

FRG Broad Agency Announcement (BAA) Solicitation Call 5 Technical Topic Area (TTA) Descriptions for Statements of Objectives (SOOs)

1. Wildland Fire Respiratory Protection

Existing respiratory protection solutions for wildland firefighting are either too bulky/cumbersome, too hot, provide insufficient protection, do not allow for strenuous activity, or do not provide extended-wear respiratory protection for the multiple hours a firefighter in the field must endure. Without effective options, many firefighters wear no protective equipment, or wear simple cotton bandanas; the resulting exposure to toxins and particulates in the environment raises their risk for cancer and other short- and long-term health issues.

The proposed solution will be a new piece of equipment worn by responders that is lightweight and offers a low-profile so it does not negatively impact the amount of gear a wildland firefighter can carry, the firefighters' range of motion, or their ability to communicate. The device will not prevent wildland firefighters or other responders from safely performing their duties.

2. Emergency Response Vehicle Warning for Civilians

Emergency vehicle to civilian vehicle alerting system is needed for when an emergency vehicle is responding to an incident with lights and sirens. Current systems - lights and sirens - do not alert civilians to oncoming emergency vehicles well or soon enough. Many civilians do not hear or notice the lights and sirens and do not move in a timely manner for the emergency vehicle to continue towards their destination uninterrupted or without accident.

The proposed solution shall be a new notification system in addition to the traditional lights and sirens used on emergency vehicles. It shall interrupt the status quo in a vehicle, such a system that cuts into the radio (e.g. satellite radio, Bluetooth, or AM/FM stations) or an audio, visual, or vibration alert in the interior of a civilian's vehicle. Additionally, the proposed solution will "listen to" emergency vehicles in close proximity that have activated their lights and sirens. In other words, when a first responder activates their lights and sirens, this technological solution shall alert vehicles of the emergency vehicle's presence, allowing for a three pronged approach to notification: lights, sirens, and direct communication to civilian vehicles that are equipped with this new technology.

3. Emergency Vehicle to Emergency Vehicle Early Warning System

First responders, primarily those in the emergency medical services, Law Enforcement, and Fire department communities need the ability to warn each other of their presence as they are driving in emergency mode. Currently, there is a relatively short period of time available to alert others of an emergency vehicle's proximity. The potential of having more than one emergency vehicle approaching or passing through the same location from different directions significantly increases the chance of a collision.

The proposed technology solution shall notify emergency response drivers of other approaching emergency vehicles from a distance and in a manner that ensures they are aware of an oncoming emergency vehicle. Each vehicle will communicate the proximity of the other vehicle as it is captured and relay that information to the driver of each respective emergency vehicle.

4. Multi-Mission Disrupter

There is a need to create a multi-mission disrupter system that includes a stand, aiming system and new ammunition to support the disrupter. The proposed unit would be closer to a one-size-fits-all standard eliminating the need for multiple disrupters; it would be easy to assemble and load; and, it would be smaller and weigh less than current models. The device will be agile with minimal time to prepare for use in a shooting configuration and will be able to support standard bomb squad operations in a land or water environment. The technology solution will prove useful to the public safety bomb squad community in the conduct of their mission support to render safe operations by saving lives, preserving life and property, allowing for faster operations, and less collateral damage.

5. Multimeter Wire Attack Kit

There are currently no tools designed for EOD use that combines the functions of a multimeter with a wire attack kit and current probe into one device – the community currently uses commercial off the shelf (COTS) equipment designed for commercial work. Creating an EOD specific device would remove unneeded features and simplify work done by the EOD technician, thus creating a safer more efficient tool that can conduct an electronic diagnostic of detonator wires and switches. The intent is to create a multimeter wire attack kit that has a high electrical isolation of the voltmeter built in and greater sensitivity of the microprobe with reduced meter readout error. With the development of this integrated tool, EOD operations would be able to be performed faster, more safely, and with greater accuracy.

