P25 Cost Savings and Resource Sharing Overview

Presented by:
PTIG - The Project 25 Technology Interest Group
www.project25.org – Booth 2761
P25 Sharing = Cost Savings

Sharing Scenarios

• Multiple Agencies Join a Single P25 System to share Infrastructure and operational Costs Examples Village of Pinecrest FL, University PD and EM Miami FL Area

• Multiple P25 County/Municipal Systems join to create a Region-wide P25 System sharing Infrastructure and Operational Costs and expanding Coverage area Examples: Hamilton County IN, Washington Capital Region, GATTTRS Austin TX

• Local/Regional P25 Systems join a P25 Statewide System sharing Infrastructure and Operational Costs and expanding Coverage area Examples: Michigan, Ohio, Wyoming, South Carolina

• Adjacent P25 Systems Share Talk Groups to offer Interoperability across Jurisdictional/State/or National Boundaries. Examples: Ohio/Indiana, Ohio/Michigan
P25 Cost Savings and Resource Sharing

Del Smith
Operations Manager, Alaska Land Mobile Radio Communications System (ALMR)

Presented by:
PTIG - The Project 25 Technology Interest Group
www.project25.org – Booth 2761
Drivers for Shared System

- Many different radio systems deployed throughout Alaska
- Need to replace aging equipment
- Federal and FCC Narrowband frequency requirements
- 911/Homeland Defense/Homeland Security & Defense Assistance to Civil Authority roles and missions
Cost Benefits to P25 Sharing

• Single Large Procurement quantity buys create cost savings from consolidating subscriber requirements and Infrastructure Costs
• A single Qualifying Technical Group eliminates duplication of purchasing qualification testing and costs by multiple agencies
• Monthly Costs for System Access are shared across a larger group of participating agencies typically less than the cost to operate maintain and update single stand alone systems.
• Monthly Access Fees allow predictable operating Fund requirements and budgets without the cost for major capital Equipment procurements
• Software Upgrades and Radio programming technology refreshment costs are shared across a larger base for multiple vendor products.
Cost Benefits to P25 Sharing

- Tower and site maintenance costs are shared by multiple agencies under a single contract.
- A larger user base can fund Public Safety Grade infrastructure with redundant back up equipment.
- Radio Frequency Sharing often allows greater system capacity and additional user access without requiring build out and cost of additional infrastructure.
- P25 System Architecture is scalable to allow cost effective design with a minimum number of sites based on geography and user loading requirements.
Prior to ALMR

• Numerous, small, local stove-piped conventional systems existed

• State conventional repeater system existed primarily along roadways
  ➢ State Troopers
  ➢ EMS
  ➢ DEC
  ➢ Forestry, etc.

• Larger local governments (Anchorage, Fairbanks, Juneau, Ketchikan) operating conventional systems for their agencies, no interoperability

• Military bases operating on NTIA frequencies, no interoperability with state/local
Initial Choices

• Agencies fund, implement, operate and maintain their own independent infrastructure, as in the past

• Agencies can purchase a few ALMR radios to use when required and continue to maintain their own in-house infrastructure

• Federal, state and local governments cooperate to share a P25 standards-based fixed trunked infrastructure enabling operability and interoperability for members
Drivers for Sharing

• SOA existing sites (SATS microwave)
  - Saved time and expense, minimum of new sites needed
  - DOD funded RF equipment at 41 sites
  - Allowed for wide area coverage

• DOD sites
  - DOD need for roadway coverage for convoys
  - Defense Support to Civil Authorities mission
  - Interoperability with Non-DOD, State, Local & tribal
ALMR System

- ALMR is a cost-shared, VHF, land mobile radio communication service, encompassing participating Federal, State and local/municipal users in Alaska, which provides secure, reliable, 24/7 operations by utilizing the latest proven land mobile radio technologies.

- Joint venture made possible by a Memorandum of Agreement, signed in July 2003, between the Assistant Secretary of Defense for Networks and Information Integration and the State of Alaska Commissioner of Public Safety.

- Frequencies authorized for State use only, and frequencies authorized for Federal use only, are jointly and equally shared for public safety use.
History of ALMR Cost Share

• System declared operational July 2008

• First Cost Share Cooperative Agreement signed in May 2009 beginning State of Alaska (SOA) fiscal year 2010 (July 1, 2009)
  ➢ Owner of equipment pays maintenance of that equipment
  ➢ Shared costs split 50/50 between the State of Alaska and
  ➢ Department of Defense (DOD)
Current Cost Share Strategy

• 88% - 12% Variation

- Based on percentage of sites owned

- Rationale: Fair and simple for infrastructure owners and NIOs alike.

- Facilitates individual NIO situation and equities; provides flexibility to the SOA and NIOs to agree upon a cost share method.

