International Wireless and Communications Expo
College of Technology
Las Vegas, Nevada
March 17, 2014

Project 25 User’s Perspective:
Panel Discussion for 2015

Presented by:
PTIG - The Project 25 Technology Interest Group
www.project25.org – Booth 1853
Program Participants

- **Moderator**
  - Del Smith: Chairman, PTIG Board of Directors, ALMR OPERATIONS MANAGER

- **Panelists**
  - Steve Nichols: Director, Project 25 Technology Interest Group
  - Chris Essid: Deputy Director, DHS, OEC
  - Steve Noel: Statewide Interoperability Coordinator (SWIC), FirstNet Single Point of Contact (SPOC) for the State of Oregon
  - Bob Symons: Wyoming Public Safety Communications Commission, Wyoming Statewide Interoperable Coordinator (SWIC)
  - Jim Downes: FPIC, LMR Standards and Security Coordinator DHS OEC, Chair of the Project 25 Steering Committee
  - Bradley Stoddard: Director, Michigan’s Public Safety Communications System, Statewide Interoperability Coordinator (SWIC) for Michigan
  - Dean Hane: Technical Services manager, Multi-Agency Communications Center MACC911
  - Keith LaPlant: Telecommunications & Interoperability Program Manager, U.S. Coast Guard
# Workshop Agenda

<table>
<thead>
<tr>
<th>Topic</th>
<th>Presenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workshop Overview, Agenda</td>
<td>Del Smith</td>
</tr>
<tr>
<td>PTIG Introduction, WEB site , PTIG Resources.</td>
<td>Steve Nichols</td>
</tr>
<tr>
<td>DHS Summary, Brief Remarks</td>
<td>Chris Essid</td>
</tr>
<tr>
<td>Oregon Project 25 LMR Systems</td>
<td>Steve Noel</td>
</tr>
<tr>
<td>Wyoming,  Wyolink P25 System</td>
<td>Bob Symons</td>
</tr>
<tr>
<td>Break</td>
<td></td>
</tr>
<tr>
<td>Project 25: The Federal User View</td>
<td>Jim Downes</td>
</tr>
<tr>
<td>State of Michigan, A MPSCS Snapshot</td>
<td>Brad Stoddard</td>
</tr>
<tr>
<td>Migrating to a P25 Trunked Network MACC 911</td>
<td>Dean Hane</td>
</tr>
<tr>
<td>P25 Implementation in the U.S. Coast Guard</td>
<td>Keith La-Plant</td>
</tr>
<tr>
<td>Open Forum and Discussion, Questions and Answers</td>
<td>Del Smith</td>
</tr>
</tbody>
</table>
Take Away Topics to Look For

• A look at P25 in the field and user supported experiences.
• How and Why P25 is Useful to So Many Public Safety Users.
• How is P25 Being Deployed for Interoperability.
• Challenge the Myths, See the Realities of P25 Pros and Cons.
• The Reality of Multiple Vendor Interoperability with P25.
• Get Acquainted with System Level Considerations,
  — P25 is about More than Multiple Choice Subscribers, Mobiles & Portables.
• Get Acquainted with PTIG Resources for your Information.
P25 Presentations at IWCE through This Week

P25 User’s Perspective, Interoperability, and Customer Applications Update for 2015 (you are in this session now)
Tuesday, March 17, 2015
8:30AM-12:00PM
Room: N257

Estudios de Caso: TETRA, LTE y P25
Wednesday, March 18, 2015
4:15PM-5:30PM
Room: N255, Ramone Mouynes, Zetron

National Emergency Communications Plan - Update
Wednesday, March 18, 2015
4:15PM-5:30PM
Room: N257, Chris Essid DHS OEC
P25 Presentations at IWCE through This Week

An Update on P25 Compliance Assessment Program (CAP)
Thursday, March 19, 2015
9:45AM-11:00AM
Room: N252, Chris Lougee, ICOM  John Merrill, DHS

Best Practices in P25
Thursday, March 19, 2015
11:15AM-12:30PM
Room: N255, Dean Hane, MACC911

ISSI for Interoperable Communications
Friday, March 20, 2015
8:30AM- 9:30AM
Room: N255, Marty Christianson Airbus DSC

Town Hall: We Are OEC
When: Wednesday, March 18, 2015
10:30AM-11:00AM
Room: Keynote Area, Ronald Hewitt, DHS
Who and What is PTIG?
Project 25 Technology Interest Group

Who we are:

- Supporters of Project 25 technology, nurturing Project 25’s adoption, growth, and expansion
- A venue fostering an atmosphere encouraging Users to contribute to and benefit from a close interaction with the vendor community driving the ongoing development of the Project 25 Standards

Set your browser to www.project25.org
Project 25 Technology Interest Group: Sustaining Members

- ICOM
- MOTOROLA SOLUTIONS
- HARRIS
- AEROFLEX
- CODAN RADIO COMMUNICATIONS
- KENWOOD
- AIRBUS DEFENSE & SPACE
- tait communications
- RELM WIRELESS
- TiL
- EFJohnson
- JVCKENWOOD Group
- COBHAM
- Vertex Standard
Project 25 Technology Interest Group: Commercial Members
34 Vendors for Project 25 Equipment and Services

15 fixed station/repeater suppliers
14 Subscriber suppliers
13 console suppliers
15 network providers
4 test equipment suppliers
5 consultant services

Available in VHF, UHF, 700, 800, and 900 MHz
## Project 25 Products and Services Available

<table>
<thead>
<tr>
<th>PTIG Member Organizations</th>
<th>Fixed Stations &amp; Repeaters</th>
<th>Mobile &amp; Portable Radios</th>
<th>Consoles</th>
<th>Networks</th>
<th>Software</th>
<th>Test Equipment</th>
<th>Systems Integration</th>
<th>Consultant Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>AECOM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AEROFLEX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AIRWAVE SOLUTIONS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AIRBUS DS COMMS (FORMERLY CASSIDIAN)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANRITSU</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AVTEC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CATALYST COMMUNICATIONS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COBHAM AVIONICS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CODAN RADIO (FORMERLY DANIELS)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CYNERGYZE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DVI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EF JOHNSON</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ETHERSTACK</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FEDERAL ENGINEERING, INC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GENESIS GROUP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HARRIS CORPORATION</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICOM AMERICA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IDA CORPORATION</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>JVC KENWOOD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MIDLAND RADIO</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MOD-U-COM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MOTOROLA SOLUTIONS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PANTEL INTERNATIONAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>POWERTRUNK</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RELM WIRELESS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIMOCO</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPECTRA ENGINEERING</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STANDARD COMM PTY LTD - GME</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TAIT COMMUNICATIONS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TECHNISONICS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TELEX RADIO DISPATCH</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VERTEX STANDARD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WIRELESS PACIFIC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ZETRON</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| 34 | 15 | 14 | 13 | 15 | 5 | 4 | 15 | 5 |
# P25 Scalable Solutions

