or other maritime infrastructure.

Related Requirements:

Maritime Operational Threat Response (MOTR) for the National Strategy for Maritime Security:

"DHS will plan for the prevention and detection of sea mining and swimmer operations in waters subject to the jurisdiction of the United States."

References:

- a. HSPD-19 4 (b, c, d), 9
- b. HSPD-19 I-Plan (Draft) Task Ref: 3.2.2
- c. National Strategy for Maritime Security. September 2005

## 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 terrorist threat facing our nation's critical infrastructure can take many forms, including bombs used in a maritime environment. Over the last two decades, terrorists have used WBIEDs to target U.S. interests with notable success and devastating consequences, including the deadly suicide bombings of the USS Cole and a French oil tanker off the coast of Yemen. Considering likely events based on available intelligence and experience, terrorist groups will continue to use WBIEDs on land and in a maritime environment against U.S. interests.

## Where?

*Please note that as more details are available, DHS will post updated research/innovation focus 4 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](mailto:ruth.doherty@dhs.gov) for more information.*

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

Accessibility by water as well as land, proximity to vast metropolitan centers and inherent integration into transportation hubs present additional multi-faceted security challenges for ports. DHS understands that drug smugglers use divers as a means of attaching and retrieving contraband, and it is not unreasonable for DHS to recognize that terrorist combat swimmers and boat operators may act alone or in teams to attach explosive devices or limpet mines to ship hulls, bridge supports, dams, levees, locks or oil rigs. Recently, the Sri Lankan government was targeted successfully by a suicide SCUBA diver who wore, placed and detonated a device against the hull of a fast patrol boat in Trincomalee Harbor, resulting in its sinking.

In the maritime environment, the ability to detect the presence of explosives or explosive devices, locate the explosive or device precisely, diagnose the device to determine its components and how they function, and defeat the device using the best tool to eliminate the threat is made more difficult by the water environment. Not only may there be more variables to consider than in a non-maritime environment, the presence of the water changes the implications of variables that are part of DHS's understanding developed on land.

*Please note that as more details are available, DHS will post updated research/innovation focus 5 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](mailto:ruth.doherty@dhs.gov) for more information.*