- Reduces the SOA cost share responsibility by some percent (based upon negotiated cost share with NIOs)
Benefits of Shared System

• A System covering the large geographic area and number of agencies could not exist without shared frequencies and infrastructure

• Interoperability between member agencies

• System at highest security level due to DOD/Non-DOD participation

• Shared costs for system updates
ALMR System Statistics

- 85 sites

- 124 member agencies
  - 23 State
  - 15 Federal Non-DOD
  - 6 DOD
  - 80 Local/municipal

- 21,488 subscribers
Thank You

Del Smith
Operations Manager, Alaska Land Mobile Radio Communications System (ALMR)
907-334-2636
delsmith@5starteam.net
P25 Cost Savings and Resource Sharing

Cindy Cast
Radio Systems Manager, Miami Dade County FL
Chairman, Project 25 Technology Interest Group

Presented by:
PTIG - The Project 25 Technology Interest Group

www.project25.org – Booth 2761
Miami-Dade County
P25 Radio System

Miami-Dade County FL
Cindy Cast, Radio Systems Manager
Miami-Dade County P25 Radio System

TOPICS
• Miami-Dade County Demographics & Gov’t Structure
• P25 Radio User Community
• P25 Cost Benefits for Sharing
• Agency examples for Joining & Decommissioning Systems
• Interoperable Benefits of Shared Systems
Miami-Dade County
P25 Radio System

Demographics

• Over 2.8 million residents
• Over 2,200 square miles (larger in size than the states of Rhode Island and Delaware, and larger in population than 17 states) with over 20 miles of sandy beaches
• In 2018, there was over 45 Million Travelers & 16.2 Million Overnight Visitors
• The County is home to more than 100 foreign consulate offices, 25 foreign trade offices, Florida Turkey Point Nuclear Power Plant, Southern Command Military Headquarters, US Coast Guard Sector, US Airforce Base, and multiple Federal Headquarters for several agencies

Gov’t Structure

• Mayor and Board of 13 County Commissioner's
• Miami-Dade County Government is made up of 25 Departments (i.e. Information Technology Department).
  • ITD, provides technology, information and business solutions.
  • Radio Communications Services Division, operates, manages and maintains the telecommunication systems to include the P25 radio system, microwave systems, OpenSky radio system, Conventional radio systems, towers, frequency licenses, etc.
Miami-Dade County P25 Radio System

Radio User Community (119)

*Over 30,000 radio devices*

- Local County Depts: 25
- Municipal Police: 30
- Tribal Police: 2
- State Agencies: 6
- Federal Agencies: 14
- Non-County/NGO: 42

(Schools, Universities, Hospitals, Ambulances, Railway Police, Security Agencies work with County, etc.)
P25 Cost Benefits for Sharing

• Purchasing large quantities of equipment creates cost savings and increase discounts from vendors
• One group responsible for all technical and administrative aspects of the system (eliminates duplication of staff)
• Operational & maintenance costs for system are shared across multiple agencies reduces cost compared to standalone system (i.e. towers, microwave, antennas, HVAC, generators, etc.)
Agency examples for Joining & Decommissioning Systems

• Example 1: Village of Pinecrest (General Gov’t & PD)
  • Previously operated on a VHF single site conventional system
    o Required Funding for:
      – Operational & maintenance vendor contracts
      – Lease tower contract
      – Limited radio coverage
      – Few radio features
  • Joined the County P25 radio system (decommissioned VHF)
    o Major reduction in funding
    o Eliminated multiple vendor contracts
    o Increased radio coverage and radio functionality
    o Increased radio interoperability
Agency examples for Joining & Decommissioning Systems

• Example 2: University PD and EM
  • Previously operated on a UHF single-site conventional system
    o Required Funding for:
      – Operational & maintenance vendor contracts
      – Equipment on-top of library building
      – Limited radio coverage
      – Few radio features
  • Joined the County P25 radio system (UHF decommissioned)
    o Major reduction in funding
    o Eliminated multiple vendor contracts
    o Increased radio coverage & radio functionality
Interoperable Benefits of Shared Systems

**Besides Reduced costs.....**

- Increase radio coverage
- Radios have the shared disaster systems/zones
- Radios have the shared interoperable systems/zones
- Radios have the shared transportable site systems/zones
- Technical experts to troubleshoot issues *(gov’t employees)*
- Technical experts to address questions any agency *(gov’t employees)*
- Technical support staff 24/7 *(gov’t employees)*
P25 Sharing = Cost Savings
State of Ohio MARCS: County Example #1

• “Traditional” RFP, Bid, Negotiate, Award Contract
  • Would take significant time and effort
  • Would result in “isolated” system
  • Would require acquisition & development of several additional tower sites
  • Estimated Costs - $18M - $20M

• Partnership - State of Ohio/MARCS
  • Replicates existing agreements with several Counties
  • Utilizes existing, discounted “State Term Schedule” pricing
  • Utilizes 3 existing “MARCS” towers in County PLUS many in surrounding area, as well as over 300 statewide
  • Minimizes risks & timeline
  • Estimated Costs - $10M - $12M
P25 Sharing = Cost Savings
State of Ohio MARCS: County Example #2

<table>
<thead>
<tr>
<th>Service</th>
<th>Standalone L Core</th>
<th>MARCS Enhanced Local Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF Infrastructure Capital Investment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dispatch Consoles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P25 Subscribers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL RF Equipment Capital Cost</td>
<td>$8,597,716</td>
<td>$7,999,138</td>
</tr>
<tr>
<td>Microwave Connectivity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>User Fee per Radio per Year</td>
<td>$0</td>
<td>$240/year ($120 Subsidized)</td>
</tr>
<tr>
<td>User Fee 11 Years (based on 1200 users)</td>
<td>$0</td>
<td>$1,584,000</td>
</tr>
<tr>
<td>User Fee Credits (MARCS arrangement)</td>
<td>$0</td>
<td>TBD</td>
</tr>
<tr>
<td>10 years of maintenance</td>
<td>$2,826,418</td>
<td>$823,984</td>
</tr>
<tr>
<td>10 years of upgrades</td>
<td>$1,587,081</td>
<td>$371,045</td>
</tr>
<tr>
<td>Maintain, Test, Cycle, Replace Generators, Towers, HVAC, Grounds &amp; all non-radio site work</td>
<td></td>
<td>MARCS Responsibility</td>
</tr>
<tr>
<td>Repairs &amp; Replacement due to Acts of God</td>
<td></td>
<td>MARCS Responsibility</td>
</tr>
<tr>
<td>Total 11 Year TCO</td>
<td>$13,011,215</td>
<td>$10,778,167</td>
</tr>
</tbody>
</table>