Mix-match between Trunked, Conventional, Site Linking, Wide Area, or Stand Alone

<table>
<thead>
<tr>
<th>Configuration Supported</th>
<th>Trunking</th>
<th>Conventional</th>
<th>Description/Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multicast</td>
<td>✔️</td>
<td>✔️</td>
<td>Enables coverage of wider areas with fewer transmitter sites when compared to simulcast</td>
</tr>
<tr>
<td>Simulcast</td>
<td>✔️</td>
<td>✔️</td>
<td>Enables reuse of frequencies to increase coverage penetration of a given area and for spectral efficiency</td>
</tr>
<tr>
<td>Direct/Simplex</td>
<td>Supported in SUs for off-network operation</td>
<td>✔️</td>
<td>Enables radio to radio communication without fixed infrastructure. Quicker communication for onsite scenarios such as a fire ground</td>
</tr>
<tr>
<td>Repeated</td>
<td>✔️</td>
<td>✔️</td>
<td>Enables a radio call to be repeated from one frequency to another, enabling communications over a larger geographic area</td>
</tr>
<tr>
<td>Voting</td>
<td>✔️</td>
<td>✔️</td>
<td>Improved inbound communications for portable radios</td>
</tr>
<tr>
<td>Single Site</td>
<td>✔️</td>
<td>✔️</td>
<td>Enables radio communications within one site’s worth of coverage</td>
</tr>
<tr>
<td>Multi-Site</td>
<td>✔️</td>
<td>✔️</td>
<td>Enables radio communications over several site’s worth of coverage</td>
</tr>
</tbody>
</table>
Worldwide Adoption

Project 25 systems are deployed in 83 countries

Source: Project 25 Technology Interest Group (PTIG), July 2011
VHF/UHF P25 interoperability possible in every state
700/800 MHz P25 interoperability possible in 45 states

Every state except North Dakota, Maine, Vermont, New Hampshire and Alaska
Next 3 Years: *P25 growth to continue*

- The “Push” to digital migration continues
- Need for additional capacity in urban areas (TDMA)
- Need for wide area systems (Phase 1 and Phase 2)
- P25 Momentum, it’s the “interoperable technology”

**P25 Shipments**

Forecast P25 Radio Shipments
Data Courtesy of: IHS Technology - Critical Communications Division
Project 25 Technology Interest Group

What do we do:

– Provide an information forum for users and manufacturers
– Manage education and training on Project 25
– Create and distribute Project 25 information
– Support the TIA standards process
– Offer Users access to the standards process without the rigor of TIA membership
– Maintain a “neutral ground” among the competing manufacturers and providers
And...
– Present Classroom Training such as THIS SESSION.
The Project 25 Technology Interest Group Releases a New List of P25 CAP Tested Radios

The Project 25 Technology Interest Group has just published a new P25 CAP Tested Radios List on the Project25.org website. The list was developed in response to government agency radio users who were not able to get P25 CAP test data from the DHS website that is currently under reconstruction. The table lists products offered that have been through P25 CAP testing and have been previously listed on the DHS Website. The DHS site is currently under redesign and not available. To fully understand the specifics of the tests run and which radios were tested for interoperability it is suggested that you refer to specific CAP test documents and Suppliers Declarations of Compliance (SDOCs) from each company. These can be accessed using the company links or by contacting the company representative in the 4th column.
The Table can be reviewed or downloaded using the link below.

P25_Cap_tested_radios_REV_8_150129.pdf
New Documents available at **www.Project25.org**

- **P25 Frequenty Asked Questions**  
  *Written to officer, firefighter (non technologist) level*

- **P25 Updated Capability Guide**  
  *Added Infrastructure interfaces and link to Statement of Requirements*

- **P25 Standards Update Summary**  
  *Summary of the latest P25 Standards Meetings with user benefits defined*

- **P25 Steering Committee Approved List of Standards**  
  *Updated from the most recent P25 Standards meeting*

- **P25 Feature Translator**  
  *link to NPSTC PAM tool*
New Documents available at www.Project25.org

• P25 CAP Tested Radio Products listing
  The DHS sponsored Website that has hosted CAP test data and SDOCs for P25 manufacturers has been off air and unavailable. PTIG now provides a P25 CAP tested Product List document with direct links to Company data bases or POC info to improve accessibility to each manufacturer’s copies of CAP test documents and SDOCs. PTIG does not intend to become the repository for CAP test data but offers this in the interim until the DHS site is renewed.

• New White paper: P25 Vocoder Improvements
  A detailed report of the numerous audio improvements made possible through the latest P25 Vocoder design.
Projects Underway 2015

- New Point of Contact list (POC) for Project 25 system operators/administrators.

  *This resource will allow Information sharing between P25 systems in different regions. It will be used by visiting agencies to get access to the Local/Statewide P25 systems to facilitate interoperable communications for mutual aid*

- Valuing mission critical radio services:

  *A study of the economic value of land mobile radio spectrum in Australia. Thanks to Australian Radio Communications Industry Association and Geoff Spring APCO Austrailasia*

- New Whitepaper: Need for continued funding for P25 systems
PTIG Commercial Members

- AECOM
- Airbus DS Communications
- Aeroflex
- Airwave Solutions
- Anritsu
- Avtec
- Catalyst Communications
- Cobham Avionics
- Codan Radio (formerly Daniels)
- Cynergyze
- DVSI
- EF Johnson Technologies
- Etherstack
- Federal Engineering, Inc
- Genesis Group
- Harris Corporation
- Icom America
- IDA Corporation
- JVCKenwood
- Midland Radio
- Moducom
- Motorola Solutions
- Pantel International
- Powertrunk
- Relm Wireless
- Simoco
- Spectra Engineering
- Standard Comm Pty Ltd - GME
- Tait Communications
- Technisonic
- Telex Radio Dispatch
- Vertex Standard
- Wireless Pacific
- Zetron
OUR MEMBER ORGANIZATIONS AS IWCE EXHIBITORS

THANK YOU

<table>
<thead>
<tr>
<th>Member Organization</th>
<th>Booth #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aeroflex *</td>
<td>1053</td>
</tr>
<tr>
<td>Airbus DS *</td>
<td>1521</td>
</tr>
<tr>
<td>Anritsu</td>
<td>1034</td>
</tr>
<tr>
<td>Avtec</td>
<td>1443</td>
</tr>
<tr>
<td>Catalyst</td>
<td>1567</td>
</tr>
<tr>
<td>Cobham *</td>
<td>1846</td>
</tr>
<tr>
<td>Codan *</td>
<td>8027</td>
</tr>
<tr>
<td>EFJohnson *</td>
<td>1031</td>
</tr>
<tr>
<td>Etherstack</td>
<td>1721</td>
</tr>
<tr>
<td>Genesis Group, The</td>
<td>521</td>
</tr>
<tr>
<td>Harris *</td>
<td>1361</td>
</tr>
<tr>
<td>Icom *</td>
<td>621</td>
</tr>
<tr>
<td>IDA Corporation</td>
<td>1371</td>
</tr>
<tr>
<td>JVCKenwood *</td>
<td>1221</td>
</tr>
<tr>
<td>Midland Radio</td>
<td>1153</td>
</tr>
<tr>
<td>ModUcom</td>
<td>1821</td>
</tr>
<tr>
<td>Motorola Solutions *</td>
<td>921</td>
</tr>
<tr>
<td>Powertrunk</td>
<td>1161</td>
</tr>
<tr>
<td>RELM *</td>
<td>1451</td>
</tr>
<tr>
<td>Simoco</td>
<td>441</td>
</tr>
<tr>
<td>Tait *</td>
<td>823</td>
</tr>
<tr>
<td>Telex Bosch</td>
<td>1261</td>
</tr>
<tr>
<td>Vertex Standard *</td>
<td>1041</td>
</tr>
<tr>
<td>Zetron</td>
<td>1121</td>
</tr>
</tbody>
</table>