6. Rescue Hoist Protective Glove

First responders who assist with rope rescues or hoist rescues have a very specialized need in regards to protective hand wear. While performing certain actions, the protective cover/webbing

is prone to wear over time increasing the difficulty for the first responder as they perform their duties.

The proposed solution will be a new glove made of advanced materials or a replaceable insert/attachment that is more durable and longer lasting than current gloves in use. The new gloves, or inserts that can be attached to the gloves, will provide increased durability and can be worn by rescue helicopter personnel without interfering with other required duties. Additionally, the glove must have enough flexibility for the rescue helicopter personnel to perform other required duties and the solution cannot negatively impact the responder's range of motion.

7. First Responder Routing Logic Guide

There is a need for an emergency responder routing system that would inform responders of upcoming road and traffic conditions and suggest alternate routes to safely and efficiently navigate their vehicles. Currently, many first responders are utilizing commercially available mapping applications such as Google maps on their cell phones to route themselves to incidents that they are dispatched to instead of using traditional Automatic Vehicle Location (AVL) systems and those systems do not include other road options that first responders could be taking to decrease incident response and egress times.

This solution shall create additional layers to existing solutions or a new application for first responders to meet the additional needs that they have while navigating roadways to incidents. the ability to take in external data sources for transit schedules (e.g., trains, drawbridges, public transit) as well as taking advantage of public and private property (e.g., right-of-ways, emergency access roads), express lanes, the ability to exceed speed limits, etc.

8. Integration of Public Data Feeds

Eyewitness accounts and information via open/publicly shared social media has great potential to significantly enhance situational awareness and the common operating picture (COP) for first responders. However, currently there is no platform to provide first responders with a single stream of data that includes open source social media and other shared information feeds (e.g. traffic and weather). This solution will provide a platform for first responders to incorporate these open data feeds into commonly used COP software with the ability to provide alerts of potential or emerging events based on triggers preset by the user. During an event, the system will continue to stream the integrated data to the users for constant up-to-date situational awareness as well as provide basic decision recommendations to inform resource allocation and response planning.

9. 3D Indoor Dynamic Mapping and Visualization

There is a need for technology that provides real-time 3D mapping and visualization of the inside of building spaces under varying conditions. Currently, first responders, in particular, firefighters and tactical law enforcement personnel, frequently operate in multi-story buildings under hazardous conditions. Exposure to such conditions without the ability to map out the location hinders the effectiveness of first responders during the course of an incident. The solution should provide first responders and Incident Commanders (ICs) the ability to render 3D dynamic mapping and visualization of indoor areas in terms of architectural and semantic information in real time. Additionally, the solution should have the durability and resiliency to succeed in extreme environmental operating conditions common to first responders and also have the ability to capture dynamic updates when structural changes occur (i.e. when the wall of a building collapses/crumbles mid-firefight) and render that information to the IC.

10. Energy Harvesting Fabrics

DHS S&T is looking for innovative energy-harvesting smart fabric technology for integration into first responder uniforms. The fabric should be able to be used for the manufacture of first responder garments, without compromising garment weight, traditional garment colors, comfort (including fit, garment “hand”, and cooling ability), environmental protection provided by the garment, or professional appearance of the garment ensemble. It should not interfere with the performance of any normal responder tasks. The fabric that is developed should be able to harness the energy from the environment in which the responders are operating to assist in powering the equipment that they are using.

Different operational scenarios are envisioned. The first is for a duty uniform that would be worn daily by law enforcement personnel, emergency medical technicians, and firefighters while they are performing routine tasks. It is envisioned that possible energy sources for these scenarios would include kinetic energy from the movement of the responders, solar energy, ambient light and heat sources, etc. The second scenario is a specialized application for firefighters, including wildland firefighters and structural firefighters. A fire environment has an abundance of thermal energy, and therefore is potentially a large source of power that can be utilized by responders to reduce their logical and weight burden. Applications include fabrics for use in structural turnout gear and/or wildland firefighting ensembles. A fabric that meets the requirements of any one of the scenarios presented above would be acceptable to meet the goals of this development effort.