*MARCS Enhanced Local Infra
Credits dependent on configuration could apply

County Responsibility
Thank You

Cindy Cast
Cindy.cast@miamidade.gov

Radio Systems Manager, Miami Dade County FL
Chairman, Project 25 Technology Interest Group
P25 Cost Savings and Resource Sharing

Greg Jurrens
Senior Manager Technical Operations
Harris County TX

Presented by:
PTIG - The Project 25 Technology Interest Group
www.project25.org – Booth 2761
P25 Sharing = Cost Savings
TXWARN: New System Partner

Problem:

• Existing TXWARN subscriber wanted to add additional capacity and coverage in their jurisdiction.
• Existing subscriber costs approx. $4.2M (over 10 years)

Options:

Build a stand alone 3-site P25 UHF system - $6.2M

+ Control over system operations, maintenance, growth
- No Interop connectivity with 20 agencies on TXWARN

Become a TXWARN System Partner, add 2 sites: $3.1M

+ Complete TXWARN Interop for the agency
+ Additional coverage for other TXWARN partners
+ Least 10 year cost projection.
P25 For the Future
P25 Connections for Emergency Communications and Mutual Aid

Jim Holthaus
Chair; TIA Private Radio Section
Chief Technology Officer – BK Technologies

Presented by:
PTIG - The Project 25 Technology Interest Group
www.project25.org – Booth 2761
P25 Connections for Emergency Communications and Mutual Aid

• P25 Applications For Emergency/Disaster Communications
  o P25 Benefits
  o P25 Ecosystem
  o Important User Considerations
Benefits of Using P25 Mission Critical Radio Equipment Include:

- Improved performance in background noise. P25 equipment can achieve 10 to as much as 25 dB improvements in background noise reduction.
- Improved Coverage – P25 Phase 1 technology is about +10dB better than narrowband Analog for the same delivered audio quality.
- Tone Signaling – DTMF, Knox and single tone is now supported.
- Enhanced Signaling – Talking Party ID, Group Calls, Unit-to-Unit Calls, All Calls, Emergency Alerts, Emergency Calls, Call Alerts, Radio Check, Radio Unit Monitoring and others.
- Location Services – Integrated GPS receivers provide location information.
P25 Connections for Emergency Communications and Mutual Aid

• The Existing P25 Ecosystem Enhances Emergency Communications and Mutual Aid Through:
  
  o **Interoperability and Performance Testing:**
    – P25 CAP Provides an Interoperable Baseline
  
  o **Multi-Agency Regional Systems**
    – Provides Day-to-Day Interoperability Across First Responders and Partners
  
  o **State-Wide Communications Systems**
    – Regional Interoperability Talkgroups Already Deployed
  
  o **Local, State and Federal Equipment Caches**
    – Ability to Direct Resources for Critical Incidents
Large Geographic Footprint of Interoperable P25 Systems for Emergency Communications

P25 List of Systems

PTIG has published Two lists of known P25 Systems in the USA, Australia, Canada, New Zealand, and the UK.

List of P25 Conventional Systems: 1334
The P25 Conventional systems total is 1334.

List of P25 Trunking Systems: 916
The P25 Trunking system list has grown from 711 systems November 2015 to 916 systems today.