* Sustaining Member of PTIG

Visit Project 25 Technology Interest Group
Booth # 1853
Steve Nichols
Director, Project 25 Technology Interest Group
Director@project25.org
www.project25.org
Project 25 User’s Perspective and Customer Applications Update for 2015

International Wireless Communications Expo
College of Technology
Tuesday, March 17, 2015
8:30 a.m. – 12 p.m.
Brief Remarks

Chris Essid
Deputy Director
US Department of Homeland Security
Office of Emergency Communications
Project 25 Background

• Project 25 was created as a joint project between APCO, NASTD and the Federal Government in 1989
• Project 25 set out to address—
  – Spectral efficiency
  – Backwards compatibility
  – Enhanced interoperability
  – Ease of migration and scalability
  – Increase vendor competition
• Teamed with TIA in 1992 to create the P25 Suite of Standards
Project 25 Development Process

**User voice**

- P25 Steering Committee
- P25 User Needs Committee
- User Needs Task Groups

- Define requirements for standardization;
- Adopt or reject TIA work
- Only Users vote
- Develops concept documents for P25

**Joint Participation**

- APIC: TIA-P25 Interface via MoU
- APIC Task Groups
- APIC Working Groups

- Develops user requirements into standards proposals
- Serves as venues for needed clarifications
- Manages documents
- All organizations get a vote

**Industry voice**

- TIA TR-8 Committee
- TR-8 Committee Subcommittees
- Subcommittee Working Groups

- Develop consensus standards with guidance from APIC and users
- Only TR-8 members vote
- Ballots and publishes TIA Standards
DHS Continued Support for Project 25

• Mission Critical voice land mobile radio is going to be around for a long time
• Project 25 is the correct choice for interoperability
• DHS continues to be committed to Project 25
  – P25 is the recommended technology of choice for interoperability in the SAFECOM Grant Guidance
  – P25 is a significant part of the NECP
  – DHS actively participates in the P25 development process and currently chairs the P25 Steering Committee
Project 25 Compliance Assessment

Overview

• Congress passed legislation creating the Project 25 Compliance Assessment Program (P25 CAP)

• The P25 CAP was implemented by DHS OIC in coordination with NIST
A P25 CAP Governing Board was formed in accordance with the legislation and is limited to active tribal, local, state and Federal government employees.

The P25 CAP currently covers interoperability and performance testing for the Common Air Interface:

- Eight labs were approved to conduct the tests
- Over 75 SDoC’s have been released
P25 standards ensure data can be passed across all levels of digital radio interfaces, as illustrated above.
Project 25 and the User

• Project 25’s influence continues to expand
  – Deployed in over 83 countries
  – Currently 34 companies provide a P25 product or service

• Project 25 continues to develop
  – Ongoing maintenance
  – User input is critical to the success of the standards
  – New technologies are being added

• User participation is required
  – User participation in the development of the standards
  – Secure P25 CAP documentation in your implementation
Summary

• Project 25 celebrated 25 years of user-industry cooperation
• Project 25 continues to evolve
• User participation is essential to the continued success of P25 interoperability
• The P25 Steering Committee and User Needs Subcommittee requests your participation in the process
Questions?

- Please direct any questions regarding DHS OEC’s activities in the Project 25 environment to:

  Jim Downes  
  US Department of Homeland Security  
  Office of Emergency Communications  
  James.downes@dhs.gov
Oregon P25 LMR Systems
Primary State System

• Primary Conventional VHF
  – Harris Unity Tri-band (VHF, UHF, 700/800)
  – Interoperability in the hands of the user
  – OSP connects to Motorola P25 TRS systems
  – Radio capable of analog/digital P25 mode
  – Supports 5000 radios
Tri- Band Radio
Trunked System Discussion

• Tri-Band Radio
  – Provides needed flexibility

• Future Planned TRS System
  – Willamette Valley
  – Interoperate with existing digital systems
  – Provides state flexibility for future planning of LMR
City of Portland

System Profile City of Portland
Installed 1993, expanded to current setup of 15 TRS sites

- Major component replacement of central controller in 2010
  - 700 MHz digital layer for encryption installed
  - RFP for new system completed in March 2013
  - City working on detailed design and project management functions
- System supports over 6000 paid subscribers -11,000+ overall access in Metro Region
  - Larger metro region (4) county region has Interoperability on all TRS systems
P25 Trunked Radio Systems

Regional and City Systems
- City of Portland 700/800MHz (project)
- Frontier 911 – Tri-County 700/800MHz
- Eugene/Lane County 450 MHz
- State of Oregon – OSP/ODOT/Corrections (project)
- Umatilla/Morrow Counties (project)
- FBI, along I-5 and I-84 highways

Planned
- City of Salem
- Deschutes County
- Washington County
- Clackamas County
People Factor
Trends in PS COMS

Current smart device uses by public safety officials

• Mobile EMS charting
• CAD/RMS app for law enforcement
• Vehicle, hydrants locations for fire services
• GIS capabilities, providing Common Operating Picture
• SMS text messaging
• Alerts, calls, mapping,
  e.g., Active 911
What Kind of Devices Used

Agencies indicate a wide range of devices in use for public safety
Many agencies leverage personal devices to save costs

- Approximately 40% of respondent agencies allow use of personal devices for official use
  - Some offer a stipend when used for business
- Majority of BYOD are smartphones. Laptops and tablets are mostly issued.
- Some agencies more stringent on BYOD in accordance with security protocols and mobile device management policies
- **Overall #1 used device LMR Voice, preferably P25 standard**
  Coming tools like (BeOn) (TWISTEDPAIR)
Crossroads between LMR and Commercial Services

**Communication Services**
- **Voice** – e.g. Interactive voice communication, non-interactive voice communication, Defined & ad hoc voice communication communities
- **Messaging** – e.g. SMS, email, blog
- **Video** – e.g. broadcast, peer-to-peer

**Applications**
- **Communication services as an app** – e.g. Skype, Twitter
- **Public informational** – e.g. CPR instructions, news updates, logistics information
- **Internal department** – e.g. HR, scheduling
- **Department data** – e.g. crime records, medical records
- **Cross department data** – e.g. DMV, criminal records
Thank You

Steve Noel
Oregon SPOC/SWIC
Office 503.378.5513/Cell 503.999.7310
Email: Steve.Noel@oregon.gov
Wyoming
WyoLink Overview

- The State of Wyoming, working through a Steering Committee and Project Team finalized a set of recommendations to develop a statewide public safety mobile communications system. The recommendations were chosen after careful consideration of all possible alternatives, including technical, operational, and financial factors; they represent the culmination of an extensive multi-year effort.

