Interoperable Voice Communications Webinar
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- Supporting the demonstration, transfer, and adoption of appropriate technology into practice by law enforcement and corrections agencies, courts, and public crime laboratories.
- Assisting in the development and dissemination of technology guidelines and standards.
- Providing specialized technology assistance, information, and support to law enforcement and other appropriate criminal justice agencies.
Purpose

Today’s webinar will focus on the issues related to public safety interoperable voice communications
Interoperable Voice Communications
The U.S. Department of Homeland Security defines interoperable communications as the ability of emergency responders to work seamlessly with other systems or products without any special effort.

Wireless communications interoperability specifically refers to the ability of emergency response officials to share information via voice and data on demand, in real time, when needed, and as authorized.
Even though interoperable communications among public safety agencies has always been an issue. Over the last decade, various events – the Columbine and Virginia Tech school shootings as well as the attacks of September 11, 2001 – have highlighted the need for the technology “tools” that will enable our public safety agencies to effectively communicate with each other when required.
Interoperability Challenges

1. Incompatible and aging communications equipment
2. Limited and fragmented budget cycles and funding
3. Limited and fragmented planning and coordination
4. Limited and fragmented radio spectrum
5. Limited equipment standards
Scale of Interoperability Issue

- Federal, State & local Criminal Justice Practitioners
  - 19,000 Law Enforcement Agencies
    - 750,000 Law Enforcement Officers
  - 4,451 Corrections Agencies
    - Some overlap with Law Enforcement Agencies
    - 430,000 Corrections Officers
  - 351 Crime Laboratories
  - Courts, Probation & Parole, etc.

- Public Safety Community at-large
  - 29,000 Fire and 6,000 EMS Departments
    - 960,000 firefighters
    - 830,000 emergency personnel
Interoperable Communication Methods Currently Used

- Swap Radios and Caches
- Gateways
- Shared Channels
- Proprietary Shared Systems
- Standards-Based Shared Systems
Interoperable Communication Methods Currently Used

• Swap Radios and Caches
• Gateways
• Shared Channels
• Proprietary Shared Systems
• Standards-Based Shared Systems
Swap Radios

Swapping radios, or maintaining a cache of standby radios, is an age-old solution that is time-consuming, management-intensive, and likely to provide limited results due to channel availability.
Interoperable Communication Methods Currently Used

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Gateways
Gateway

Gateways retransmit across multiple frequency bands, providing an interim interoperability solution as agencies move toward shared systems.

However, gateways are inefficient because:

- they require twice as much spectrum since each participating agency must use at least one channel in each band per common talk path; and

- they are tailored for communications within the geographic coverage area common to all participating systems.
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Shared Channels

Interoperability is promoted when agencies share a common frequency band or air interface (analog or digital), and are able to agree on common channels. However, the general frequency congestion that exists nationwide can place severe restrictions on the number of independent interoperability talk paths available in some bands.
The Federal Communications Commission (FCC) has designated interoperability channels in the following frequency bands.
Below 512 MHz

**150-174 MHz:** one calling channel and four tactical channels (0.25 megahertz total).

**156-162 MHz:** two channel pairs for interoperability in thirty-three Economic Areas (EA), where these channels are allocated for public safety (.0375 megahertz total).

**220-222 MHz:** ten channels for mutual aid. (.04 megahertz total).

**450-512 MHz:** one calling channel and three tactical channel pairs (0.2 megahertz total).
763-775/793-805 MHz Band

**Narrowband Interoperability Channels:** sixty-four paired narrowband channels designated for nationwide interoperable voice and data communications (0.8 megahertz total). Section 90.547 of the FCC’s rules requires that mobile and portable transmitters operating on narrowband channels must be capable of operating on all of the designated nationwide narrowband interoperability channels.

**Narrowband State Channels:** a single geographic license issued to each state (2.4 megahertz).

**Broadband:** 10 megahertz allocated for a nationwide interoperable public safety broadband network to be provided via a public/private partnership.
806-809/851-854 MHz Band

Five channels for nationwide interoperable voice communications (0.125 megahertz total). See 47 C.F.R. §90.617(a)(1).
4.9 GHz Band

18 channels designated "to foster interoperability by providing a regulatory framework in which traditional public safety entities can pursue strategic partnerships with both traditional public safety entities, such as the Federal Government, and non-traditional public safety entities, such as utilities and commercial entities, in support of their missions regarding homeland security and protection of life and property." (50 megahertz total)
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Proprietary Shared Systems

Shared systems are one of the best solutions for achieving an enhanced level of communication interoperability; however, proprietary systems limit the user’s choice of product with regard to manufacturer and competitive procurement.
Examples of Proprietary Shared Systems

**City** – shared radio systems used by fire, police and EMS and, in some cases, other municipal services (i.e. Departments of Public Works and Transportation, etc.).

**County** – shared radio systems used by Sheriff’s Department, local Police Departments, County/Local Fire Services and EMS.

**Region** – (multiple states or counties) shared radio system that encompasses a wide geographic area, crossing areas of service and jurisdictional lines.

**State** – statewide shared radio system that is used by both local and State agencies (may also support Federal users when working daily with State and local agencies or during joint operations).
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Standards-based Shared Systems

Standards-based shared systems promote competitive procurement and a wide selection of products to meet specific user needs. With proper planning of the talk group architecture, interoperability is provided as a by product of system design, thereby creating an optimal technology solution.
Standards-based Systems

What is Project 25 (P25)?

- A suite of standards for the manufacturing of interoperable digital two-way wireless communications products.
- Developed in North America by State, local and Federal representatives and under Telecommunications Industry Association (TIA) governance. The published P25 standards suite is administered by the TIA (Mobile and Personal Private Radio Standards Committee TR-8).
- Radio equipment that is “P25-Compliant” is able to meet a set of minimum requirements to fit the needs of public safety. These include the ability to interoperate with other P25 equipment so that users on different systems can talk via direct radio contact.
Standards-based Systems

Who develops the P25 standards?

The P25 standards are created by a committee of manufacturers, public safety agencies and State and Federal communications professionals to provide detailed standards for the design of communications systems so that all purchasers of P25-compatible equipment can communicate with each other.
Standards-based Systems

What are the benefits of P25?

• Allows effective, efficient, and reliable intra-agency and inter-agency communications
• Ensures competition in system life-cycle procurements
• Provides user-friendly equipment
• Improves radio spectrum efficiency
New and Emerging Equipment and Technologies

• Dual-band Radios

• Multiband Radios
New and Emerging Equipment and Technologies

• Dual-band Radios

• Multiband Radios
Mobile and Handheld Dual-band Radios
New and Emerging Equipment and Technologies

• Dual-band Radios

• Multiband Radios
Multiband multimode radio (MMR) is a class of radio that can operate in multiple frequency bands using multiple Modes.
Questions?
For Additional Information

Visit our Websites:

http://www.commtechcoe.org
http://www.ojp.usdoj.gov/nij/topics/technology/communication
http://www.justnet.org

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