A Grand Total of 2250 Project 25 Systems
### 38 Project 25 Statewide Systems

<table>
<thead>
<tr>
<th>State</th>
<th>Region</th>
<th>Phase</th>
<th>Frequency</th>
<th>Region</th>
<th>Phase</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama 1st Responder</td>
<td></td>
<td>Phase 2</td>
<td>700/800</td>
<td>Maine MSCS</td>
<td>Phase 1</td>
<td>VHF</td>
</tr>
<tr>
<td>Alaska ALMR</td>
<td></td>
<td>Phase 1</td>
<td>VHF/700</td>
<td>Maryland FRIRS</td>
<td>Phase 2</td>
<td>700</td>
</tr>
<tr>
<td>Arkansas AWIN</td>
<td></td>
<td>Phase 1</td>
<td>700/800</td>
<td>Massachusetts CMS</td>
<td>Phase 2</td>
<td>700/800</td>
</tr>
<tr>
<td>Colorado DTRS</td>
<td></td>
<td>Phase 1</td>
<td>700/800</td>
<td>Michigan MPSCS</td>
<td>Phase 1</td>
<td>700/800</td>
</tr>
<tr>
<td>Connecticut CSP</td>
<td></td>
<td>Phase 1</td>
<td>700/800</td>
<td>Minnesota ARMER</td>
<td>Phase 1</td>
<td>700/800</td>
</tr>
<tr>
<td>Delaware DPS</td>
<td></td>
<td>Phase 1</td>
<td>700/800</td>
<td>Mississippi MWIN</td>
<td>Phase 1</td>
<td>700/800</td>
</tr>
<tr>
<td>Florida SLERS</td>
<td></td>
<td>Phase 1</td>
<td>700</td>
<td>Missouri MSWIN</td>
<td>Phase 2</td>
<td>VHF/700/800</td>
</tr>
<tr>
<td>Hawaii HIR</td>
<td></td>
<td>Phase 1</td>
<td>700</td>
<td>Montana MSIRS</td>
<td>Phase 1</td>
<td>VHF</td>
</tr>
<tr>
<td>Idaho ICAWIN</td>
<td></td>
<td>Phase 1</td>
<td>700</td>
<td>Nebraska NSRS</td>
<td>Phase 1</td>
<td>VHF</td>
</tr>
<tr>
<td>Illinois STARCOM</td>
<td></td>
<td>Phase 2</td>
<td>700/800</td>
<td>New Hampshire</td>
<td>Phase 1</td>
<td>VHF</td>
</tr>
<tr>
<td>Indiana SAFE</td>
<td></td>
<td>T Phase</td>
<td>1 800</td>
<td>New Jersey NJICS</td>
<td>Phase 2</td>
<td>700</td>
</tr>
<tr>
<td>Iowa ISICS</td>
<td></td>
<td>Phase 2</td>
<td>700</td>
<td>North Carolina VIPER</td>
<td>Phase 1</td>
<td>700/800</td>
</tr>
<tr>
<td>Kansas KSICS</td>
<td></td>
<td>Phase 1</td>
<td>700/800</td>
<td>Ohio MARCS</td>
<td>IP Phase 2</td>
<td>800</td>
</tr>
<tr>
<td>Louisiana LWIN</td>
<td></td>
<td>Phase 1</td>
<td>700</td>
<td>Oklahoma OWIN</td>
<td>Phase 1</td>
<td>800</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Oregon SRP</td>
<td>Phase 2</td>
<td>700</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Rhode Island SCN</td>
<td>Phase 1</td>
<td>800</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>South Carolina PALMETTO</td>
<td>Phase 1</td>
<td>800</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>South Dakota SRS</td>
<td>Phase 1</td>
<td>VHF</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Tennessee ACN</td>
<td>Phase 2</td>
<td>700/800</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Virginia STARS</td>
<td>Phase 1</td>
<td>VHF/800</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Washington State Police</td>
<td>Phase 2</td>
<td>700</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>West Virginia SIRN</td>
<td>Phase 1</td>
<td>UHF Lo</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Wisconsin WIS</td>
<td>Phase 1</td>
<td>VHF/800</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Wyoming WYOLINK</td>
<td>Phase 1</td>
<td>VHF/800</td>
</tr>
</tbody>
</table>
P25 Connections for Emergency Communications and Mutual Aid

• **User Considerations:**
  - Mutual Aid Agreements:
    - Prepare Ahead
    - Regional ID Planning
    - Coordinate Encryption Keys
  - P25 Interfaces
    - CAI, Encryption and ISSI Enhance
  - V/U/800 Nationwide Interoperability Channels
    - Mix of Analog and P25
    - P25 Radios are Backwards Compatible with Analog
    - Greatest Common Denominator
  - 700 MHz Nationwide Interoperability Channels
    - FCC Mandates Use of P25
P25 Connections for Emergency Communications and Mutual Aid

- State-Wide Communications Systems
  - Regional Interoperability Talkgroups Already Deployed
    - Organized as Homeland Security Regions
    - Standardized Interoperability Templates for Each Region
    - Program All Radios With All Interoperability Templates

Kansas Homeland Security Regions and KDOT Tower Sites

- 1 – PSAP
- 2 – MED (Hospitals/Medical)
- 3 – EOC (Emergency Operations Center)
- 4 – LE
- 5 – EMGT (Emergency Mgmt)
- 6 – FIRE
- 7 – EMS
- 8 – PWKS (Public Works)
- 9 – channel 9 and on are KHP event channels specific to that zone
## State of Florida P25 ID Plan

<table>
<thead>
<tr>
<th>P25 ID Range:</th>
<th>Assignment:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – 999,999</td>
<td>TBD</td>
</tr>
<tr>
<td>1,000,000</td>
<td>Region 1</td>
</tr>
<tr>
<td>2,000,000</td>
<td>Region 2</td>
</tr>
<tr>
<td>3,000,000</td>
<td>Region 3</td>
</tr>
<tr>
<td>4,000,000</td>
<td>Region 4</td>
</tr>
<tr>
<td>5,000,000</td>
<td>Region 5</td>
</tr>
<tr>
<td>6,000,000</td>
<td>Region 6</td>
</tr>
<tr>
<td>7,000,000</td>
<td>Region 7</td>
</tr>
<tr>
<td>8,000,000</td>
<td>State Agency</td>
</tr>
<tr>
<td>9,000,000</td>
<td>Federal Agency</td>
</tr>
<tr>
<td>9,500,000</td>
<td>NGOs/CIIs</td>
</tr>
<tr>
<td>9,700,000</td>
<td>Transportation</td>
</tr>
<tr>
<td>9,750,000</td>
<td>TBD</td>
</tr>
<tr>
<td>9,980,000</td>
<td>Seminole Tribe</td>
</tr>
<tr>
<td>9,990,000</td>
<td>Miccosukee Tribe</td>
</tr>
<tr>
<td>10,000,000+</td>
<td>TBD</td>
</tr>
</tbody>
</table>
It’s not just a radio. It’s a partnership.

Michigan’s Game Plan
Service to Citizens

From unplanned emergencies...

