

PUBLIC SAFETY COMMUNICATIONS & GOVERNING AGENCIES



Technological advances in public safety communication are constantly evolving. Likewise, understanding the intricacies of state & federal regulatory agencies that govern public safety communications can be mind-boggling. This article provides a high-level overview of the main public safety communications systems in use today - LTE (Long Term Evolution) and legacy LMR (Land Mobile Radio). It also attempts to identify the key public safety communication organizations and regulatory agencies that govern them. At no time in history have there been so many technological options and organizations, that often overlap, available for public safety communication.

Over the past 30 years, manmade and natural disasters have pushed public safety communication professionals and government officials to come up with new strategies to meet the challenges of our ever-evolving world. Hence, in 2012 the US federal government allocated \$7 billion for the development of the Nationwide Public Safety Broadband Data Network (NPSBN), using LTE standards and technology. The NPSBN allows public safety responders to utilize high-speed data and video capabilities not currently available with LMR technology. NPSBN also provides first responders with prioritized access, high reliability that is required for public safety communications. While wireless broadband LTE offers advanced capabilities, it does not offer mission-critical voice. As a result, public safety agencies continue to maintain and sustain LMR systems to ensure access to mission-critical voice capabilities.

The public safety community is governed by local state, federal government agencies, tribal, and other organizations involved in public safety communication. Within these agencies, there are also integrated partnerships that are responsible for various types of emergencies. The federal agencies play key roles after the first 48 hours of a major emergency event. The states agencies are first responders of an emergency event until federal assistance is coordinated and deployed. The roles and responsibilities of these agencies sometimes overlap.



DHS OEC

At the Federal level, the Department of Homeland Security (DHS) Office of Emergency Communications (OEC) partners with three emergency communications advisory groups, comprised of participants from national organizations, public safety at-large members, and statewide interoperability coordinators (SWIC). While each organization works towards similar goals within the emergency communications environment, each has a distinctive mission. SAFECOM and the National Council of Statewide Interoperability Coordinators (NCSWIC) are supported by and provide policy recommendations to the OEC. The First Responder Network Authority's (FirstNet) Public Safety Advisory Committee (PSAC) assists FirstNet in carrying out its duties and responsibilities. Its main focus is the nationwide public safety broadband network (NPSBN). The National Public Safety Telecommunications Council (NPSTC) is a public safety communications federation and is a member of SAFECOM and PSAC.

NPSBN

The Nationwide Public Safety Broadband Network (NPSBN) provides comprehensive high-speed wireless communication services to more than 60,000 public safety and emergency response agencies. The NPSBN provides a secure, reliable, and dedicated interoperable network for emergency responders to communicate. The main goal of the NPSBN is to drastically improve the public safety community's ability to communicate with agencies, regardless of jurisdiction or level of government to access critical information. For example, law enforcement can watch video images of a crime in progress, download building plans of a burning building to handheld mobile devices, or connect rapidly and securely with personnel from other jurisdictions. Just as smartphones have changed the way society communicates, these technological advancements are dramatically changing the way public safety responders communicate and operate.



FirstNet

The First Responder Network Authority (FirstNet) was established by Congress in February 2012 as an independent authority under the Department of Commerce, the National Telecommunications, and Information Administration (NTIA). FirstNet is responsible for the deployment, operation, and maintenance of the NPSBN. Using priority access to LTE spectrum, the NPSBN provides interoperable data, voice, and text communications for first responders throughout the U.S. and its territories.

FirstNet is governed by a board comprised of 15 members who have experience in the areas of public safety, information technology, communications, and finance. The board's permanent members include the Secretary of Homeland Security, the United States Attorney General, and the Director of the Office of Management and Budget. The remaining members are selected by the Secretary of Commerce, with each serving 3-year staggered terms.

PSAC

The Public Safety Advisory Committee's (PSAC) main mission is to assist FirstNet in carrying out its duties and responsibilities. SAFECOM, NCSWIC, and NPSTC are members of the PSAC, as well as all the national organizations that are represented on SAFECOM. PSAC provides guidance, information, and subject matter expertise to FirstNet from a public safety perspective. It ensures that user needs, requirements, and public safety operational capabilities are included in the NPSBN. The PSAC provides subject matter expertise on concepts developed by FirstNet, including policies, procedures, technologies & operational methods. The PSAC also advises FirstNet on the creation of plans related to build-out, deployment, and operations of the Nationwide Public Safety Broadband Data Network.



SAFECOM

SAFECOM is not an acronym, it gets its name from the White House's Office of E-Government & Information Technology, where it is referred to as the Wireless Public Safety Interoperable Communications/Project SAFECOM. SAFECOM is an advisory body to DHS, with a focus on improving public safety communications operability, interoperability, and security across local, regional, state, tribal, territorial, international borders, and federal government entities. SAFECOM's prime focus is to improve Interoperability between emergency responders so they can communicate among jurisdictions, disciplines, and levels of government, using a variety of needed and authorized frequency bands. SAFECOM promotes and educates on the use of technologies, resources, and processes related to emergency communications.

