

# ALMR INSIDER

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## Critical ALMR Infrastructure Update Needed

In 2013, the ALMR System was updated to the 7.13 iteration of the Motorola Solutions system software from 7.1.1. Motorola Solutions supports pre-testing of all software updates to the System components for five software iterations. This meant a required update to the System was needed in late 2017 earlier 2018. However, due to issues in coordinating funding of the overall System between different fiscal years from the Department of Defense (DOD) and State of Alaska (SOA) for the ALMR portion, and the Municipality of Anchorage (MOA) for the Anchorage Wide Area Radio Network (AWARN) portion, the update was delayed. Motorola Solutions agreed to continue pre-testing software updates until December 2018 to ensure continued System security. The update to 7.17 got underway in March and will be completed early this fall.

Motorola Solutions releases an updated iteration of their system software and hardware on an annual basis. To ensure system security, and to be able to benefit from technology advances, the ALMR System should update to a new iteration of 7.X within the next two years. However, the 7.17 iteration is the last system update that will support the Quantar site radios in the 72 SOA ALMR sites. The Quantars are at least 25-year-old technology and, having reached their end of life (EOL), will no longer be supported by Motorola Solutions after 2020 and need to be replaced.

DOD has already replaced the Quantars in their sites with current GTR8000 radios and the MOA AWARN was implemented with GTR8000 radios in their sites. The SOA will be the only ALMR infrastructure partner in the ALMR cooperative that will not be able to update to the next 7.X iteration, and beyond, until the Quantars are replaced.

Given the DOD and Non-DOD Federal agencies' strict security requirements, they will be required to update to the most current system iteration in 2021 to ensure continued pre-tested software updates by Motorola Solutions. If the SOA has not replaced the Quantars in their sites, the inability for all partners to update in 2021 will have a detrimental effect on the partnership and may cause DOD and the MOA to exit ALMR, negatively affecting the seamless interoperability that exists between DOD, Non-DOD, State, local and tribal public safety agencies today.

Given the number of Quantars that need to be replaced (295 at 72 sites), it is imperative that the SOA quickly develop a plan and budget for phased replacement of the Quantars over the next 24 months. Ideally, funding to initiate the replacement should be included in the SOA FY2020 capital budget, so that installation of GTR8000 radios can begin this summer.

(Article prepared by Mr. Del Smith, ALMR Operations Manager)

## Defining Public Safety Grade Systems

The public safety community requires a wide variety of interoperable, standards-based communication services, configurations, and capabilities with well-defined performance, interoperability and testing specifications. This is the essence of the Project 25 (P25) Suite of Standards as it relates to Public Safety Grade (PSG) communications systems.

A PSG communications standard first and foremost provides a set of features, capabilities

and services required by the diverse group of public safety users. The P25 User Needs Sub-Committee (UNS) has defined those required features and the P25 Suite of Standards supports those features. Manufacturers take the features and specifications defined by the P25 standard and implement them in reliable software hosted on rugged hardware platforms that are exhaustively tested to meet the performance and inter- (continued on pg 3)

## New Research Addresses LMR to LTE Interworking

Interworking between land mobile radio (LMR) and Long Term Evolution (LTE) is feasible without the Project 25 (P25) Inter RF Subsystem Interface (ISSI), according to research from Catalyst Communications Technologies following a Department of Homeland Security (DHS) grant to research interworking.

The study of LMR to LTE interworking requirements and existing standards also found interworking features vary with each radio system. The research study that Catalyst began in early 2018 to analyze how a standards-based interworking solution could enable mission-critical communications between users of LMR systems and users on cellphones with push-to-talk (PTT) applications.

The research should determine the feasibility and architecture for a reliable, secure and standards-based LMR/P25 to LTE mission-critical network interface service for different LMR systems in use and new LTE systems being deployed, including the First Responder Network Authority (FirstNet).

As part of the research, Catalyst determined how well public-safety requirements could be met using existing standards, including Third Generation Partnership Project (3GPP) for LTE and P25, Digital Mobile Radio (DMR) and TETRA for LMR. The company also considered the viability of interworking LTE with current analog and proprietary-based LMR systems. Catalyst con-

cluded that existing standards did support interworking and made recommendations for ISSI extensions.

The foundation for the research was the National Public Safety Telecommunications Council (NPSTC) report “Public Safety Land Mobile Radio (LMR) Interoperability with LTE Mission Critical Push to Talk.” Of the 56 core requirements identified in the report and other documents, Catalyst determined and scored a 76 percent conformance using ISSI with a Phase 2 P25 trunking system on the LMR side. Catalyst determined and scored different conformance results for other radio systems and quantified each rating, primarily dependent of its interoperability interface.