- Increased/Enhanced interoperability for first responders
- Shared Services and Consolidation.
- Savings across government by reducing:
  - Parallel infrastructure
  - Multiple disparate radios
  - Operating costs
  - Hardware and software costs
  - Maintenance costs

... to planned events

MIS - NASCAR  All Star Game  Super Bowl  NCAA Tournament
Conventional Interoperability

Identify & Adopt Best Practices for Interoperability

- APCO/NPSTC Standard Channel Nomenclature
- Configuration for Interoperability Channels
- Methodology Can be Applied Universally
- Key Parameters
- RX/TX Frequency
- RX/TX Network Access Code
Conventional Interoperability

APCO/NPSTC 1.104.2-2017
Standard Channel Nomenclature for the Public Safety Interoperability Channels

### Appendix - Table 1: Sorted by Band in Numeric Order

<table>
<thead>
<tr>
<th>Subscriber Channel Configuration (S, F, M)</th>
<th>Sub. Name</th>
<th>Common Name</th>
<th>Eligible Users</th>
<th>Rx Tone or NAC</th>
<th>Tx Tone or NAC</th>
<th>NTx</th>
<th>Mode and A &amp; W &amp; D</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>F, M</td>
<td>FCC 450 - 470 MHz Public Safety Band</td>
<td>UCALL40</td>
<td>CAL40</td>
<td>Any Public Safety</td>
<td>453.2125</td>
<td>156.5</td>
<td>N</td>
<td>H</td>
</tr>
<tr>
<td>B, M</td>
<td>UCALL41</td>
<td>TAC41</td>
<td>Any Public Safety</td>
<td>453.4025</td>
<td>156.5</td>
<td>N</td>
<td>H</td>
<td>A</td>
</tr>
<tr>
<td>B, M</td>
<td>UTAC42</td>
<td>TAC42</td>
<td>Any Public Safety</td>
<td>457.125</td>
<td>156.5</td>
<td>N</td>
<td>H</td>
<td>A</td>
</tr>
<tr>
<td>B, M</td>
<td>UTAC43</td>
<td>TAC43</td>
<td>Any Public Safety</td>
<td>457.325</td>
<td>156.5</td>
<td>N</td>
<td>H</td>
<td>A</td>
</tr>
<tr>
<td>B, M</td>
<td>UTAC44</td>
<td>TAC44</td>
<td>Any Public Safety</td>
<td>457.525</td>
<td>156.5</td>
<td>N</td>
<td>H</td>
<td>A</td>
</tr>
<tr>
<td>B, M</td>
<td>UTAC45</td>
<td>TAC45</td>
<td>Any Public Safety</td>
<td>457.725</td>
<td>156.5</td>
<td>N</td>
<td>H</td>
<td>A</td>
</tr>
<tr>
<td>F, M</td>
<td>FCC 700 MHz Public Safety Band</td>
<td>7CALL60</td>
<td>CAL60</td>
<td>Calling Channel</td>
<td>760.24375</td>
<td>770.34375</td>
<td>B203</td>
<td>N</td>
</tr>
<tr>
<td>B, M</td>
<td>7CALL61</td>
<td>TAC61</td>
<td>General Public Safety</td>
<td>760.4375</td>
<td>770.5375</td>
<td>B203</td>
<td>N</td>
<td>H</td>
</tr>
<tr>
<td>B, M</td>
<td>7CALL62</td>
<td>TAC62</td>
<td>General Public Safety</td>
<td>760.6375</td>
<td>770.7375</td>
<td>B203</td>
<td>N</td>
<td>H</td>
</tr>
<tr>
<td>B, M</td>
<td>7CALL63</td>
<td>TAC63</td>
<td>General Public Safety</td>
<td>760.8375</td>
<td>770.9375</td>
<td>B203</td>
<td>N</td>
<td>H</td>
</tr>
<tr>
<td>B, M</td>
<td>7CALL64</td>
<td>TAC64</td>
<td>General Public Safety</td>
<td>761.0375</td>
<td>770.24375</td>
<td>B203</td>
<td>N</td>
<td>H</td>
</tr>
<tr>
<td>B, M</td>
<td>7CALL65</td>
<td>TAC65</td>
<td>General Public Safety</td>
<td>761.2375</td>
<td>770.4375</td>
<td>B203</td>
<td>N</td>
<td>H</td>
</tr>
<tr>
<td>B, M</td>
<td>7CALL66</td>
<td>TAC66</td>
<td>General Public Safety</td>
<td>761.4375</td>
<td>770.6375</td>
<td>B203</td>
<td>N</td>
<td>H</td>
</tr>
<tr>
<td>B, M</td>
<td>7CALL67</td>
<td>TAC67</td>
<td>General Public Safety</td>
<td>761.6375</td>
<td>770.8375</td>
<td>B203</td>
<td>N</td>
<td>H</td>
</tr>
<tr>
<td>B, M</td>
<td>7CALL68</td>
<td>TAC68</td>
<td>General Public Safety</td>
<td>761.8375</td>
<td>771.0375</td>
<td>B203</td>
<td>N</td>
<td>H</td>
</tr>
</tbody>
</table>

*For informational purposes only, not part of ANSI.
International Wireless and Communications Expo  
Las Vegas, Nevada  
March 5, 2019

Thank You

Jim Holthaus

Chair; TIA Private Radio Section  
Chief Technology Officer – BK Technologies  
jholthaus@bktechnologies.com
International Wireless and Communications Expo
Las Vegas, Nevada
March 5, 2019

P25 For the Future
P25 Connections for Emergency Communications
and Mutual Aid

Robin Grier
President, Catalyst Communications Technologies

Presented by:
PTIG - The Project 25 Technology Interest Group
www.project25.org – Booth 2761
Interoperability and Interworking with LTE

- P25 features can be mapped to PTT over LTE (Unit ID, Emergency, Location, I-call)
- Trunking and conventional have different P25 interfaces and different features
- Common Air Interface supports both with flexibility

