

Apex Program: Next Generation First Responder

Visionary Technology for First Responders

The Department of Homeland Security Science and Technology Directorate (S&T) launched a number of high-impact Apex programs to tackle the nation's toughest security challenges, support today's operational environment, and address future challenges with strategic and innovative solutions. Apex programs provide the homeland security enterprise with analyses of stakeholder needs and the capabilities to meet those needs.

The Next Generation First Responder (NGFR) Apex program envisions first responders who are protected, connected and fully aware, enabling faster, more efficient and safer response to threats and disasters of all sizes. NGFR is developing an integrated and modular ensemble that includes an enhanced duty uniform, personal protective equipment (PPE), wearable computing and sensing technology, and robust communication networks. With enhanced protection, communication and situational awareness, first responders can better safeguard lives and property during disasters.

Program Description

NGFR will integrate multi-threat PPE, plug-and-play sensors and advanced communications devices to provide multi-layer threat protection and immediate situational awareness to first responders. Future innovations include embedded wearable sensor technology, mobile computing, advanced visualization and real-time network data exchange.

NGFR's goal is to provide modular and flexible solutions to help first responders in two ways. First, NGFR will provide real-time situation awareness that enables responders to recognize and avoid hazards before, during, and after incidents. Wearable sensors and smart devices will connect first responders with vital information and sophisticated analytical and visualization capabilities. Second, enhanced duty uniforms and PPE will provide fire resistance, liquid resistance and splash protection, puncture resistance, and improved wearability, functionality, and comfort. These PPE and duty uniforms will enable responders to withstand unanticipated threats, reducing fatalities and injuries.

NGFR's cutting-edge technologies will accelerate decision-making and improve response while balancing environmental constraints at a response site. NGFR will leverage a

wearable communications hub device to enable advanced voice and data communications, along with wearable body sensors, heads-up display and video cameras to aid situational awareness.



Figure 1. NGFR Stakeholders

Approach

NGFR will harness the best existing and emerging technologies and integrate them in a well-defined and standards-based open architecture. NGFR projects range from core capabilities suitable for all jurisdictions and disciplines to specialized technology more appropriate for metropolitan areas. Each jurisdiction can tailor the solutions they need for specific hazards. This will make it easier for first responders to adopt NGFR solutions.

First Responder Input and Priorities

S&T initiated the NGFR Apex program to address capability gaps identified in [Project Responder 4: 2014 National Technology Plan for Emergency Response to Catastrophic Incidents](#). Project Responder 4 is the result of focus groups that included over 250 federal, state and local first responders, responder associations, and industry, academia, and the National Laboratories' technical subject matter experts. These diverse voices ensure achievable solutions that reflect operational priorities. NGFR will continue to communicate with the first responder community to validate requirements and test products throughout the program lifecycle, including hosting online and in-person dialogues.

Next Steps

Over the next five years, NGFR will implement a series of projects. Once prototypes are developed, projects will go through a rigorous testing and evaluation phase with first responders. NGFR solutions will be transitioned for use in the first responder community as they become available.