WyoLink — Wyoming’s statewide public-safety interoperable radio communications system
WyoLink Overview

- WyoLink will be a Project-25 digital, trunked, VHF High-band (136-174 MHz) radio system utilizing 57 sites. The system will be interconnected via the Wyoming Department of Transportation (WYDOT) microwave backbone and its planned extensions.
WyoLink RFP Benefits

• WyoLink will provide the following critical benefits to the citizens and public-safety responders in WY:
  • Full interoperability across all participating State, local, and Federal agencies. This will include an interface to the existing Casper and proposed Cheyenne 800-MHz system
  • Improved statewide mobile coverage from 83% (estimated coverage) to 95%
  • Full compatibility with the current and emerging Project-25 public safety digital radio communications standards.
WyoLink Benefits RFP

• Digital technology, the technology of choice in the industry today and into the future, which brings added features such as encryption, low-speed data messaging, individual unit identification, and automatic vehicle location (AVL)

• Increased communications capacity through the addition of radio frequencies and the use of trunking technology, which will provide enhanced flexibility, reliability, and radio frequency efficiency

• WyoLink will provide interoperability by unifying Wyoming Public Safety agencies in a single system
Project-25 Digital

- Project-25 is the predominant public safety standard for mobile communications
- The WyoLink system will be designed to meet Project-25 standards. All new equipment (radios and infrastructure) purchases will be Project-25 compliant
- WyoLink mandates compliance all applicable standards of Project-25 as only viable direction for enhancing interoperability
Project-25 Digital

• Achieving spectrum efficiency, obtaining user-friendly equipment, ensuring competitive procurement, and providing for graceful forward migration.

• WyoLink has adopted the suite of Project-25 open standards because it allows purchasing of interoperable subscriber equipment from any Project-25 manufacturer and provides the standard-based features needed by the user community as public safety radio technology evolves.
Project-25 Digital

- WyoLink will be designed such that any subscriber unit manufactured to conform to Project-25 trunking standards, regardless of manufacture.

- Approved End User Equipment 2015:
  - Motorola
  - Relm
  - Kenwood
  - EF Johnson
  - Technisonic
  - Midland
  - ICOM
  - Tait
Project 25 Technology Interest Group

WyoLink 2015

• 17,000 radios programmed to use WyoLink
• 264 Agencies
• Busy rate (by time) 0.014%
• WyoLink Availability – 99.9% of the time
• Usage – 70% local Agencies, 28% State Agencies and 2% Federal Agencies
• 70 Sites – 5 – 800 MHz
Federal Agencies Using WyoLink

- Federal Bureau of Investigation
- Drug Enforcement Agency
- Alcohol Tobacco & Firearms
- IRS – Criminal Investigations
- Bureau of Land Management
- DOI - Fish and Wildlife
- U.S. Marshal’s Office
- Bureau of Reclamation
- Forest Service – Law Enforcement
- National Park Service
- Transportation Security Administration
- Federal Highway Administration
- F.E. Warren Air Force Base – 90CS/90GTCS
- Immigration and Customs Enforcement
- USDA - Animal & Plant Health Inspection Services (APHIS)
- National Guard
WyoLink 2015

WyoLink Number Of Calls By Year

- 2009: 2,172,338
- 2010: 7,524,048
- 2011: 13,586,728
- 2012: 17,968,777
- 2013: 20,341,786
- 2014: 20,870,121

Number of Calls
• Robert (Bob) Symons
• Wyoming Public Safety Communications Commission
• Wyoming Statewide Interoperable Coordinator (SWIC)
• bob.symons@wyo.gov
• 307-777-5065
• http://pscc.wyoming.gov/
• http://wyolink.wyoming.gov/
Federal Partnership for Interoperable Communications (FPIC)

- The FPIC serves as a coordination and advisory body to address technical and operational wireless issues relative to interoperability within the federal emergency communications community.

- The FPIC includes more than 200 Federal, State, local, and tribal public safety representatives from over 45 Federal agencies, as well as representatives from State, Tribal and local entities, focusing on improving interoperability among all levels of government and addressing common public safety related communications issues.

- Address topics and questions concerning:
  - Interoperable communications
  - Security Services
  - Spectrum
  - Standards
Federal Government and Project 25

- The Federal Government has been an active participant in the Project 25 Standards creation since the beginning of the program
  - Initiated in part by the National Telecommunications Information Administration (NTIA) narrowband mandate
  - Federal requirements for secure communications forced a migration to digital technologies
- Most Federal Agencies have adopted Project 25 for tactical voice communications starting in the mid-1990’s
  - Most agencies are operating narrowband, conventional, encrypted systems
  - A number of Federal Agencies operate or participate in P25 trunked systems, including DOJ Bureau of Prisons and IWN, Lawrence Livermore National Lab, and Department of Defense
Federal Government and Project 25 (continued)

- Although Broadband (LTE) is rapidly moving forward, most public safety entities agree that LMR will continue to support mission critical voice for several years.

- With this in mind, most federal agencies continue to promote Project 25 as the best solution to provide interoperable, digital, mission critical communications for the foreseeable future.

- As Federal agency budgets are reduced, many agencies are seeking opportunities to achieve cost effective solutions and operational efficiencies by securing partnerships with statewide and regional public safety systems:
  - Enhanced coverage
  - Better interoperability with state and local agencies
  - Typically provides a multi-vendor environment
Federal Government and Project 25 (continued)

- A number of Federal Agencies are operating on existing state systems which provides increased operational efficiencies (coverage, interoperability) and cost effectiveness.

- The P25 standards provide a capability to take advantage of a competitive market and the introduction of multi-band subscribers further enhances the ability to operate on different P25 Systems.

- The partnership in Wyoming is a prime example of how Project 25 has supported an opportunity for the Federal Government to form a partnership with the State of Wyoming resulting in a win for all concerned.

- These partnerships are being developed in other states, including Alaska, Connecticut, Missouri, Nebraska and South Carolina, and without P25 these cooperative activities would be more difficult.
US Department of the Interior System Overview

- **Overview of DOI’s Radio Systems**
  - Both BLM and NPS operate P25 VHF Phase 1, Conventional systems
    - BLM has approx. 705 sites providing coverage for over 220 million acres of BLM managed land.
    - NPS has over 1,300 sites providing coverage within and around 350 plus national park units supported by LMR.
  - Both BLM and NPS continue to cooperate/interoperate with many states/counties/federal systems for fire and law enforcement activities
  - Most of NPS LEOs are locally supported. However, some NPS LEOs along the Southwest Border are supported by the NLECC
  - Both BLM and NPS are upgrading dispatch centers and will follow the P25 CSSI, FSI and ISSI standards for connectivity
    - NPS currently owns and manages 36 Dispatch Centers throughout the US&P
USDA Animal Plant Health Inspection Service (APHIS) P25 System Overview

- APHIS is operating on multiple P25 statewide systems including Wyoming
- APHIS began implementing P25 in 2006
  - APHIS Radio Communications Directive is being updated to specify P25 as primary technology, providing critical interoperability, spectral efficiencies and backward compatibility to legacy systems and migration to 6.25kHz spectral efficiency (Phase 2)
  - Five APHIS program areas currently operating on P25
    - Wildlife Services & Plant Protection and Quarantine (PPQ) operating on Wyoming System
  - Recognizing cost saving opportunities by sharing resources with other government and non-government entities
  - All P25 radios operate in a multi-mode configuration
FPIC’s Commitment to Encrypted Communications