- More information on Wednesday
  4:15 pm - 5:30 pm
  Initiatives for LMR/LTE Interworking
  Room: N261
  Session Number: W44
Extend P25 using LTE as the backhaul

- Priority and Pre-emption make the cellular backhaul even better
- Florida Highway Patrol and others have used cellular backhaul for 10 years, even with 3G
- Direct Mode (Talk Around) can be captured locally and routed back to the primary system
- Audio and meta data from a Local Repeater can be captured locally and routed back to the primary system
Incident Command

- Link P25 trunking to P25 conventional to analog, any band, on the fly
- Monitor and Manage on-scene
- Record audio and meta data outside of coverage area
Mutual Aid

- Fixed Gateways that can be remotely controlled to switch channels, talk groups, and systems
- Create, modify, and tear down patches on the fly
- Link P25 to legacy radio systems including SmartNet, EDACS, & MDC 1200
- Connect to P25 using ISSI/CSSI, DFSI, or Common Air Interface
Mutual Aid

- Fixed Gateways that can be remotely controlled to switch channels, talk groups, and systems
- Create, modify, and tear down patches on the fly
- Link P25 to legacy radio systems including SmartNet, EDACS, & MDC 1200
- Connect to P25 using ISSI/CSSI, DFSI, or Common Air Interface
Thank You

Robin Grier
President, Catalyst Communications Technologies
P25 New Products and Services for 2019

Cheryl Giggetts
Principal, CTA Consultants

Presented by:
PTIG - The Project 25 Technology Interest Group
www.project25.org – Booth 2761
VM7000 P25 Multi-deck / Multi-band Mobile

What is New

• All-Band Multi deck Mobile
• Simultaneously receive and transmit up to four bands
• Supports high power (110W) VHF option
• Includes enhanced vehicular repeater integration

P25 Interoperability solution

• Interoperates with up to four P25 systems simultaneously
• ATLAS® P25, Astro® 25, VIDA® P25
• Mixed protocol operation (P25 Phase 1 & 2)

Benefits to Public Safety

• Select and unselect speaker audio control similar to dispatch control (multiple simultaneous conversations)
• Allows public safety user to roam to and operate on secondary systems while simultaneously connected to the primary dispatch
Harris XL-185M - P25 Converged Mobile Radio

What is New
Expanding the powerful XL family of converged P25 communications to the Mobile Radio platform!

- Single-band, premium integrated vehicular solution
- 700/800 or 900 MHz bands
- P25 / EDACS / Conventional
- Standard features include:
  - Wi-Fi (2.4GHz & 5GHz)
  - GPS
  - Bluetooth
  - Noise Cancellation
- Field upgradable, LTE-ready platform

P25 Interoperability solution
- CAP certified, field-proven P25 mobile interoperability
- Convergence of P25 (LMR), Wi-Fi and LTE technologies

Benefits to Public Safety
- Clear, intelligible audio for mission critical communications
- Common user experience with XL-185P and XL-200P
- Vehicle Area Network with applications to support data needs via LMR, Wi-Fi and LTE
- Future-ready to expand over time

Learn more at Harris Booth #1549
What is New

- Voice log archives with GPS metadata and mapped RSSI analysis with Radio Discovery Tool (RDT)
- Hardware based advanced system key (ASK)
- Enhanced talkgroup scanning (up to 32 talkgroups with user selectable priority modes)
- Receive only talkgroups prevent unauthorized transmissions

P25 Interoperability solution

- VHF, UHF and 700/800 MHz models
- Conventional Analog FM/P25/Mixed-Mode and P25 Phase 1 (FDMA) and Phase 2 (TDMA) trunking
- AES/DES Encryption with Over-the-Air Rekeying

Benefits to Public Safety

- Small lightweight and concealable for surveillance and tactical operations and smaller vehicle installs
- Recorded voice log archives with GPS metadata show when and where voice calls were made and can help identify interference issues
- Diagnostics with mapped RSSI analysis values can show lack of coverage where coverage was
New P25 Monitor: G5 P25 Voice Pager

What is New

• Now supports Phase II TDMA
• Now supports DMR Conventional Tier I & II
• New 2019 Release Planned: VHF & UHF Dual Band model!

P25 Interoperability solution

• P25 CAP certified, the G5 is a P25 compliant, receive only device that does not register or affiliate on the Network.
• Supports AES-256 Bit Encryption Standard
• Dual Band Models: VHF & 700-800MHz and UHF & 700-800MHz

Benefits to Public Safety

• P25 Digital Paging provides improved coverage, excellent voice clarity and superior reliability.
• Migrating from Analog to P25 Digital Paging can provide substantial savings- eliminating costs associated with network infrastructure replacement, maintenance, site & utility costs.

