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Inside this issue:

Transitioning from FDMA to TDMA

The Alaska Land Mobile Radio (ALMR) Communications System is currently a P25 Frequency Division Multiple Access (FDMA) system, which operates on 12.5 kHz channels consistent with the Federal Communications Commission (FCC) narrow-banding requirements. FDMA is often referred to as phase one of the narrow-banding effort. When the State of Alaska Quantar repeaters are replaced with GTR 8000s, the System will be able to utilize Time Division Multiple Access (TDMA), which is phase two and allows for operating on 6.25 kHz channels, essentially doubling the capacity for handling voice traffic.

A P25 trunked system can be deployed with either FDMA or TDMA traffic channels or a mixture of FDMA and TDMA traffic channels. The FDMA Common Air Interface (CAI) is designed to provide 12.5 kHz spectral efficiency and meet FCC narrow-banding requirements, while the TDMA CAI is designed to provide 6.25 kHz "equivalent" spectral efficiency by providing two virtual channels within a single 12.5 kHz channel.

For TDMA, the two virtual channels are commonly referred to as "TDMA slots." When a 12.5 kHz channel is operating in TDMA mode, the infrastructure is using both slots for outbound signaling. Depending on how the TDMA channel is being used, radios are instructed to use one or the other slot for inbound signaling (radio to infrastructure) and radios will listen to one or both slots for outbound signaling (infrastructure to radio).

The advantages of this approach include:

- Interoperability: The standardization of the trunking control channel enables and promotes interoperability among different manufacturers' trunked radio subscribers.

- Migration: A common trunking control channel for both FDMA and TDMA trunked subscribers allows user agencies the flexibility of migrating their system over time from FDMA to TDMA by gradually adding TDMA capable devices, as their budget allows.

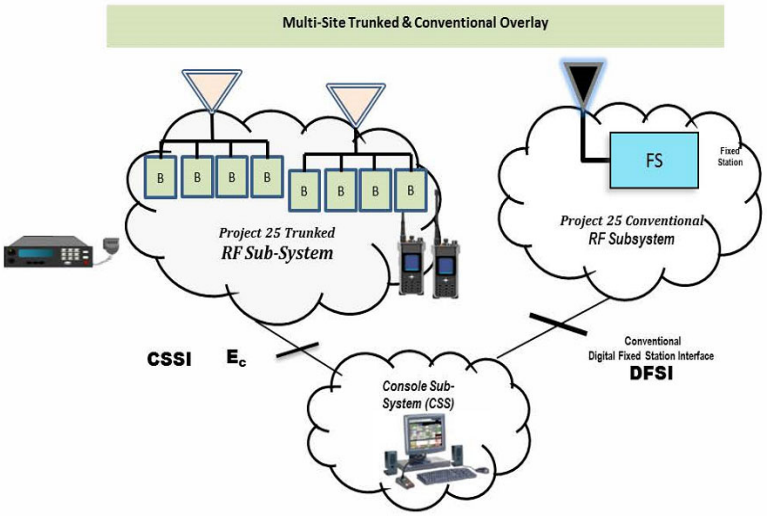
- Hybrid System Support: The common control channel can be used to support hybrid systems with multiple sites and/or simulcast cells, where different sites/cells can support multiple voice and/or traffic channels that may be configured as FDMA or TDMA, based on agency traffic load or requirements. Additionally, hybrid sites/cells can be configured in a manner, which supports both FDMA and TDMA subscriber radios where calls are dynamically assigned based on FDMA/TDMA capability of the subscribers involved, potentially on a site-by-site basis.

- A new addition to the P25 suite of standards defines a TDMA control channel for P25 trunking operation. Similar to the FDMA trunking control channel, the TDMA control channel includes an inbound (radio to infrastructure) channel, which is used for individual or group service requests for voice, data, or supplementary service. It also includes an outbound (infrastructure to radio) channel, which broadcasts system information, control signaling, and provides call assignments.

- The TDMA control channel supports the same functionality as the FDMA control channel. However, with the use of the TDMA control channel, a single 12.5 kHz channel supports two virtual channels and can be configured to utilize one or both virtual channels for inbound/outbound signaling.

Therefore, a P25 trunked system with a TDMA control channel can be deployed in the same type of configurations as current trunked systems. (continued on page 2)

Transitioning from FDMA or TDMA (continued)



The P25 suite of standards is evolving and continuing to grow as technology and user requirements evolve. The standardization of the TDMA control channel will enable multiple manufacturers to support this capability with interoperable equipment. Additionally, the TDMA control channel will provide another option for system managers and user agencies to effectively support their users and to improve the spectrum efficiency of their network in both low-density and high-density situations.

