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Challenges for Public-Safety LTE

Although there are many challenges still to address before LTE is ready to meet all the needs of public-safety agencies, the momentum is building. Users are expected to begin using LTE for both voice and data services by 2020 or sooner.

There are many reasons why LTE was proposed as the platform - spectrum efficiency, data rates, and alignment with international standards. LTE should also allow users to leverage proven and mature standards with no tie to proprietary solutions and a greater choice of vendors.

Public safety has found great value in carrier-integrated and over-the-top push-to talk (PTT) services over cellular (PoC) solutions, because it has a broad range of missions. Mission support, undercover, LMR capacity reduction, and LMR coverage extension are a few reasons public safety uses PoC, but will continue to advocate the use of traditional LMR for mission-critical communications. Mission-critical PTT (MCPTT) will become viable when LTE networks, MCPTT service, and PTT devices provide the same features and reliability of LMR solutions.

Early LTE adopters face many challenges as standards transition from committee rooms to real world. Early indications from lead projects highlight some signs of challenges to come:

- Priority and access control for public-safety LTE require new functionality in hardware and software.
- Instead of access to the wide range of commercial off-the-shelf devices, new chipsets and products are needed and the choice is limited.
- Standardization work is ongoing. The current 3GPP standards define the core public-safety LTE services, but many features will be completed in stages during the coming years.
- Users not only need the latest hardware, they need commitment from suppliers that products will support future public-safety LTE releases and supplier commitments to a road map to deliver those features.
- The proposal for off-network operation - direct mode - was based on LTE proximity services (ProSe). Real-life testing has shown that ProSe is unlikely to deliver the coverage needed for public-safety users.

The biggest influence on the success of any new technology is how well it meets user needs. Standards provide the foundation where open and interoperable solutions are made, but only define how elements of a solution talk to each other. They define the signaling between a device and network, how calls are set up and transferred, and how data is routed. They do not define how a product looks, its user interface, or the functionality it delivers. Get this wrong for the control room, the officer on the street, the incident commander, or many others and no matter how good the standard, it will fail in the marketplace.

If we take a high-level, simplistic view of the different operational requirements of public-safety users, it is easy to see variation in requirements across the services. Police rely more on voice, while fire and particularly ambulance make extensive use of mobile data for dispatch and task management. Based on current market trends and early announcements from vendors, the first-generation devices will be data-centric, smartphone-based units with large touchscreens and basic additions of PMR-style functionality such as PTT control, improved speaker audio and enhanced battery life. This addresses the largest part of the public-safety market, but falls short for many user groups.

One of the hopes for public-safety LTE was to be able to select from a wide range of suppliers, leveraging off-the-shelf technology. The reality is public-safety LTE is not off the shelf. Chipsets supporting new standards are only just now on the market, and further changes may be needed. (continued on page 2)

Challenges for Public-Safety LTE (cont.)

Small suppliers face many hurdles selling into a market that expects long-term support, long-term road map commitments, and service networks.

There is no doubt that public-safety LTE will bring huge benefits to the public-safety and critical communications user community. The progress of FirstNet during the next few years will define how practical and successful this transition will be. While the groundwork has been done in the standards bodies, there is a lot of work needed to ensure workable solutions exist for end users. Governments and end users need to find ways to encourage and engage new entrants to the markets to bring innovative and cost-effective solutions, and influence the products and solutions brought to market to ensure they meet their needs.

(Excerpts from "Challenges for Public-Safety LTE" By Iain Ivory, Mission Critical Communications, LMR + LTE: The Evolving Public-Safety Network)

Tech Corner: Portable Radio Battery Maintenance

The following information is provided as general maintenance guidelines for portable radio batteries. As is always the case, users should refer to the specific manufacturers instructions for complete details regarding their battery maintenance.