Visit Unication at IWCE Booth 353
InterTalk Enlite Cloud-Based Dispatch System

What is New

- **Enlite** is a first-to-market dispatch solution in North America
- Offers a public-safety-grade dispatch console, empowered by the cloud
- **Enlite** provides P25 connectivity in the field via mobile-connected devices

P25 Interoperability solution

- Connect **Enlite** console to P25 via DFSI or CSSI/ISSI
- Convergence of analog radio, P25, LTE, call-taking capabilities, and more
- Allows user to extend their P25 network over Wifi, LTE, or satellite connections

Benefits to Public Safety

- Empower your P25 system to create seamless communications across multiple devices
- Enhance situational awareness and operational intelligence
- Reduce hardware footprint and cost, making **Enlite** affordable for virtually any agency

Learn more at InterTalk Booth #1561
www.intertalkenlite.com
Telex C-Soft P25 Console

What is New

• C-Soft v7.5 Now Shipping

P25 Interoperability solution

• P25 Analog
• P25 DFSI & CSSI (Phase I & II)

Benefits to Public Safety

• SIP & NENA phone interface
• Crosspatch between radio technologies
• Over-The-Air and Direct IP interfaces can coexist
• DES & AES FIPS 140-2 compliant encryption
• Interface with CAD, AVL, and others via API
• Supported by 10+ IP recorder companies
• Highly customizable graphical user interface
• System security helps prevent and mitigate cyberattacks
New P25 Happenings

What is New

- Completed first ISSI/CSSI Non CAP interoperability testing with Motorola using new PTIG testing template
- New Scout Enterprise consoles E1, E4, E8 and EX.
- Scout Select product line now offers a subscription purchasing method
- New integration with Motorola APX radios for wireless connectivity
- Added Verizon Broadband to our existing PoC interface suite which includes AT&T Enhanced PTT

Benefits to Public Safety

- Connect P25 systems to LTE and LMR technologies for maximum interoperability using standards based interfaces.
- Ready for FirstNet
- Use off-the-shelf computers with public-safety-grade, high-performance Avtec USB speakers, microphones, and foot switches.
- Secure, reliable, proven platform.
- Scalable with licenses on same architecture
- Designed, built, and supported in the U.S.
New P25 Repeater Infrastructure

What is New

• 100W VHF P25 Operation
• Remote Programming/Diagnostics
• Now Shipping!

P25 Interoperability Solution

• Vendor Neutral P25

Benefits to Public Safety

• High Performance at Affordable Price
• Software upgradeable

https://codancomms.com/products/cascade
Learn more at Codan Booth #1361
PDR8000 – Portable Digital Repeater Connectivity Deployment Application Notes

What is New

• Connectivity Deployment Application Notes

P25 Interoperability solution

• Provides portable, on-scene P25 coverage for special events or incidents.
• Back to Back Cross Band Repeater (RT/RT)

Benefits to Public Safety

• Provides guidance to further extend a P25 Network through a variety of backhauls including over IP/LTE Network via V.24 or serial modem links.

Catalyst Communications Technologies

IntelliLink™ Interworking Technology

What is New

- Results from a DHS Contract to research Standards based (P25) Interworking with FirstNet™ / 3GPP LTE
- Catalyst analyzed 56 Core Requirements and found 76% conformance using Inter Subsystem Interface (ISSI) to a P25 trunking system - but few agencies can use ISSI
- Interworking with other radio systems and other interfaces is also feasible but has a lower conformance percentage

P25 Interoperability solution

- Catalyst has designed a near-term, modular, multi-vendor architecture
- Uses Standard 3GPP messages to interface with LTE MCPTT before the Full IWF is complete
- Offers an Adapter to a variety of LMR systems without ISSI

Benefits to Public Safety

- More P25 users (including those without ISSI) can access FirstNet™ and have Interworking with their current LMR
- LMR / LTE Interworking promotes migration - not replacement - to FirstNet™

Learn more at Catalyst Booth #1280

www.catcomtec.com
What is New

• Fast and cost effective radio tests to obtain building occupancy permit
• Grid test based on NFPA, IFC, and AHJ regulations
• Automatic report generation for submission

P25 Interoperability solution

• P25: RSSI, SINR, Frame BER, Phase detection
• FirstNet Measurements: multiple bands/operators
• Future proof: 5G, CBRS, NB-IoT
• RSSI on other technologies

Benefits to Public Safety

• Ensure indoor communications for first responders
• Makes adopting and enforcing requirements realistic

New P25 Over-the-Air Radio Diagnostics for Large Coverage Deployments

What is New

• MX-3000 Master device accommodates the requirements of larger geographically dispersed systems (state, regional and county systems)

P25 Interoperability Solution

• An essential tool for P25 migration

Benefits to Public Safety

• Provides comprehensive reports indicating alignment characteristics by radio ID, identifying their status as Failed, Passed or Never Received

• Detect radio issues before it becomes an emergency – mitigates possible legal liability

• A proactive radio maintenance tool that assures operational readiness

Visit LocusUSA at Booth 731 to learn more
https://www.locususa.com/products/diagnostx/
LMR User Acceptance & Certification Program

What is New

- Field Testing For User Agencies
- Acceptance, Certification & Validation
- A2LA Accredited Test Lab

P25 Interoperability solution

- Subscriber Unit Certification for use on your System.
- RF System Acceptance or Validation - New or Existing
- P25 CAP - Compliance Assessment Program Test Plan
- Beyond CAP - User Designed Test Plan

Benefits to Public Safety

- “Do No Harm” - Only compliant SU’s loaded
- All system features and services will execute as expected
- All elements of system are actually compliant (current)
- Validate performance after installation in real world situation

Is your P25 system compliant? Will your ISSI work?

https://compliancetesting.com/
ChrisL@compliancetesting.com
480-748-4449
Pick the form-factor that best suits your needs:

- Virtual Machine
- Panasonic Toughbook
- Dell/HP 19” server
- Valid8 M-series HW
Etherstack P25 Off-Air Monitor

PC Application for:
- Non-intrusive, Bi-directional P25 Channel Observation
- P25 Air Interface Testing
- P25 Interoperability Verification
- Real-time Maintenance and Diagnostics

Log Items Pane
A summary of all the messages captured is listed. The source column indicates the channel in which the message originated. The summary column gives a brief overview of the message including any salient field values.

