The Hybrid Public Safety Microphone ("Turtle Mike")
- Aligning the Legacy Radio Systems with the Broadband Environment

The Issue Faced by Public Safety Agencies

First responders use narrowband land mobile radios (LMR) for critical voice communication. Today, first responders are beginning to augment these communications with smartphones that leverage commercial cellular broadband networks. Commercial cellular networks can serve as a valuable resource for first responders despite the fact that they don't provide the same critical elements as first responders have on legacy systems (e.g., push-to-talk, radio-to-radio, one-to-many, etc.). Furthermore, first responders are using these smart devices for enhanced information exchange capabilities (e.g., imagery, video, and geography). The Hybrid Public Safety Microphone, also known as the "Turtle Mike", is a bridging solution that enhances legacy radio system capabilities by allowing the use of commercial broadband networks for improved communication interoperability. These capabilities include added resilience, redundancy (e.g., back-up systems), and expanded coverage. Since commercial broadband networks cannot currently provide the same elements as their legacy radio systems, first responders will likely continue to use their legacy radios for the foreseeable future. However, these types of bridging solutions allow agencies to continue to leverage their existing investments while taking advantage of commercial cellular networks.

How Does it Work?

The Turtle Mike solution consists of both hardware and software components, that can function independently, providing first responders with the ability to communicate on either LMR or commercial broadband networks. The Turtle Mike solution can be added to any existing LMR system, providing access to cellular networks which can prove beneficial to off-load voice communication traffic.

Figure 1: Picture of the Turtle Mike hardware solution.

The software solution integrates with multiple communication devices on cellular voice networks and can be downloaded onto any smart device such as an Android, an iPhone, or a tablet. The software allows first responders to access LMR channels as well as set up separate broadband conferences on the cellular network from their smart phone device. These supplemental broadband conferences allow first responders to create multiple separate conferences that meet the immediate needs of an incident. Since this software solution can be downloaded onto several device types, it allows for enhanced coordination even by responders who may not have access to legacy radios. Ultimately, this type of solution can provide an affordable option for first responders because it does not require costly replacement of existing communication equipment and infrastructure.

Initial Pilot Testing

The Department of Homeland Security (DHS) Science and Technology (S&T) Directorate conducted a pilot test of the technology during an event called "Cruise Night" in Kearney, Nebraska (NE), in partnership with the Kearney Police Department. Other partners in the pilot included the Buffalo County Sheriff's Department, the NE State Patrol, Good Samaritan Hospital, South West Ambulance, and Buffalo County Public Works. Participants established a "Cruise Night Event" channel on the LMR State Mutual Aid frequency to achieve interoperability. A "Cruise Night" broadband conference was set up on the system for all participants with a Turtle Mike device, which allowed both LMR and cellular participation in a central group. This connection allowed additional participants to communicate who would not otherwise have been able to participate using LMR alone. The Turtle Mike solution allowed for additional broadband conferences arranged separately from the legacy radio frequency talk groups thereby off-loading communication traffic from the LMR State Mutual Aid channel.

Figure 2: Picture of related smartphone application.

Benefits of Turtle Mike

- Provides a broadband conference function for unlimited one-to-many and many-to-many voice conferencing via commercial broadband
- Provides unlimited broadband conference capacity unrestricted by Federal Communications Commission frequency distribution limitations present in LMR
- Connects legacy radio channels to internet voice broadband conferences via cellular or Wi-Fi
- Increases and enhances coverage, redundancy, and resiliency by providing the end-user with the ability to leverage both LMR and commercial broadband networks
- Enhances "talk around" functionality, or unit-to-unit communication without infrastructure
- Provides public safety recording and instant playback function

Next Steps

For the next phase of this project, DHS S&T has partnered with DHS Customs and Border Protection to conduct further R&D to address (1) mission critical voice over broadband, (2) remote management, (3) video and data to tactical users, and (4) network integration (e.g., LMR, commercial broadband).

To learn more about the Hybrid Public Safety Microphone, contact SandTFRG@hq.dhs.gov.