- Initialize the New Battery – A new battery is shipped with about 50 percent of its full capacity charge for several reasons – one of which is safety. The second reason is the battery charge will slowly decrease with time, and by the time the battery is used, it will be below maximum charge. Therefore, as proper maintenance and battery protocol, it is expected that the new battery will be charged fully before use. Charge the battery overnight to maximize its future capacity. Charge a new Nickel Cadmium or Nickel Hydride battery for 14 to 16 hours, and a new Li-on (Lithium Ion) battery an extra one to two hours after the full charge light turns green.
- If you are using a battery and charging system that utilizes a calibration cycle, do not remove the battery from the charger until the light indicates that the battery can be safely removed.
- Store new batteries that have not been initialized in a well ventilated, cool, and dry storage area. This will preserve the capacity and number of life cycles. Do not store near flammable material. Nickel Cadmium batteries can be stored for up to two years, and Nickel Hydride batteries/Li-on batteries can be stored for up to 18 months.
- If a battery has been in use and needs to be stored for several months, it is best to discharge the battery to 50 percent of its capacity. Then, store the battery in a cool, dry location away from flammable material.
- If a battery has been initialized, used, discharged to 50 percent and stored for several months, it is the best procedure to fully discharge the battery before recharging. This procedure is different from the initializing procedure, because the battery has already experienced a load during use.
- If using a rapid charger, it is best to leave the battery in the charger for an additional hour.
- Do not use the battery charger as a stand or holding spot if its plugged in. If a battery experiences continuous charging, it will lose its capacity.
- Carry a spare battery, and do not rely on charging partial capacity batteries to carry out your day's duties. Having a spare battery, to be used in tandem with your primary battery, is a cost effective solution rather than frequently buying a new, primary battery.
- Do not try to increase the battery life by extra charging, because it significantly decreases the lifecycle and capacity of the battery.
- Before using a battery that is brought out of storage, bring it to room temperature (69 degrees Fahrenheit) Charging below 39 degrees and above 104 can decrease battery life.

Batteries are designed and precisely manufactured by engineers to ensure optimum performance. By following these battery maintenance steps, and helping others in your workplace to understand and follow them, you will lengthen the life of your two-way radio batteries.

(Article by Mr. Del Smith with excerpts from Nova Communications, Lengthening Portable Two Way Radio Batteries with Proper Maintenance, October 21, 2016)

Best Practices Working Group Publishes Best Practices Master Report

Radio Interoperability Best Practices Working Group, comprised of nearly 200 participants, representing public safety, government, academia, and industry communities has published their Consolidated Best Practices Master Report.

Public safety responses are increasingly complex and often requires that different jurisdictions and disciplines communicate. Interoperable communication is the backbone of emergency response and without it, the lives of our citizens and our first responders are at risk.

The National Public Safety Telecommunications Council (NPSTC) researched best practices ranging from the need for routine training on communications systems to formal agreements and policies, from using common channel names to creating change management practices, and the use of encryption and managing radio channel assignments in high-risk situations. The overall report and each individual Best Practice was a collaborative effort spanning every phase of development.

(Excerpts from article in NPSTC Daily News, Jun 18, 2018)

The Future of Police Radio

Law enforcement agencies nationwide are looking at adopting the FirstNet first responder cellular voice and data network for mission-critical communication. Does that mean the end of land mobile radio (LMR) as a primary emergency communications tool?

The Lake County (FL) Sheriff's Office is planning to adopt first responder cellular communications, but is not ready to do away with its LMR system. They have already begun field trials with FirstNet and officials there say they're excited about the prospect of being able to share data and video reliably and securely across the emergency community, but Sgt. Jason Matthews doesn't see LMR going away. "It will take some time before we are sold on the idea of replacing a deputy sheriff's tried-and-true LMR completely in favor of a ruggedized broadband device," he says.

Matthews is not alone. Despite eagerness in law enforcement to put FirstNet through its paces, LMR likely will remain the primary mode of voice communications for the foreseeable future. In fact, analysts with Research and Markets see demand for LMR expanding from $14.6 billion in 2017 to $25.7 billion in 2025.

Why is LMR still front and center, with broadband LTE just around the corner? A number of factors help to explain it. Some have to do with the nature of police operations, while others reflect realities around such issues as cost and infrastructure. Let's look at them.

OPERATIONAL ISSUES

Many who follow public safety technology argue LMR is simply more naturally suited to the way cops operate. "At a fundamental level, cellular technologies are optimized for communications between a single unit and the system. LMR on the other hand is fundamentally much like broadcast. It is wide area to a group and between everybody on the channel," says Neil Horden, chief consultant with Federal Engineering, a public safety communications consultancy.

That's a crucial distinction for first responders. "Public safety operates in group mode. Fire officers responding to an event want to work as a group. Police on a beat during normal operations want to talk to and hear each other, even when they are not involved, because it provides them with situational awareness," Horden says.