NCSWIC

The National Council of Statewide Interoperability Coordinators (NCSWIC) is a national governance body established to assist state and territory interoperability coordinators with promoting the critical importance of interoperable communications and best practices within their states and nationally. NCSWIC is comprised of SWICs from all 56 states and territories. By developing professional partnerships and collaborating with public safety responders and policymakers, the NCSWIC promotes awareness of the critical importance of interoperable communications. NCSWIC enhances public safety by assisting states and territories with implementing the core elements of interoperability and ensuring interoperable communication is achieved as needed, on-demand, and when authorized; at all levels of government; and across all disciplines. NCSWIC members strive to enhance the response capabilities of public safety responders by coordinating and collaborating with FLSTT and non-governmental public safety responder agencies. OEC provides support to the NCSWIC to build partnerships, discuss important issues impacting emergency communications interoperability, and share best practices and lessons learned.

NPSTC

NPSTC is a voluntary federation of 16 public safety organizations, whose mission is to ensure public safety has the spectrum needed to communicate in life-threatening situations without interference. NPSTC analyzes and makes recommendations regarding public policy, regulatory, and technology issues to governmental regulatory organizations on behalf of public safety. NPSTC plays a key role in providing input to DHS OIC and OEC regarding the issues of public safety wireless communications and interoperability.

LTE & 3GPP

Long-Term Evolution (LTE) is a wireless broadband communication standard for mobile devices and data terminals, based on the GSM/EDGE and UMTS/HSPA technologies. LTE technology enables very high-speed data communications that are not possible with current LMR technologies. High-speed data transmission capabilities are what make LTE ideal for public safety. LTE was designed to deliver high bandwidth mobile data which allows mobile devices to stream video or to transfer large amounts of data quickly. Next-generation public safety communications will likely pair up narrowband Land Mobile Radio (LMR) networks for voice with broadband LTE networks for high-speed data (Hybrid LMR-LTE Public Safety Networks).

The 3rd Generation Partnership Project (3GPP) is a collaboration agreement that was established in December 1998. The collaboration agreement brings together several telecommunications standards bodies. The original scope of 3GPP was to produce globally applicable Technical Specifications and Technical Reports for a 3rd Generation Mobile System based on evolved GSM core networks and the radio access technologies that they support (i.e., Universal Terrestrial Radio Access (UTRA) both Frequency Division Duplex (FDD) and Time Division Duplex (TDD) modes). The scope was subsequently amended to include the maintenance and development of the Global System for Mobile communication (GSM) Technical Specifications and Technical Reports including evolved radio access technologies.

APCO

APCO was founded in 1935. It is the world's oldest and largest organization of public safety communications professionals. It supports the largest U.S. membership base of any public safety association. Federal and State agencies have looked to APCO for leadership and guidance on public safety communication. APCO's main mission is to be a leader in providing public safety communications expertise, professional development, technical assistance, advocacy, and outreach to benefit its members and the public. APCO serves the government functions that provide public safety communications services in the following areas: law enforcement, forestry, conservation, fire, highway maintenance, emergency rescue and medical services, emergency management, and other activities supported or endorsed by federal, state, local and tribal governments.

LMR & P25

LMR (land mobile radio) systems have been deployed since the 1930s and is a broad term that encompasses all licensed two-way, "push-to-talk" mobile radio communications. LMR communications systems are intended for use by terrestrial users in vehicles (mobiles) or on foot (portables) and are used to support mission-critical voice communications. LMR systems are used by emergency first responder organizations and public safety organizations. These systems are also used in many industries including industrial, transportation, utilities, logistics, and military. LMR systems typically include handheld mobile radios, vehicle-mounted mobile radios, fixed base stations, and repeaters.

Project 25 (P25 or APCO-25) is a set of standards for North American radio communications for public safety, security, public service, and commercial applications developed among others by APCO. It is standardized by the Telecommunications Industry Association (TIA) and supports both voice and data transmissions. P25 compliant radios can communicate in analog mode with non-P25 radios in analog and digital mode with P25 radios. P25 radios are a direct replacement for analog UHF (typically FM) radios but add the ability to transfer data as well as voice, allowing for more natural implementations of encryption and text messaging. P25 radios are commonly implemented by dispatch organizations, such as police, fire, ambulance, and emergency rescue service, using vehicle-mounted radios combined with handheld walkie-talkies.



Conclusion

Unlike LMR, LTE networks are dependent on cellular tower infrastructure and were primarily developed for phone and business communications where coverage, reliability and resistance to noise and other factors were secondary considerations. Consequently, it is unlikely that cellular LTE networks will replace LMR for voice communication in Mission Critical PTT applications. However, given the need for LTE's flexibility and data capabilities, it is likely that hybrid LMR-LTE networks featuring both technologies will proliferate. The emergence of hybrid LMR-LTE networks means that both LMR (mobile radios) and LTE devices (smartphones) will need to interoperate. Unfortunately, LMR and LTE devices are not directly interoperable since their networks have been designed and built to different technical standards. LMR systems work with narrow channel bandwidths and high transmission power, which requires low data rates to support high spectral efficiency.

Most public safety communication experts agree that LMR and LTE system networks will coexist, as hybrid or independent systems, and supplement each other. However, other experts believe the two technologies will ultimately converge. In either case, most government agencies such as SAFECOM and NCSWIC recommend following a multi-path approach to emergency communications. This requires operating and maintaining their LMR systems while also investing and deploying LTE wireless broadband systems.

References:

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