- Federal agencies have had long standing requirements to provide encrypted communications
  - Security Policies vary by department and component, but are often driven by National Institute of Standards and Technology (NIST) Federal Information Processing Standards (FIPS) requirements
  - FIPS requirements have been addressed in the Project 25 Standards
- FPIC continues to be an active participant in the development of security services within the P25 Suite of Standards
  - Introduced the requirements for the Inter-Key Management Facility Interface (IKI)
  - Driving updates to the Over-the-Air Rekeying standards, link layer encryption and the Security Services Overview
FPIC’s Commitment to Encrypted Communications (continued)

- Federal agencies have seen a surge in encrypted communications as state and local agencies begin to implement security services
  - Increased requirements for privacy to protect law enforcement operations and personal identifiable information (PII)
  - Response to academia whitepapers discussing challenges with land mobile radio security
  - Requires significant coordination between agencies still requiring interoperable communications
  - Reduced cost delta in providing encryption with digital technologies although the system complexity increased
  - Problems with analog encryption are no longer relevant for digital
    - Coverage loss
    - Reduced audio quality
FPIC and Secure P25 Communications

- The FPIC Security Working Group has developed a series of documents addressing Encrypted Communications in a P25 environment
  - Considerations for Encryption in Public Safety Radio Systems – pending publication
  - Key Management Guidelines and Best Practices – under development
Contact Information

- Jim Downes
  - DHS OEC
  - James.downes@dhs.gov
  - (703) 235-4096
Questions?
Active FPIC Membership and Participation

- Active members and participants include:
  - DOJ-OCIO
  - DOI-OCIO
  - DHS-OCIO
  - DHS-OEC
  - DHS-OIC
  - US Marine Corps
    - HQ Marine Corps Installations and Logistics Department
    - Marine Corps Installation Command
  - US Navy
    - Enterprise LMR Management Office
    - NCIS
  - US Air Force
    - Spectrum Management Office
    - Office of Special Investigations
  - National Guard Bureau J6
  - USDA Animal and Plant Health Inspection Service (APHIS)
  - Department of Commerce - NIST Computer Security Division
  - Department of Homeland Security
    - CBP, NPPD/FPS, ICE, USSS, USCG
  - Department of Justice
    - ATF, DEA, FBI, US Marshals
  - Department of the Interior
    - BLM, NPS, U.S. Park Police
  - Department of the Treasury
  - National Interagency Fire Center
  - State of South Carolina - Statewide Program Manager/SWIC
  - State of Kansas SWIC
  - State of Montana – State Highway Patrol
  - State of Wisconsin WISCOM
  - State of Connecticut - Statewide Program Manager
  - State of Wyoming - Statewide Program Manager/SWIC
  - District of Columbia SWIC
  - State of Maryland – MD First Program Manager
  - State of Texas DPS and DoT
  - San Diego Sheriff Department
  - City of Phoenix AZ Police Department
  - Metro DC COG
    - Fairfax County
    - Montgomery County
    - Loudoun County
    - Prince William County
FPIC Security Working Group Recommendations

- Developing nationwide best practices white paper for the use of Storage Location Numbers (SLN) and associated KeyIDs.
  - DES-OFB
  - AES

- Recommends the use of interoperability keys generated by the National Law Enforcement Communications Center (NLECC) in Orlando, Florida.

- Recommends adoption of the SLN Database for national use for Federal, State and Local SLNs.

- Adopt the KeyID database for national distribution and use
  - Protection of information needs to be addressed
State and Local Request for Interoperability Keys

- Contact Mark Putnam, Customs and Border Protection, NLECC
  - Mark.d.putnam@cbp.dhs.gov
- Need a Key Fill Device (KFD)
- KFD need to be configured per NLECC Guidelines
- Need PCMCIA card
- RSI issued by NLECC
- Shadow key for DES and AES-256 required
- NLECC keys configured in KMF
- Needs completed approval form from management with contact phone numbers included
- NLECC will verify identity prior to the release of keys
FPIC Recommendations for Key Management

- In addition to the two documents previously developed, the FPIC Security Working Group is drafting additional document(s) detailing the process for implementing a key management system.
- The whitepapers focus on establishing key management in today’s operational environment and key management capabilities in a standards based environment, to include a nationwide SLN matrix for interoperability and a nationwide Key ID database.
- Encourage wider distribution of SLN Allocation Database to reduce programming problems
## Adopted Federal SLN Database

<table>
<thead>
<tr>
<th>SLN</th>
<th>Algorithm</th>
<th>Use</th>
<th>Crypto Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DES</td>
<td>Interoperable</td>
<td>Annual</td>
</tr>
<tr>
<td>2</td>
<td>DES</td>
<td>Federal Interoperable</td>
<td>Annual</td>
</tr>
<tr>
<td>3</td>
<td>AES</td>
<td>Interoperable</td>
<td>Annual</td>
</tr>
<tr>
<td>4</td>
<td>AES</td>
<td>Federal Interoperable</td>
<td>Annual</td>
</tr>
<tr>
<td>5</td>
<td>DES</td>
<td>National Law Enforcement State and Local Interoperable DES</td>
<td>Static</td>
</tr>
<tr>
<td>6</td>
<td>AES</td>
<td>National Law Enforcement State and Local Interoperable AES</td>
<td>Static</td>
</tr>
<tr>
<td>7</td>
<td>AES</td>
<td>US – Canadian Fed Law Enforcement Interoperability</td>
<td>Static</td>
</tr>
<tr>
<td>8</td>
<td>AES</td>
<td>US – Canadian PS Interoperability</td>
<td>Static</td>
</tr>
<tr>
<td>9</td>
<td>SLN 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>SLN 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>DES</td>
<td>Multiple Public Safety Disciplines</td>
<td>Static</td>
</tr>
<tr>
<td>12</td>
<td>AES</td>
<td>Multiple Public Safety Disciplines</td>
<td>Static</td>
</tr>
<tr>
<td>13</td>
<td>DES</td>
<td>National Fire/EMS/Rescue</td>
<td>Static</td>
</tr>
<tr>
<td>14</td>
<td>AES</td>
<td>National Fire/EMS/Rescue</td>
<td>Static</td>
</tr>
<tr>
<td>15</td>
<td>DES</td>
<td>National Task Force Operations</td>
<td>When needed by operational requirement</td>
</tr>
<tr>
<td>16</td>
<td>DES</td>
<td>Law Enforcement Task Force (one time only operation)</td>
<td>One time use as needed for Special OPS</td>
</tr>
<tr>
<td>17</td>
<td>AES</td>
<td>Law Enforcement Task Force (one time only operation)</td>
<td>One time use as needed for Special OPS</td>
</tr>
<tr>
<td>18</td>
<td>SLN 18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>AES</td>
<td>Federal – International Law Enforcement Interoperability</td>
<td>When needed by operational requirement</td>
</tr>
<tr>
<td>20</td>
<td>AES</td>
<td>Public Safety – International Law Enforcement Interoperability</td>
<td>When needed by operational requirement</td>
</tr>
</tbody>
</table>
State of Michigan

An MPSCS Snapshot

Michigan’s Public Safety Communications System

Brad Stoddard - 2015
Brad Stoddard, Director
Michigan’s Public Safety Communications System
Statewide Interoperability Coordinator (SWIC)

• Brad Stoddard has been with the State of Michigan over 16 years with various leadership and Director roles of Public Safety Services and Information Technology for the Michigan State Police, Michigan Department of Military and Veterans Affairs, Michigan Department of Transportation, and with Michigan’s Public Safety Communications System (MPSCS). Brad has been past chair and vice chair of APCOs Broadband Committee, is Vice Chair of FEMA Region 5 Regional Emergency Communications Coordination Working Group (RECCWG), is Vice Chair of the Michigan State Interoperable Governing Board and participates in various NPSTC, regional, and statewide working groups focused on public safety technologies and communications.

