Enhancing Rural And Remote Communications

NOSORH National Rural EMS & Care Conference

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Today’s Agenda

- What is FirstNet?
  - Program Overview
  - Network
- New and Emerging Technologies
  - High Power User Equipment – HPUE
  - Push to Talk – LMR/LTE Interconnection
- Use Case
- Questions
AT&T is responsible for building, operating, deploying, and maintaining the FirstNet network in accordance with a 25-year contract with the FirstNet Authority. As part of this agreement, AT&T gains access to 20 MHz of federally owned spectrum and $6.5 billion in initial funding, and it will invest about $40 billion over the life of the contract to establish the network.

FirstNet is a nationwide wireless broadband network for first responders being built and deployed across all 50 states, 5 U.S. territories and the District of Columbia. FirstNet offers public safety a communications network built and customized to meet their needs.

The First Responder Network Authority is responsible for overseeing the creation and delivery of FirstNet – the nationwide public safety broadband network. An independent entity within the Department of Commerce’s NTIA, the FirstNet Authority ensures AT&T delivers on the terms of its contract and deploys a network that meets the needs of public safety now and into the future.
Eligibility Framework

- Primary Subscribers
  - Public Safety Communications
  - Emergency Management
  - Emergency Medical Services
  - Fire Services
  - Continuity of Government
  - Law Enforcement

- Extended Primary Subscribers
  - Utilities and Energy
  - Education (K-12/Higher)
  - Hospitals and Public Health
  - Transportation Services
  - Public Works
  - Internet of Things (IoT)
FirstNet Network
Nationwide Public Safety Broadband Network
The Power of the Core

- The FirstNet Core serves as the brain and nervous system of the network, separates public safety traffic from commercial traffic, and supports FirstNet functions, including quality of service, priority, and preemption.

- It is the foundation for the delivery of advanced public safety features that are unique to FirstNet, including end-to-end encryption, continuous security monitoring, superior reliability and availability, local control, and mission critical services.

- It is built on separate physical hardware for a highly secure network.

- It is tested and validated by the First Responder Network Authority.
FirstNet Core Features

**Priority/Preemption**
Always on priority and preemption, so first responders will have dedicated access to the network when and where they need it.

**Encryption**
End-to-end encryption, so public safety can transmit data securely.

**Security**
24/7/365 security monitoring through a Security Operations Center staffed with a dedicated team.

**Reliability**
Superior reliability and availability, so the network is as dependable as first responders themselves.

**Local control**
Enabling local leaders to boost priority levels when needed to keep their first responders connected.

**Mission-critical Functions**
Making a range of technologies available to public safety in the future, like push-to-talk and location-based services.
FirstNet Momentum

150+ dedicated deployable network assets, including Flying COWs, Communications Vehicles, SatCOLTs, Compact Rapid Deployables, and an Aerostat

190+ unique apps in the FirstNet App Catalog

800+ solutions deployed in 2021, from FirstNet SatColts to network restoration efforts

370+ FirstNet Ready™ devices

~95% Band 14 coverage completion

3M+ FirstNet connections

19,500+ public safety agencies and organizations subscribed
High Power User Equipment (HPUE)
High Power User Equipment (HPUE)

- Exclusive to Band 14
- Regulated by FCC rules and 3GPP standards
- Increases transmission power beyond standard commercial devices
- Extends coverage in rural areas, as well as provides stronger building penetration
- Devices announced to date are vehicle mounted solutions
FirstNet MegaRange™ HPUE Devices

- FirstNet devices operating on Band 14 are allowed to transmit according to the 3GPP standard for HPUE. **This is unique to FirstNet.**
- HPUE devices also operate on the other FirstNet bands at standard power levels.
- HPUE devices have been added to the National Institute of Standards and Technology (NIST) list of certified devices as of June 2020.
- Visit FirstNet.com for additional information.

*This slide does not constitute an endorsement by FirstNet Authority of any product or service, organization, or company.*
FirstNet Push to Talk/LMR Interconnection
## Commercial Push-to-talk vs MCPTT

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<thead>
<tr>
<th>Commercial PTT (Over the top)</th>
<th>MCPTT</th>
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<tbody>
<tr>
<td>Commercial grade</td>
<td>Standards based</td>
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<tr>
<td>Not built into the network</td>
<td>Integrated with FirstNet network</td>
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<tr>
<td>Limited talkgroup size</td>
<td>Larger talkgroup size</td>
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<tr>
<td>Proprietary APIs</td>
<td>Standard Protocols</td>
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<tr>
<td>Lacking universal LMR interfaces</td>
<td>Works across multiple devices, apps and servers</td>
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<tr>
<td>Best Effort Latency and Connect Times</td>
<td>QPP/Mission Critical Latency and Connect Times</td>
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<tr>
<td>Varying encryption capabilities</td>
<td>End-to-end encryption</td>
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<td></td>
<td>24/7/365 NOC/SOC with dedicated team</td>
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<td></td>
<td>Local control</td>
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Land Mobile Radio (LMR) Interconnection