Marker Information
Delta time information from the current log entry to marked entries is displayed here.

Details Pane
Detailed view of a selected message with a descriptive breakdown of each field and its value in both decimal and hex.

Etherstack P25 Off-Air Monitor
www.etherstack.com
Thank You

Cheryl Giggetts
Principal, CTA Consultants
giggetts@cta-c.com
P25 Testing and Compliance Update

Jim Downes

Presented by:
PTIG - The Project 25 Technology Interest Group
www.project25.org – Booth 2761
Jim Downes, Cybersecurity and Infrastructure Security Agency (CISA), Project 25 (P25) Steering Committee Chair
Importance of LMR Sustainment and Continued P25 Support

- The majority of public safety community agrees P25 is the best choice for mission critical emergency communications interoperability
  - P25 is the recommended technology of choice for MCPTT Voice interoperability in the SAFECOM Grant Guidance and the DHS NECP
- P25 provides a competitive environment with multiple vendors offering standards compliant equipment and services
- This multiple vendor environment dictates a critical need for consistent and reportable Conformance and Interoperability Testing to ensure both operability and interoperability among multiple vendor resources
Levels of P25 Compliance Testing

The P25 user and manufacturer community agree there basically four levels of compliance described below when referring to the requirements or capabilities of P25 products, features and services.

1. Compliance in the context of the P25 Statement of Requirements (SoR) document
   i. Compliance statements at this level mean functionality covered by the SoR have been implemented.

2. Compliance in the context of a published P25 standard document
   i. Compliance statements at this level mean functionality has been implemented in accordance with a P25 Standard document or documents.

3. Compliance in the context of a published P25 standard test procedures document
   i. Compliance statements at this level mean functionality has been implemented per a P25 Standard document and has passed P25 standard tests associated with that functionality.
Levels of P25 Compliance Testing

4. Compliance in the context of the DHS OIC Compliance Assessment Program (CAP)
   i. The DHS OIC Compliance Assessment Program identifies equipment tests that may or may not be included in the P25 suite of standards. When CAP testing uses tests included in the P25 suite of standards, then compliance statements at this level mean the tested functionality has been implemented per a P25 Standard document (or documents) and this functionality has passed its associated P25 standard tests that are included in CAP Compliance Assessment Bulletins (CABs) and the testing was performed in CAP recognized labs and the test results are reported in a CAP approved document.

   Additional information on the four levels of compliance testing can be found on the “What is P25 Compliance?” Whitepaper at http://www.project25.org/images/stories/ptig/PTIG_Whitepaper_on_P25_Compliance_Final_190119.pdf
Project 25 Testing

- Project 25 Compliance Assessment
  - The ability to utilize equipment from multiple vendors and maintain both intra-system and inter-system interoperability requires use of common standards
  - It is critical that P25 equipment and systems are compliant with the published standards and confirmed through an open and coordinated process
  - The P25 Steering Committee and the TIA TR8 Engineering Committee support the CAP process and provides jointly developed P25 Recommended Compliance Acceptance Tests (RCAT)s for CAP consideration
  - It is important that both users and vendors are actively engaged in the process
The P25 Steering Committee approved 12 test procedure documents, developed in coordination with TR-8, for forwarding to the P25 Compliance Assessment Program (CAP) for consideration in the development of Compliance Assessment Bulletins (CABs) that define the tests required for program participation. Recommendations included four published interoperability test documents for inter-RF subsystem interface (ISSI) and trunked system standards. Users are urged to refer to the published test procedures listed in the Project 25 List of Approved Standards when developing acquisition plans when there is no CAP approved test results available.
P25 Steering Committee Activity

- The P25 Recommended Compliance Assessment Test Procedures were approved by the P25 SC and forwarded to the P25 CAP Director:
  - TSB-102.CBBC-A: Project 25 RCAT – Transceiver Performance – Conventional Mode Fixed Station
  - TSB-102.CBBE: Project 25 RCAT – Conventional Operation
  - TSB-102.CBBH-A: Project 25 RCAT – Performance – Trunked Mode Fixed Station Transceiver and Related Infrastructure
  - TSB-102.CBBJ-C: Project 25 RCAT – Trunking Interoperability
  - TSB-102.CBBK-A: Project 25 RCAT – Trunking ISSI
  - TSB-102.CBBL-A: Project 25 RCAT - TDMA Trunking Voice Channel Air Interface
Project 25 Testing

- ISSI/CSSI Non-CAP Interoperability Test Template
  - The template was developed to provide the public with test results prior to the availability of CAP recognized ISSI/CSSI testing labs and testing results
  - APIC Compliance Assessment Process and Procedures Task Group (CAPPTG) forwarded a Non-CAP Interoperability Test Template for P25 Steering Committee approval. The P25 Steering Committee approved the template
  - The template will be used by the manufacturers to conduct and record interoperability tests of common features/functions between different systems
  - PTIG published the template and the results of testing as a method for reporting ISSI and/or CSSI P25 Interoperability test results for user and manufacturer reference www.project25.org
  - Allows reporting on interoperability of testing equipment from two manufacturers; that may have been performed in a single lab, in a lab to lab setting or in an installed customer setting
For Additional Information

- Project 25 Technology Interest Group (PTIG):
  http://www.project25.org

- DHS P25 Compliance Assessment Program (CAP)

- Project 25 Steering Committee Info
  https://www.dhs.gov/technology
P25 for the Future
New Products, Applications, Interoperability and Security