• Brad has been at the forefront of the nationwide public safety broadband wireless network and a recognized speaker on public safety communications and applications, and application security. Brad is the Statewide Interoperability Coordinator (SWIC) for MI, is involved in many national workgroups and organizations and has advised National Governor’s Association on public safety communications planning across the nation.

• Brad holds a BS in Electrical Engineering from Colorado Tech. Prior to joining the State of Michigan, Brad’s background included research and development work with the Department of Defense with Space and Defense companies.
The History

Michigan’s Public Safety Communications System

- **1984** - Executive Branch and Legislative Fiscal agency committee evaluated the 1940s era system for replacement to support all state agencies.
- **1990** - Governor Engler’s Telecommunications Task Force supported the Steering Committee’s recommendation; Michigan Public Safety Communication System (MPSCS) was first authorized as the Michigan State Police (MSP) Statewide Two-Way Radio and Microwave Backbone System in Public Act 253
- **1994** - Michigan Legislature approved the funding for the new system and a contract was awarded to construct the 180 site MPSCS at a cost of $187 million – will be the first statewide system in the country; provides 97% statewide all weather mobile radio coverage
- **1995 to 2002** - MPSCS constructed in 5 geographically based phases; First P25 system in the nation revised cost $215 million
- **2003** - “Blackout of entire east coast highlights MPSCS capabilities in a large scale disaster
- **2003 to 2012** - Local, tribal, and private public safety invested additional $150 million
- **2006 to 2008** – over 36,000 radios added to MPSCS from federal grant dollars to locals
- **2009** – No additional radio IDs available (surpassed planned growth)
- **2006 to 2012** – Integrated solution from dispatch operations to vehicle developed; Computer Aided Dispatching (CAD), Automatic Vehicle Locator (AVL), and integrated dispatch consoles for end-to-end communications solutions.
- **2010 to 2012** – System software upgraded to double amount of radio IDs system capable of managing; key cyber security controls integrated into network
- **2014-Present** – Planning and advancing statewide lifecycle remediation for RF, Microwave and other key system infrastructure
MPSCS Timeline 1984-Present

1984 – MSP forms Steering Committee to evaluate 1940’s radio system
   Included MSP, DNR, DOT, Military Affairs, House & Senate Fiscal agencies
   Recommended system large enough to support all state agencies

1990 – Governor Engler’s Telecommunications Taskforce supports Steering Committee’s recommendations.


1994 – Legislature approves funding in June.

1994 – Governor Engler signs contract with Motorola in December.

1995 – Groundbreaking for Phase 1 construction in September.

1997 – Phase 1 (SE Michigan) Complete

1997 – Livingston becomes first local agency to join

1998 – Phase 2 (SW Michigan) Complete

1999 – System upgraded to ASTRO 5.0 = P25 Standard
2000 – Phase 3 (Northern Lower Peninsula) Complete

9-11-2001 – World Trade Center attack shows need for Interoperability, P25


2002 – Phase 4 (UP) Complete providing statewide interoperable communications. 8000 Users on the system. MSP, National Guard, DMVA.

2003 – System upgraded to ASTRO 6.2 = Data

2003 – Van Buren, Berrien, US Coast Guard, US Forestry Services

2003 – Northeast Blackout demonstrates the value of MPSCS as cellular and other systems crash and become inoperable.

2004 – State of the State Address Gov. Granholm:

"Interoperability" - or the ability of public safety personnel at all levels of government and in all jurisdictions to communicate seamlessly and instantly with one another - will continue to be a vital goal for Michigan's Homeland Security team.

It is my goal that by 2008, every police officer, fire fighter, emergency medical professional and every first responder at every level of government will be able to talk directly to each other in any emergency. When Michigan's citizens call for help, we must ensure that police and fire personnel can respond.
2004 – Mason, Oceana, Monroe, US Forestry
2005 – MPSCS recognized with ACT/IAC Intergovernmental Solutions Award
2007 – Calhoun, St. Clair, Monroe expands, US Fish & Wildlife
2007 – Michigan Receives $25M PSIC Grant
2008 – System upgraded to ASTRO 6.9 = Security, Consoles
2009 – Saginaw, Shiawassee, Gratiot, Site on Wheels, MBS Airport, US Selfridge
2010 – Washtenaw, EMU, Tuscola, Genesee expands, US ACE
2011 – Bay, St. Clair & Wayne expand
2012 – System upgraded to ASTRO 7.11. Doubling capacity raised to 128,000 Users
2013 – Site added for MSP in Grand Rapids, System surpasses 70,000 Users
2014 – Midland, Montcalm, Detroit Metro Airport, Western Wayne
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
How we got there

Resources that made it happen

• Existing Radio Technician knowledge
• Communications Engineering staff
• Real Estate expertise
• Program Management and Quality Assurance contractor
• Legal representation
• Equal ownership of issues by all parties
• Obtainable & defendable goals
• A well defined contract is required!
System Capabilities

Statewide

- 800 MHz and limited 700MHz (where 800 MHz not available)
- 97% mobile all weather capable
- 95% on street portable coverage
- Features
  - Over-The-Air-Rekeying (OTAR)
  - Over-The-Air-Reprogramming (OTAP) capable
  - Integrated Voice and Data (IV&D)
  - 800 MHz Paging (testing)
  - Automatic Resource Locator (ARL)
It’s not just a radio. It’s a partnership.

From Then to Now

Michigan is the model of interoperability

1,468

State, Local, Federal, Tribal and Private Public Safety Agencies Served

Includes 245 tower sites with more than 50 state and local public safety dispatch centers and a network communication center that serves more than 68,000 radios.
It’s not just a radio. It’s a partnership.

From Then to Now

Michigan is the model of interoperability

- **59,415** square miles the Michigan’s Public Safety Communications Spans

One of the largest trunked communications system in North America, second in the world and features P25 digital, trunked technology providing interoperable communications in all 83 counties spanning both peninsulas of the state.
It’s not just a radio. It’s a partnership.

