Creating Alternative Communication Options

In an emergency, first responders need timely and relevant data to make informed decisions. Land Mobile Radio (LMR) networks only work for voice communication and do not have the capacity to transmit large amounts of data. Commercial cellular networks can become overloaded or fail completely as they become saturated by public use. This leaves public safety agencies competing for the same network resources when trying to transmit their mission-critical information, especially video.

The Department of Homeland Security (DHS) Science and Technology Directorate (S&T) explored new communications options for public safety use through the piloting of datacasting technology. Datacasting uses existing broadcast television signals to deliver encrypted data to targeted recipients.

S&T joined the Johns Hopkins University Applied Physics Lab and SpectraRep, their commercial partner, along with America's Public Television Stations (APTS) and several Public Broadcasting Service (PBS) television stations around the country to implement pilot projects to determine the benefits and limitations of datacasting technology for public safety use.

Delivering Encrypted Data and High Quality Video to Responders in the Field

Sharing video and other data over existing public safety networks has been a challenge. When broadcast television transitioned from analog to digital broadcast transmissions, the same programming could be broadcast using less bandwidth. This created the opportunity to allocate television spectrum in new ways, including delivering encrypted and targetable computer data through the television signal. Datacasting takes advantage of that available spectrum in the broadcast bandwidth that is no longer required for television programming.

Public broadcasting networks are a unique television partner given their public service mission. Datacasting reallocates a portion of their spectrum for transmitting video, data files and other critical incident information (e.g., building blueprints, live security video) to specific first responders anywhere in the television signal coverage area without relying on or overwhelming other communication channels.

Preventing Network Overload

Datacasting is a broadcasting mechanism capable of one-to-many content delivery. For example, an unlimited number of recipients can be targeted without running out of bandwidth. This not only reduces congestion on commercial cellular networks, but it complements existing systems. Further, it allows public safety agencies to transmit encrypted video and data that is invisible to the general public through the digital television signal.

Transmission hardware is set up at the television station while recipients use a receiver dongle in order to receive the information broadcast from the station. Datacasting's software allows the owners of the video and other data to target individual users or groups of receivers to view the video, files and notifications transmitted. These owners retain control and can be selective about who can see video feeds and other information, even across various agencies and political jurisdictions.

Live video broadcast to a mobile data terminal.

Next Steps

S&T completed technology pilots with the cities of Houston and Chicago, and released test reports with information on how it was used and capability gaps filled. The reports can be accessed on https://www.dhs.gov/science-and-technology/first-responders. The technology was used during several major events in Houston and continues to be used to support day-to-day activities, including the response to Hurricane Harvey. S&T has two additional pilots planned for 2018, including a rural school safety test in Adams County, Indiana and communications augmentation for a large event in Salt Lake City.

To learn more about Datacasting, contact first.responder@hq.dhs.gov.

2018-08-08

Homeland Security
Science and Technology