In situations where more than one 12.5 kHz physical channel is available at the site, transition to the TDMA control channel allows agencies to instantly improve spectrum efficiency and traffic capacity without increasing the number of physical channels. For example, a four-channel site with the FDMA control channel and three TDMA traffic channels can support six simultaneous talk-paths. However, with a transition to the TDMA control channel in a single slot, the system would now be capable of supporting seven talk-paths – an increase in virtual resources of 17 percent without the addition of any physical channels. This increase will provide greater traffic capacity for the system/site and reduce the effect of busies and call queuing.

Another benefit can be realized in high-density situations where a relatively high amount of traffic is expected and many traffic channels are available at the site. In high-traffic volume situations, a dual logical TDMA control channel can provide an efficient means of supporting larger amounts of traffic using a single two-slot TDMA physical radio channel. This may eliminate the need for multiple FDMA control channels at high density sites.

(Article prepared by Mr. Del Smith, ALMR Operations Manager, with excerpts taken from Project 25 Technology Interest Group White Paper: P25 Trunking Control Channels, by Mr. Dominick Arcuri and Mr. Andy Davis)

Will LTE Replace LMR?

The question of when Long Term Evolution (LTE) networks might replace LMR systems is an ongoing industry debate. During recent months, I have covered several industry stories that lead me to think full replacement might never happen, and if it does, it's going to take a long time — at least 20 years.

The FCC is looking to realign the 900 MHz band for LTE services. I read most of the comments and reply comments filed with the FCC, mostly by utilities. Unless Americans can adapt to life without electricity or water, I don't see narrowband voice systems for these utilities going away anytime soon. The utilities agree they need broadband data services to complement their mission-critical voice networks, but they can't offer reliable services to consumers without LMR communications.

This issue has two articles on complex, robust and expensive Project 25 (P25) networks that are taking advantage of advanced interfaces built as part of the P25 standard. The networks are currently being built and expanded, so these jurisdictions have no plans to do away with narrowband voice. They have separate LTE strategies, but the LMR networks are central to their jurisdictions' work and officials' safety.

In addition, P25 networks are becoming more vital and ingrained into overall communications for more users because the Inter RF Subsystem Interface (ISSI) and Console Subsystem Interface (CSSI) are tying in additional agency networks, control centers, and even groups such as railroads. The utility of LMR is improving and expanding, not diminishing.

So while LTE is becoming more important and 5G is on the horizon, I don't see LMR going away. The individuals touting LMR's demise generally work for or are tied to an LTE-related business or service, so it's in their best interest to talk about the imminent transition from LMR to broadband.

However, the people I hear from who use P25 and LMR networks on a daily basis do not think replacement will happen, at least not anytime soon. They find LTE helpful, but LMR is what they need day to day to do their jobs and keep themselves and the public safe.

(Article by Sandra Wendelken, extracted from Mission Critical Communications, August 2019)

CISA Releases the Updated National Emergency Communications Plan: Enhancing Communications for the Public Safety Community

The Department of Homeland Security (DHS) Cybersecurity and Infrastructure Security Agency (CISA) recently released comprehensive updates to the National Emergency Communications Plan (NECP) – the Nation's roadmap to ensuring emergency communications interoperability at all levels of government.

Organizations with missions to improve public safety interoperability and communications collaborated with CISA on this effort to ensure critical firsthand knowledge of emergency communications challenges, needs, and best practices are reflected in the NECP.

CISA engaged over 3,500 public safety representatives from Federal, state, local, tribal, and territorial public safety agencies, non-governmental organizations, and other groups in revising the NECP. The process examined lessons learned from real-world incidents, results from the 2018 SAFECOM Nationwide Survey, the 2018 Nationwide Communications Baseline Assessment, and input from stakeholder groups throughout the nation to inform the plan's goals, objectives, and success indicators.

Key updates to the NECP include adding a cybersecurity goal, emphasizing the importance of strategic and lifecycle planning, promoting the importance of evaluating and documenting lessons learned from training and exercises, underscoring the need for coordination of communications assets and capabilities at incidents and planned events, and focusing on effective and interoperable information sharing.

A copy of the updated NECP is available for download at: https://www.cisa.gov/necp and for questions on the NECP, contact: necp@cisa.dhs.gov.