Public Safety Evolution

<table>
<thead>
<tr>
<th>2002</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>8,000 mobile and portable radios</td>
<td>68,575 mobile and portable radios</td>
</tr>
<tr>
<td></td>
<td>(757% increase)</td>
</tr>
<tr>
<td>180 tower sites</td>
<td>244 tower sites</td>
</tr>
<tr>
<td></td>
<td>(64 sites are locally owned</td>
</tr>
<tr>
<td></td>
<td>but integrated into the MPSCS)</td>
</tr>
<tr>
<td>6 Dispatch Centers</td>
<td>55 Dispatch Centers</td>
</tr>
<tr>
<td>38 console positions</td>
<td>248 console positions</td>
</tr>
<tr>
<td>2 million/month Push-To-Talks (PTT)</td>
<td>11 million/month Push-To-Talks (PTT)</td>
</tr>
<tr>
<td></td>
<td>(450% increase)</td>
</tr>
<tr>
<td>152 agencies with interoperable voice and</td>
<td>1,468 agencies with interoperable</td>
</tr>
<tr>
<td>data communications</td>
<td>voice and data communications</td>
</tr>
<tr>
<td></td>
<td>(866% increase)</td>
</tr>
</tbody>
</table>
Standards = Strategic Options
So many vendors, so many choices
Subscriber Radios

- 6 Mobile Manufacturers
  - 39 radio models
- 7 Portable Manufacturers
  - 37 radio models
- Motorola, Harris, Tait, Kenwood, EF Johnson, Bendix King (portable)
It’s not just a radio. It’s a partnership.

Who has a radio?

- Agency breakdowns by discipline: [http://www.mcgi.state.mi.us/mpscs/](http://www.mcgi.state.mi.us/mpscs/)

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMS</td>
<td>15</td>
<td>1%</td>
</tr>
<tr>
<td>FEDERAL</td>
<td>45</td>
<td>3%</td>
</tr>
<tr>
<td>FIRE</td>
<td>462</td>
<td>31%</td>
</tr>
<tr>
<td>HEALTH</td>
<td>215</td>
<td>15%</td>
</tr>
<tr>
<td>LAW</td>
<td>297</td>
<td>20%</td>
</tr>
<tr>
<td>MISCELLANEOUS</td>
<td>65</td>
<td>4%</td>
</tr>
<tr>
<td>PUBLIC SAFETY</td>
<td>244</td>
<td>17%</td>
</tr>
<tr>
<td>ROAD COMMISSION</td>
<td>29</td>
<td>2%</td>
</tr>
<tr>
<td>SCHOOL</td>
<td>35</td>
<td>2%</td>
</tr>
<tr>
<td>STATE</td>
<td>26</td>
<td>2%</td>
</tr>
<tr>
<td>TRANSPORTATION</td>
<td>13</td>
<td>1%</td>
</tr>
<tr>
<td>TRIBAL</td>
<td>22</td>
<td>2%</td>
</tr>
</tbody>
</table>

Grand Total: 1468
Michigan’s forward-thinking strategy
Shared System = Increased Interoperability

Numbers Through the Years
Michigan’s forward-thinking strategy

Voice + Data = Interoperability

Dispatch Connected Consoles
Michigan’s forward-thinking strategy

Voice + Data = Interoperability

Multi-Jurisdictional Events

193 Car Pile Up on Michigan Highway I-94
Michigan’s forward-thinking strategy

Voice + Data = Interoperability

- Currently MPSCS is using an automatic vehicle location and automatic resource location system for state of Michigan agencies. The system will allow dispatch and command users to track both mobile and portable units.

- Computer-Aided Dispatch ensures officer safety by keeping them constantly tracked. This allows dispatch to know where an officer is at all times.
State of Michigan
System Profile
State of Michigan – A Leader

Interoperability Continuum

- **Governance**: Individual Agencies Working Independently
  - Informal Coordination Between Agencies
  - Key Multidiscipline Staff Collaboration on a Regular Basis
  - Regional Committee Working with a Statewide Interoperability Committee

- **Standard Operating Procedures**: Individual Agency SOPs
  - Joint SOPs for Planned Events
  - Joint SOPs for Emergencies
  - Regional Set of Communications SOPs
  - National Incident Management System

- **Technology**: Swap Radios
  - Gateway
  - Shared Channels
  - Proprietary Shared Systems
  - Standards-based Shared Systems
  - "MICHIGAN A LEADER"

- **Training & Exercises**: General Orientation on Equipment
  - Single Agency Tabletop Exercises for Key Field and Support Staff
  - Multiagency Tabletop Exercises for Key Field and Support Staff
  - Multiagency Full Functional Exercise Involving All Staff
  - Regular Comprehensive Regional Training and Exercises

- **Usage**: Planned Events
  - Localized Emergency Incidents
  - Regional Incident Management
  - Daily Use Throughout Region

Minimal Level → Interoperability Continuum → Optimal Level
Questions

Brad Stoddard, Director
Michigan’s Public Safety Communications System
Department of Technology, Management & Budget
Statewide Interoperability Coordinator (SWIC)
StoddardB@michigan.gov (517) 336.6262
MIGRATING TO A P25 TRUNKED NETWORK LESSONS LEARNED

Dean Hane
Technical Systems Manager, MACC 9-1-1
Moses Lake, WA
Background

- Rural eastern WA, 3000+ sq. miles of coverage required
- Population: 90,000+
- 30+ user agencies, 1,300 subscribers
- Tait RF system, LSM technology
  - 11 site simulcast
  - 800MHz P25 Trunking
- Cassidian Controllers
- Avtecc console system
Design Problems to Solve Up Front

Issue 1: Narrowband compliance.
• Meeting the 1/1/13 deadline while 800MHz P25 installation continued.
• Slower P25 implementation – new channels, licensing, more design and redundancy considerations.

Issue 2: Two mobile radios in vehicles. Sour pill.
• Space issues, too many mics, extra maintenance, more cost.

Issue 3: Interoperability.
• All neighboring counties are VHF narrowband analog.
• Created “continuous” console patches to VHF dispatching channels. Fire users needed to keep analog two-tone pagers and Knox Box alerting devices.

Issue 4: What about state mobilizations for fire users?
• Implemented ICRI devices for Fire users in the field.
• Keep VHF mobiles in all vehicles and VHF portables as cache.

Issue 5: Law concerned about multi-jurisdictional pursuits.
• Another need for the VHF radio.
• Law is using *some* encryption. Still tethered to the VHF patch for a while. No encryption on VHF patched channels.
Implementation Issues

2. Timeline and schedule delays.
3. Delays between training & use of system.
5. Coverage issues between VHF & 800MHz. “The old system worked here.”
7. P25 doesn’t mean “interoperability”.
8. 3rd party interface equipment – headsets, SCBAs, etc.
Migration Issues

1. Testing and Deployment Issues
   • A couple rounds of “two steps forward, one step back”.
   • Radio firmware issues and enhancements.
   • In the beginning it was very good – mostly because of small sample sizes and controlled testing. Real deployment showed issues with radio “behavior”.
   • Vendor did an excellent job of solving issues in the field.
   • Infrastructure has been very consistent & reliable.

2. Console related issues
   • Patching, configuration, trunking gateways, simplex vs. duplex operations. Dispatcher culture.
   • We spent time sorting out functional modes, options & indications.
Culture Changes

1. Users felt they lost control of their radios.
   - Users no longer programming their own radios.
   - System key access is restricted.
   - Standardized programming files & templates.
   - Users must coordinate radio purchases – P25 licenses for trunking.

2. Analog vs. Digital audio characteristics.
   - People used to digging out voice in the analog noise. Digital is much different in low signal or high BER coverage areas. “Digitized, garbled, Charlie Brown’s teacher”.
   - Audio quality drop is fast compared to analog.
Culture Changes


4. **Call setup delays – even at consoles.**
   - Problematic during crisis situations. Everybody wants their call NOW.
   - Migrated consoles from half duplex to full duplex. Dispatchers confused when someone is talking to them when they speak.