The research also uncovered the need for a non-ISSI based interworking solution for users who didn’t have, or couldn’t afford, the P25 ISSI interface on their current LMR system. Catalyst conceived an “adapter” product that expands access to mission-critical PTT (MCPTT) interworking for LMR without ISSI and for LMR-to-LMR interoperability. Catalyst will develop an interface service/server, anticipated to be a software product running on a standard networked computer(s), which will satisfy the interworking requirements defined by NPSTC.

(Article taken from Mission Critical Communications/Radio Resource International, March 6, 2019)

## State of Alaska Installs DiagnostX Devices at Multiple Sites

In the January 2018 Insider article, we discussed the need for proactive radio maintenance and described the available technology to accomplish that, specifically a hardware device and software called DiagnostX, marketed by LocusUSA. The State of Alaska (SOA) recently acquired four of these devices enabling technicians to identify problem radios without the time and expense involved in bringing all radios into a shop for testing.

Until now, the only way for public safety agencies to determine whether a radio is functioning to specification is to bring it in for annual maintenance or wait for a user to report a problem. This means potentially scheduling thousands of radios for costly annual service checks that require hundreds of technician man-hours, as well as taking radios out of the field, where they’re needed most. Unfortunately, given the logistics involved in testing radios, oftentimes the radio is not checked until it fails, and even then, users often tend to think it’s a system issue, not the radio.

The two-way radios ALMR public safety agencies use rely on an internal reference oscillator to remain on the proper frequency. Over time, these oscillators drift off frequency, eventually causing the radios to fail.

DiagnostX has an intelligent RF (radio frequency) receiver that scans the radio network downlink (outbound) control channel frequencies to identify the frequency in use. Once the active downlink frequency has been iden-

tified, the system monitors the corresponding uplink (inbound) frequency and analyzes all control channel transmissions. After tuning to the uplink control channel frequency, DiagnostX monitors and characterizes all transmissions, distinguishing “suitable” from “non-suitable.” DiagnostX will constantly monitor and evaluate active radios on the System ensuring minimum downtime and assuring peak operational readiness. The over-the-air radio waveform analyzer system can be installed at any ALMR site at the receive antenna multi-coupler, or use any other receive antenna. Over time, the devices will be moved to other sites ensuring all radios are examined.

By identifying and addressing radios with operational problems, agencies will experience a higher level of System performance and reduce maintenance costs by 50 percent or more. Servicing only radios that are out of alignment will free up technicians to focus on other system issues.

Regardless of the challenges associated with dwindling budgets and personnel cuts, the bottom line for first responders, who risk their lives on a daily basis, is their commitment to protect and serve the public. DiagnostX has already proven to be a powerful tool for many public safety agencies outside of Alaska ensuring that police, fire and EMS personnel can feel confident that their radios will work whenever and wherever they are needed.

(Article by Mr. Del Smith, Operations Manager, with excerpts from LocusUSA White Paper, November 7, 2017)

## Defining Public Safety Grade Systems (cont)

operability specifications prescribed by the P25 Suite of Standards. These software and hardware platforms are then combined and implemented as a P25 System in a highly reliable, highly resilient manner, with redundant elements, backup power, etc. These systems are designed to cover a specified geographic area with extra margin for coverage reliability. Equipment that is built to the P25 standards and has been tested to P25 standard tests and is installed, operated and maintained per the NPSTC document to the maximum extent practical, creates an interoperable PSG communications system. Multi-vendor solutions enabling interoperability between devices, public safety individuals and groups, fleets and teams

that can be can be linked across local, regional, state and national networks exist offering public safety agencies competition and options for cost effective sourcing. Public safety practitioners have been doing this with the P25 Suite of Standards for close to 30 years and there are over 700 P25 systems in operation providing PSG, life-saving communications for day-to-day operations, as well as emergency situations. Thus, PSG P25 is the foundation of North American public safety communications and the cornerstone of many PSG systems around the world, like ALMR.