PSTA Puts Its Weight Behind P25 DFSI for LMR/LTE Interoperability

The Public Safety Technology Alliance (PSTA) has released a report that recommends the use of the P25 Digital Fixed Station Interface (DFSI) for land mobile radio (LMR)/long-term evolution (LTE) interoperability.

The report was produced by the PSTA LMR/LTE Interoperability Subcommittee as part of its work to identify integration protocol standards suitable for public safety users operating across LMR and broadband push-to-talk (PTT) using any wireless broadband technology.

According to the report, the primary need being addressed by this effort, is the identification of a suitable protocol and feature set for the integration of analogue FM LMR, given that this accounts for roughly 30 percent of the North American public safety user base.

PSTA sought an affordable open standard LMR protocol capable of supporting features identified in the National Public Safety Telecommunications Council (NPSTC) report on LMR/LTE integration, while being compatible with the greatest number of deployed public safety LMR systems.

The report notes that "DFSI is inherently part of P25 conventional systems (no gateways would be needed), can be modified with simple extensions to add significant capabilities to analogue FM systems (including PTT-ID and emergency calls), can be used as an affordable alternative to the Inter RF Subsystem Interface) (ISSI)/ Console Subsystem Interface (CSSI) for P25 trunking systems, and could possibly be leveraged to integrate some or all of the remaining five percent of the North American market that uses other LMR technology."

However, the PSTA is not proposing the elimination of the P25 ISSI – "which still have their place as the ideal integration standard where the system owners can afford those licenses" – and views DFSI as the best short-term option by "virtue of it being an existing extensible standard," while potentially considering an enhanced radio-over-IP (ROIP) option for the long-term use with the hope that it could be developed to be "entirely suitable for the intended application." It also notes a number of FSI shortcomings, which it says could be addressed with "manufacturer extensions."

The Alliance for Telecommunications Industry Solutions (ATIS) and the Telecommunications Industry Association (TIA) are working to develop an standard for P25-LTE interworking that will leverage the 3GPP generic interworking function (IWF), which is currently expected to be completed in September.

"After a thorough examination and review of several open standard LMR protocols, the PSTA LMR/LTE Interoperability Subcommittee has identified the P25 DFSI as best suited to meet our primary goals," said LMR/LTE Interoperability Subcommittee member Randy Richmond, JVC-KENWOOD.

"Cost of implementation is always an important consideration in public safety and the subcommittee decided on DFSI as the primary recommendation from the PSTA, because it is an affordable solution that fills the stated need for a viable and broad open standard," added LMR/LTE Interoperability Subcommittee member Andy Seybold.

"It is critical to have seamless voice communication between legacy LMR systems and public safety LTE-based communications as we see more and more first responders relying on LTE each day," noted chief Jeff Johnson, PSTA board member.

(Article by Sam Fenwick, extracted from Critical Communications Today, July 8, 2019)

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Cybersecurity for the ALMR System

ALMR provides a robust communications system for the 126 member agencies, with the benefits of day-to-day independent operations and interoperability between agencies, when needed. An added benefit to all members is the stringent security requirements required by the membership of the Federal agencies.

The ALMR partnership of the Department of Defense (DOD), Non-DOD Federal agencies, State of Alaska (SOA) and the Alaska Municipal League (AML) enables all members to operate on a system the meets the strict security requirements of the DOD Risk Management Framework (RMF).

The update of the ALMR System to the 7.17.3 software platform, which has been underway since May, will soon be completed. The final step in the update process is a security review and scan conducted by a Motorola security team over several weeks. The entire ALMR System is being examined to ensure that all devices are scanned, any existing vulnerabilities are identified and any potential risks mitigated

The entire RMF process for the System is being carefully documented by the ALMR Information Systems Security Manager (ISSM) and will identify the vulnerabilities, potential mitigation strategies and any issues encountered during the RMF documentation process.

Ultimately, the DOD approving authority (AO), which falls under the purview of the Alaskan Command J6, will review the RMF documentation and will render a decision regarding an approval to operate (ATO) for the ALMR System.

Currently, the projected completion of the RMF process and the decision by the AO is expected before the end of the calendar year.

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

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Did You Know?

In accordance with Talkgroup Development Procedure 400-14, agencies should **not** monitor both their home talkgroups and assigned IC talkgroups during incidents/contingencies. This results in the use of two channels at the same time at the surrounding utilized site(s) and may lead to increased busies or denial of service to other responding agencies, especially at three-channel sites. (Article by Ms. Sherry Shafer)