

# DHS Science and Technology Directorate

## Next Generation First Responder Program

### Visionary Technology for First Responders

Technology is advancing at an exponential rate, but many of today's first responders still use outdated, inefficient and unreliable equipment. Our nation's first responders require innovative tools and technologies to stay ahead of the curve and the Department of Homeland Security Science and Technology Directorate (S&T) Next Generation First Responder (NGFR) program is working to make this possible. By leveraging advanced communications systems, drones and wearable technology, and connecting "Internet of Things" (IoT) devices and smart cities, NGFR hopes to equip first responders with the next generation of tools and technologies. The NGFR program envisions an open, plug-and-play and standards-based environment that enables faster, more efficient and safer responses to threats and disasters of all sizes. But in a world of closed proprietary systems, there is no guarantee that disparate technologies will be able to seamlessly share data, or even connect to one another. This is the problem that S&T is trying to address.

### Protected, Connected and Fully Aware

The NGFR program is working on a number of projects to provide solutions to help first responders in three distinct areas:

- Improved personal protective equipment (PPE) to provide puncture and slash resistance, as well as chemical, biological and thermal protection while accounting for comfort. PPE and duty uniforms will enable responders to withstand unanticipated threats, reducing fatalities and injuries.
- Integrated communications that ensure that all traditional methods of communication provide an uninterrupted connection. Integrated and interoperable communications allow responders to reliably communicate with teammates, commanders and dispatch, and allow for more efficient and safe deployment of resources.
- Real-time situational awareness that enables responders to recognize and avoid hazards before, during and after incidents. Wearable sensors and smart devices would connect first responders with vital information, sophisticated analytical capabilities and integrated visual displays.

### NGFR Framework

The NGFR framework contains the architecture, standards and hardware. The NGFR framework finds, accesses, consumes, translates and displays voice, video and data for first responders. Although it is much easier for one proprietary device to communicate with its matching proprietary system, that is not what first responders need. The NGFR framework creates an interoperable ecosystem allowing these commercial capabilities to plug into one system.



### A Solution for Every Organization

First responders protect a wide variety of communities – from rural environments to major metropolitan cities, and everywhere in between. The resources available from one to the next differ greatly. The NGFR program is focusing on creating a plug-and-play system built around universal data standards, ensuring that responders can build the system they want from the components they need to meet their mission. This system can adapt to allow every type of first responder, in every type of environment, to respond to every type of emergency.

The NGFR architecture has three components: the Core, the Kit and the PPE. The Core is the foundation of the NGFR system, and includes Wi-Fi, Bluetooth, land mobile radio and commercial cellular connectivity, video and audio recording, location services, and a display screen. The Kit adds physiological and environmental sensors, data analytics, satellite communications and unmanned aerial systems. The NGFR PPE includes multi-threat duty uniforms with hazard resistance and sensor-integrated textiles.

### Integration Demos

To facilitate the creation of a fully interoperable system for first responders, the NGFR program is incrementally integrating technologies. Using an agile approach to development, the NGFR program will continuously plan, test, evaluate the systems, and incorporate feedback. Two integration demonstrations will be held each year, enabling stakeholders to have hands-on interaction with integrated NGFR tools and technologies and provide valuable feedback.



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To learn more about the Next Generation First Responder program, contact [SandTFRG@dhs.gov](mailto:SandTFRG@dhs.gov).