Police operations require uninterruptible comms, and while FirstNet is being touted as being a mission-critical grade network, experts say for voice, LMR will always be inherently more robust. FirstNet officials likewise say there is good reason to expect LMR to be around for some time to come. "The radios may have ten times the power of a smart phone, so they can punch their signal through walls, in parking structures and basements," says Bill Schrier, a senior advisor to FirstNet. " In a wild or a remote area where there aren't any cell towers, LMR is better able to reach into those areas."

QUESTIONS OF CONTROL

"Most LMR radios are controlled closer to the agency. The agency can determine how much coverage and capacity is needed, and controls that end product, whereas with broadband you basically get the carrier's best effort," says retired Los Angeles County Fire Department battalion chief John Lenihan, who is now the chair of the National Public Safety Telecommunications Council Interoperability Committee.

Most LMR operators understand the nuance here. "With land mobile, if you have bad power, you build sites with battery backup. If you have connectivity issues, you build your own microwave network. Now you are turning all that over to FirstNet, Horden says. "Giving up control will rub many cops the wrong way. Public safety, in general, is risk averse. The nature of the job means it is better to use something that does 80 percent of what you need, but always works, rather than something that maybe could do 95 percent, but you don't know if it will always work," Horden added

Some also wonder whether any LTE network could match the performance of LMR. "When you have a vast array of routers and switches, you can have quite a bit of latency between the time you push the button and the time the voice reaches the ear, even if it's someone just a couple of blocks away," Lenihan says. LTE developers are working to address such concerns, "but LMR has already honed that capability over many years."

LOOKING AHEAD

Given the wide-ranging concerns, both in terms of operation and infrastructure, it's clear LMR is not going away any time soon. "Public safety entities will continue to rely on their LMR networks for mission-critical voice features needed in an emergency response setting. In the near term, public-safety entities will need to maintain and/or upgrade their LMR networks, as appropriate," according to FirstNet documents.

FirstNet officials recognize this, as well, and report mission-critical voice is in the works, but say they can't predict when such functionality will arrive because standards are still in development. Until then, experts say police will need to make the case loud and often for LMR's continued importance. Some see this as a critical moment in police telecommunications, a time when funding priorities could easily be knocked off track by the promise of first responder LTE.

"The people who make noise about LTE replacing LMR are not from public safety. They are engineers and lab rats. They have never used anything but a cell phone, so why wouldn't everyone just use a cell phone?" Andrew Seybold says. "That's a problem. These LMR systems have to stay in operation. Police can't afford for mayors and governors to believe the hype about LTE replacing everything. That's just dangerous."

(Article by Adam Stone, POLICE Magazine's Special Report: Mission Critical Communications)

What to Look for When Choosing a Technology Vendor

Commitment to Open Standards:
Open standards offer choice; you avoid the pitfalls of proprietary hardware and software, you can operate multi-vendor radio fleets, and upgrade to the devices and infrastructure that best meets your needs. Open-standards vendors collaborate and innovate to bring solutions to market sooner and flexible, defined interfaces avoid the risk of stranded investments.

Innovation:
A culture of innovation and a track record of incorporating new technology into product lines ensures a sound technology base for exciting new developments in the future.

Technology Partnering:
Technology partnering is collaborative and cooperative. By complementing products and services with applications and systems from a range of technology partners, customers are assured the best solution, more choice, and lower integration overheads.

Design, Implement, Manage:
Service continuity is critical. Working with a vendor who can design, implement and manage the process from end to end, customers can enjoy an enduring and collaborative partnership throughout their project life cycle.

Integrity and Trust:
Committing to a new communication solution is an important investment. A trusting relationship with your vendor ensures ongoing support for the life of your network. You need to know that they have years of experience and a sound reputation with positive clients who vouch for their integrity.

(Article by Tait Communications, "What to Look for When Choosing a Technology Vendor," undated, Tait Communications ELearning)

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Did You Know?

Agencies wishing to implement a configuration change to the ALMR System infrastructure must submit a System Change Request form. Changes must be properly documented, reviewed, evaluated, coordinated, and approved prior to implementation. The process is outlined in System Change Request (CR) Management Procedure 400-3. You can also contact the Operations Management Office for assistance.

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