

# DHS Science and Technology Directorate

## Apex Engine: Communications & Networking

### Context

The Department of Homeland Security (DHS) Science and Technology Directorate (S&T) launched a series of high-profile, high-impact Apex programs to look strategically at the nation's security and address future challenges while supporting today's operational needs. Apex Engines were created to meet cross-cutting needs for all Apex programs.

### Impact and Vision

The Apex Communications & Networking (CN-E) Engine ensures first responders and other operators served by Apex programs can exchange information (i.e., voice, video, or data) through any medium.

S&T develops many tools for end users, such as first responders, that all rely on the foundational ability to transmit information via networks. CN-E provides Apex programs with the most efficient and effective network solutions for reliable connections in any situation.

### Description and Approach

CN-E provides Apex programs with integrated networking solutions to ensure interoperable communication across all network platforms (e.g., Wi-Fi, commercial 4G LTE, FirstNet or satellite). This Engine focuses on:

- (1) information exchange between DHS components, responders, and other end users, and
- (2) the network solutions for first responder communications with citizens in the alerts, warnings, and notifications area.

CN-E works towards the goal of keeping the Apex user community connected through the use of flexible network architecture. To achieve this vision, CN-E will accelerate targeted interoperability solutions, leaving the end users better equipped to protect lives, property and the nation.

### Key Activities

- Work with Apex programs to identify requirements and apply existing capabilities to meet immediate needs.
- Coordinate with other Apex Engines and other S&T organizations to address Apex program needs
- Work with Apex program leadership to identify common use cases to create interoperable communications and network models that are seamless for the end user. The

Engine will promote the ability to move between networks without interruption or interference while reducing identified points of failure. The figure depicts key components and technology focus areas of CN-E. The best communications solution varies between different incident and network areas (e.g., communicating over long ranges or through buildings), so each case must be assessed independently. CN-E will review the needs of each Apex program and recommend dynamic solutions for each use case. Examples of these solutions include small cell deployable networks, unmanned aerial vehicles, cellular on wheels, or even wearable communications hubs integrated into a first responder's personal protective equipment.



Apex Engine CN-E Key Components and Focus Areas.

### Customer Input and Priorities

CN-E is driven by S&T Apex program requirements, which in turn are stakeholder-driven. For example, many of the efforts identified in the Next-Generation First Responder Apex program were drawn from the *S&T Project Responder 4* report.

This report was drafted in collaboration with the first responder community to identify capability gaps and priorities for catastrophic incident response. S&T also regularly receives input through public safety groups such as the National Public Safety Telecommunications Council, the SAFECOM Emergency Response Council, and federal partners.

CN-E leverages feedback from the community as well as the latest advancements from academia and industry to serve the Apex programs.



**Homeland Security**

Science and Technology

To learn more about the Communications and Networking Apex Engine, contact [SandTFRG@dhs.gov](mailto:SandTFRG@dhs.gov).