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The background features a horizontal bar chart with varying bar heights, overlaid with binary code (0s and 1s) in a light blue color. On the right side, there is a large circular graphic with concentric rings and a central dot, resembling a target or a signal. The overall color palette is dominated by orange and blue tones.

**Arizona Public Safety Broadband
FirstNet Forum**

Three Tasks Public Safety Needs Completed

- Integration of Next Generation 9-1-1 with FirstNet
 - For vetted pictures and videos to be distributed to those responding to an incident
- Rural Broadband Coverage
 - FirstNet has a mandate
 - Multiple federal agencies offer more than 25 different grants
 - Should be under a common organization to combine all grants for rural coverage
- Topic for Today
 - Land Mobile Radio to FirstNet Push-to-Talk Integration
 - A must-have to complete part of the LMR/FirstNet combined communications solution

PTT Integration for LMR and LTE (FirstNet)

- There is a critical need for this today!
- Will enable agency handling an incident to coordinate with incoming units regardless of where they are from (as long as they are using FirstNet)
- Interoperability between local, state, and federal agencies is vital to providing better, more reliable communications
- There are ways to accomplish this BUT there are pitfalls too!

The Interoperability Goal

- ➔ Provide common, open-standard, inexpensive ways to accomplish LMR/FirstNet integration
- ➔ Agencies using digital (P25) systems may need a different solution than agencies using analog FM systems
- ➔ Work being done by various organizations to solve this problem
 - 3GPP Standards Body
 - PSTA (Public Safety Technology Alliance)
 - Vendors
 - Others



Today's Choices for LMR to FirstNet Interoperability

P25 TRUNKED, P25 CONVENTIONAL, AND ANALOG

P25 to FirstNet Integration

- ➔ RF Subsystem Interface (P25 ISSI) is standard technology for cross-network interoperability for P25 Trunked systems.
 - There is also a Console Subsystem Interface (P25 CSSI)
- ➔ If a P25 already includes ISSI, it is ready to be interconnected
- ➔ If a P25 does not include ISSI, it can be an expensive add-on depending on the vendor, prices vary from more than \$600K down to about \$40K
- ➔ Two vendors approved so far for FirstNet PTT have both integrated P25 to LMR PTT systems (Kodiak-Motorola) and ESChat
- ➔ However, there are still a large number of Analog FM systems in use

Analog FM LMR Systems

- ➔ Radio over IP (Radio over Internet Protocol)
 - NOTE: not the public Internet, simply IP-based
- ➔ Requires a donor radio at dispatch or point of cross-over
- ➔ Does not provide for FirstNet location or unit number being transferred to LMR network
- ➔ Can be easily remotely turned on and off using FirstNet phones (touch-tone)
- ➔ The most prevalent way connections are made today
- ➔ Most inexpensive way to cross-connect LMR/FirstNet today



What Is Coming and When


P25 FSI, DHS BSI, RoIP+

P25 FSI, DHS BSI, RoIP+

- ➔ P25 FSI (Digital First Service Interface)
 - Available as standard in all P25 conventional systems
 - Can be modified for use with analog systems and perhaps other digital formats (DMR, etc.)
- ➔ DHS BSI is a Department of Homeland Security interface system designed to make interoperability easy
 - This standard lacks connectivity options for most existing LMR standards
- ➔ RoIP+ is a work-in-progress by at least two vendors including JPS, Mutualink
 - New extensions would enable location and unit numbers to be sent and received on both Analog LMR networks and FirstNet
- ➔ There is a recommendation before the Public Safety Technical Alliance (PSTA) to build extensions to DFSI to handle all non-P25 trunked systems

Next Six Months

- ➔ DFSI should be reviewed further for adaptability
- ➔ RoIP+ should be tested and compared to DFSI results
- ➔ 3GPP interoperability standard should be reviewed
- ➔ There does not have to be a single choice for interoperability but...
 - Any choices must be an open standard, easy to implement, and delivered as a tested and working solution or solutions as soon as possible
- ➔ Interconnectivity between LMR and FirstNet is vital to public safety



Important Question—Yet to be Answered

HOW MANY DIFFERENT PTT VENDORS WILL BE APPROVED FOR FIRSTNET?

Push-to-Talk over FirstNet

- ➔ Two suppliers of PTT over FirstNet today
- ➔ Kodiak (now Motorola) embedded in FirstNet (Built with AT&T) network
- ➔ ESChat is an over-the-top PTT system usable on multiple LTE networks
- ➔ Rumored to be at least one more PTT vendor that will be approved by FirstNet in the very near future
- ➔ The question is
 - How many Push-to-Talk vendors will be permitted on FirstNet (or other public safety LTE systems around the world)?

The Answer Remains Unclear

- ➔ The TCCA (GSMA Critical Communications Association) has tested with more than thirty vendors of PTT applications and servers
 - Some within the TCCA believe all PTT vendors that prove they are interoperable with the other vendors should be permitted on public safety LTE networks
- ➔ I disagree! There needs to be a reasonable number but not all of them
 - If there are too many, over time each PTT vendor will offer new and improved features and functions
 - This will make a standard for PTT obsolete and lead to the same problems with lack of interoperability we had using only LMR
 - FirstNet or any public safety broadband network has been designed to increase interoperability, not decrease it!

Conclusions

- FirstNet is a great PTT platform for providing multi-agency interoperability
- FirstNet will not replace Land Mobile Radio systems any time soon
- We need one or more simple, easy-to-implement open standard for interconnecting LMR to FirstNet
- My crystal ball says we should have accomplished this goal by the end of 2019

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Questions, Comments?