- Broadband Enhanced Push-to-Talk (EPTT) and LMR users can communicate seamlessly with each other.
- **Expanded coverage**: benefits by having both LMR and LTE coverage.
- **Optimization of LMR resources**: non-first responder groups on LTE with interworking to LMR.
- **Convergence into a single device**: support specialized operations.
- Additional options to provide interoperable communications across jurisdictions.
- Reduces the need for large caches of LMR devices for large mutual aid events.
- **Over the air programing** allows for easy connection to LMR groups.
- Interoperable communications at the Radio, Network, or Console level.
# Type of LMR Interconnection

<table>
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<tr>
<th>Network Diagram (Logical)</th>
<th>Why</th>
<th>LMR System Compatibility</th>
<th>Pros</th>
<th>Cons</th>
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</table>
| ![Network Diagram](image) | Interop with virtually any LMR system quickly, easily and affordably | Virtually all LMR systems (digital, analog, P25, proprietary) | - Works with virtually all LMR systems  
- No support or license required from LMR vendor (OEM)  
- Most affordable option  
- Quickest to implement  
- Easiest to expand  
- Can be used with non-CSSI certified console LMR systems | - No caller ID or 1:1 calling  
- Requires hardware for voice conversion |
| ![RoIP](image) | ![ISSI](image) | ![CSSI](image) | ![RoIP Pros](image) | ![RoIP Cons](image) |
| ![ISSI](image) | Interop with existing P25 LMR ISSI server with ISSI licenses | Works with P25 LMR systems | - More efficient and faster call setup  
- Offers greatest features (including 1:1 calling, group calling, caller ID, alerting and call logging) and talkgroup scalability  
- No need for patching, gateways, donor radios or donor phones | - Limited to P25 systems  
- Requires an open ISSI port which can be expensive  
- Requires additional planning and configuration |
| ![CSSI](image) | Interop with Zetron or Avtec LMR consoles (dispatch-heavy settings) | Primarily P25 and certain other digital and analog systems | - Allows connectivity of disparate radio systems  
- Supports a large number of talkgroups  
- Good for dispatch-centric LMR network | - Only works with P25 and certain other systems  
- Possible licensing restrictions with certain LMR OEMs  
- Design work required by console vendor |

**Most Common / Viable**

- Works with virtually all LMR systems
- No support or license required from LMR vendor (OEM)
- Most affordable option
- Quickest to implement
- Easiest to expand
- Can be used with non-CSSI certified console LMR systems
FirstNet in EMS
FirstNet’s Impact on EMS Communications

Evolving Use of Telehealth in EMS

- Implementation of the CMS Triage, Treatment, and Transport ET3 model
- Tool to real-time connect patients with advanced providers
- Working to redefine definitive care using cost effective technology

FirstNet Contributions

- Clear, congestion free network connection to enhance the user experience
- Priority and pre-emption to ensure the best available connectivity
- Inherent encryption and dedicated core network to ensure security of that patient/provider conversation
On-Set of the Pandemic

- Avoidance of normal healthcare activities due to exposure fears
- Expanded use of telehealth to meet unique patient circumstances
- Established the technology as a vital tool in the mission
- FirstNet continued network expansion will allow telehealth to evolve as fundamental tool in all areas of healthcare

*Based on data collected by AT&T from Jan.-May 2020
Sacred Cross EMS provides EMS and emergency and non-emergency ambulance transport services across North and West Texas. Many of the areas that the company services are rural, and cellular coverage is traditionally sparse.

With the help of FirstNet, Sacred Cross is able to communicate among crews, with hospitals, and with dispatch provide better patient care in these remote areas during everyday incidents and planned events.
Sacred Cross Needed Communications update

The Problem

• Antiquated, unreliable land mobile radio system
• Limited broadband capability
• Unable to effectively perform key telemedicine applications from the field:
  - Cardiac monitors
  - 12 Lead
  - Video Assessment

The Solution

• FirstNet LTE Connectivity
• Uniden UV350 Vehicle Communicator
• SONIM ruggedized phones
• Enhanced Push-to-Talk
Expanded Footprint

- Out of region transfers
- Mutual Aid support
- Communications continuity
- Safer transfers
Thank You