(Article prepared by Ms. Sherry Shafer, with excerpts taken from PTIG White Paper, March 2016)

## Public Safety Communications Evolution

In the current state of communications, LMR networks and commercial broadband networks are evolving in parallel. As communications evolve, public safety will continue to use the reliable mission-critical voice communications offered by traditional LMR systems. At the same time, agencies will continue to implement emerging wireless broadband services and applications. During the transition period, the FirstNet Authority, in conjunction with public safety, is building out the NPSBN and public safety organizations will begin to transition to the FirstNet partner's public safety network from existing commercial broadband service. If and when the technical and non-technical requirements are met and are proven to achieve mission-critical voice capability, it is anticipated agencies may migrate partially or entirely to this broadband technology. Since wireless broadband technology does not currently support a mission-critical voice capability (i.e. talk around/simplex/direct mode), there will be a significant period of time where wireless broadband networks and LMR systems are both necessary.

Reliable voice communications are essential for day-to-day operations, large-scale responses, and other tactical situations. Voice communications provide public safety responders with highly available, always on, reliable, and continuous connectivity between dispatch agencies and public safety users, as well as among multiple agencies' users. Presently, dedicated LMR networks provide highly available voice services. The ability to talk user-to-user or one user to many while not connected to infrastructure is a critical feature.

The public safety community will continually need to evaluate and test offered equipment and services to determine operational readiness and compliance in the challenging public safety environment. Until broadband technology is physically and technically capable of supporting public safety voice communications capabilities, consistent with or better than current LMR offerings, public safety agencies at all levels of government will need to continue using current LMR networks for their mission-critical voice communications. Wireless broadband voice services will continue to complement and co-exist with

LMR, but not replace it. Commercially available wireless broadband voice services do not currently meet all requirements for public safety voice communications; therefore, LMR will remain as the primary voice communications service for public safety in the foreseeable future. Public safety's use of LMR systems will also continue for the foreseeable future, as there is no defined timeframe when LTE broadband technology may provide the same level of mission critical voice services available today.

The envisioned dedicated, public safety wireless broadband infrastructure "converged network" capable of offering mission critical services, which include voice, data, and video to public safety, is important because it reduces the costs of developing and maintaining systems and increases the effectiveness of public safety in the field. However, convergence of LMR and LTE will be a long-term proposition and gradual transition as agencies integrate new technologies, rather than replace existing systems.

The pace of convergence will vary from agency to agency and will be influenced by operational requirements, existing systems, wireless broadband coverage, and funding levels. During the migration period, solutions for connecting traditional LMR with broadband systems will be necessary. Even when the NPSBN is capable of meeting all public safety voice and data requirements, some agencies may need or choose to operate separate LMR systems. Broadband technology to support mission critical voice is not currently available and it remains too early to define the timeframe for the availability of such technology.

The vision of public safety communications as it transitions from today's technology to the desired long-term evolution outlines a conceptual framework for deploying nationwide wireless broadband communications while maintaining LMR networks to support mission-critical voice communications.

(Article prepared by Ms. Sherry Shafer using excerpts from Department of Homeland Security, Public Safety Communications Evolution, Jan 2019)

### What's the User Council and What Do They Do?

The ALMR User Council (UC) is one of the governing bodies for the System. They are charged with oversight of decisions that may affect the operations and maintenance of ALMR and they work in coordination and cooperation with the Operations Management Office. The UC answers directly to the ALMR Executive Council.

Covered in UC Charter are provisions for replacement of UC members. It is expected members will be transferred, promoted, separated, etc., and it is the responsibility of agencies and municipal regions to anticipate these changes and to provide updated appointments to the council.

Additionally, if users feel their perspectives are not being given sufficient consideration by other members of a region, or in the case of non-municipal agencies, users may provide written petitions or letters to the UC Chair for consideration at scheduled meetings. User agencies who are not UC members, but are represented

by their regional or agency-specific member, are welcome to observe meetings, but may not participate without permission from the Chair.

Lastly, it is the responsibility of the three municipal voting members to establish methods whereby the needs and preferences of the region they represent can be determined. This may be through regularly scheduled teleconferences, meetings, or other arrangements. Minutes from regional meetings should be kept, distributed to regional member agencies, maintained by the regional representatives, and transferred as the regional members change over time.

The UC represents agency interests and ensures ALMR is accessible and serves all members equally.

UC meeting minutes, as well as the charter, can be found on the ALMR web site: <http://www.alaskalandmobileradio.org/UC%20Historical2019.htm>

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### Talkgroup and Codeplug Subcommittee

A group of UC representatives has volunteered to look at the codeplugs of any agency on the System to determine if there are problems that may affect radio performance/agency efficiency. If your agency would like the subcommittee to examine your codeplug, please contact Mr. Nate Skinner, UC Vice Chair, to make the necessary arrangements. (nathan.skinner@alaska.gov)

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