5. **Only one user at a time on a TG. “Why is my call getting denied?”**

6. **Feedback issues when both mobiles on the same channel while patched.**

7. **Echo/feedback issues in vehicles when portable & mobile used - audio delays. Users “double-clutch” microphones.**

8. **Law Enforcement users somewhat wary about encryption control. Now we have to control the radio asset.**
Things We Did Right

1. Implemented excellent processes and communications. We were “fair, but firm”.
2. Fleetmap design supported operations and expansion.
4. Digital audio quality is very good. Virtually no background noise.
5. Use the power of network management. Great visibility to the system health & welfare.
6. We were an experienced customer and knew where responsibilities started & stopped.
   • We built all of the sites first with construction contractors.
   • We implemented microwave connectivity as a standalone project after site construction.
   • We implemented the “radio” system separately after microwave & construction.
7. Implemented good user training.
What We Could Have Done Better

1. Put P25 traffic on Ethernet side of microwave.
   a) Implemented P25 traffic on TDM side for consistency with troubleshooting of analog voice. Each T1 protected.
   b) Problem is bandwidth limitation. P25 uses web pages and other overhead we didn’t fully understand. Vendor explained up front advantages of Ethernet transport.
   c) We grew much faster than we thought. Adding channels & sites already. Migrating traffic over to Ethernet now.
2. We made leaps between analog and P25 and probably underestimated the magnitude of change for our users.
3. Managed the transition of coverage between VHF & 800MHz.
Q & A
P25 Implementation in the U.S. Coast Guard

Keith LaPlant
Telecommunications & Interoperability Prgm Mgr
U.S. Coast Guard
Miami, FL
(305) 415-7007
Keith.H.LaPlant@uscg.mil
Legacy Capability

- Analog wideband coverage of marine band channels deployed nationwide in early 1970s
- Motorola 6 channel consoles
- Mixed deployment of non-standard VHF transceivers at 300 radio sites
- Spectra mobile and Sabre or MX-300R handheld radios
RESCUE 21

• 1994 Requirements documenting need for increased capacity and better coverage
• 1995 Acquisition project chartered to modernize the National Distress and Response System
• 2000 Phase I contract awarded
• 2001 Contractors demonstrate ability to meet critical design criteria
RESCUE 21

• 2002 Phase II awarded to General Dynamics
• 2005 Rescue 21 IOC in Atlantic City NJ and the Eastern Shores VA
• 2012 32 of 37 Sectors are operational, 253 Remote Fixed Facilities on air
• 2017 Estimated completion for Alaska and Inland Rivers Sectors
RESCUED 21

• P25 chosen as core of new radio system
  – Established standard
  – Vendor agnostic
    • Subscriber base is mix of Motorola, EF Johnson, Harris and Relm radios
  – Easier to draft specifications when standards are already defined
  – P25 standards support some core R21 requirements such as OTAR and AES encryption
    • VHF and UHF channels are OTAR capable nationwide
    • Single KMF supports OTAR for 8000 plus subscribers
• P25 facilitates increased interoperability
  – P25 conventional channels (correctly programmed) work across any network regardless of vendor
  – Use of a NAC eliminates confusion about CTCSS v CDCSS
  – CG is expanding the purchase and use of dual or multi-band radios many of which include P25 trunked capability
What is RESCUE 21

- Rescue 21 is a command, control, and communication system that supports all US Coast Guard coastal missions, with emphasis on Search and Rescue (SAR) and Homeland Security
  - Maintains compatibility with legacy maritime customers (analog wideband)
  - Implements digital, encrypted tactical channels
  - Fully IP based with VoIP from remote sites
What is RESCUE 21

• **Key Features**
  – Improved Voice and Direction Finding Coverage out to 20 NM offshore
    • U.S. Coast Guard operational frequencies
    • Working frequencies in the marine band
    • Monitoring of VHF-FM distress channels 16 and 70 in the coastal zone
  – Improved System Availability – 99.5%
  – Enhanced Situational Awareness
    • Geo Display
    • Direction Finding
  – Digital Recording
    • Instant Playback
    • Archiving

• **Key Features**
  – Interoperability
    • Federal
    • State
    • Local
    • National Law Enforcement and Incident Response interoperability frequencies
    • Region-specific mutual aid frequencies
    • DHS first responder frequencies
  – APCO Project 25 (P25) compliant
    • P25 otar capable
    • Clear or encrypted
  – Phone patch capability
  – 24 x 7 network and system monitoring and fault detection
RFF Configuration

- **VHF-FM CH16 GUARD**
- **VHF-1**
  - VHF-FM MARINE BAND
  - CG VHF-FM P25 CHANNELS
  - VHF-FM INTEROP CHANNELS
  - ENCRYPTED OR CLEAR
- **VHF-2**
  - VHF-FM MARINE BAND
  - CG VHF-FM P25 CHANNELS
  - VHF-FM INTEROP CHANNELS
  - ENCRYPTED OR CLEAR
- **UHF-1**
  - CG P25 CHANNELS
  - UHF-FM INTEROP CHANNELS
  - ENCRYPTED OR CLEAR
- **DIGITAL SELECTIVE CALLING (DSC)**
  - CHANNEL 70
  - DIGITAL DISTRESS TRANSCEIVER
- **VHF-3**
  - UNUSED
Typical RFF

- VHF Rx
- VHF Tx
- UHF Tx/Rx
- DF Array (9 element)
R21 Coverage
Thank You

Keith LaPlant
Telecommunications & Interoperability Prgm Mgr
U.S. Coast Guard
(305) 415-7007
Keith.H.LaPlant@uscg.mil
Questions and Answers
OUR MEMBER ORGANIZATIONS AS IWCE EXHIBITORS

THANK YOU

<table>
<thead>
<tr>
<th>Member Organization</th>
<th>Booth Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aeroflex *</td>
<td>1053</td>
</tr>
<tr>
<td>Airbus DS *</td>
<td>1521</td>
</tr>
<tr>
<td>Anritsu</td>
<td>1034</td>
</tr>
<tr>
<td>Avtec</td>
<td>1443</td>
</tr>
<tr>
<td>Catalyst</td>
<td>1567</td>
</tr>
<tr>
<td>Cobham *</td>
<td>1846</td>
</tr>
<tr>
<td>Codan *</td>
<td>8027</td>
</tr>
<tr>
<td>EFJohnson *</td>
<td>1031</td>
</tr>
<tr>
<td>Etherstack</td>
<td>1721</td>
</tr>
<tr>
<td>Genesis Group, The</td>
<td>521</td>
</tr>
<tr>
<td>Harris *</td>
<td>1361</td>
</tr>
<tr>
<td>Icom *</td>
<td>621</td>
</tr>
<tr>
<td>IDA Corporation</td>
<td>1371</td>
</tr>
<tr>
<td>JVCKenwood *</td>
<td>1221</td>
</tr>
<tr>
<td>Midland Radio</td>
<td>1153</td>
</tr>
<tr>
<td>ModUcom</td>
<td>1821</td>
</tr>
<tr>
<td>Motorola Solutions *</td>
<td>921</td>
</tr>
<tr>
<td>Powertrunk</td>
<td>1161</td>
</tr>
<tr>
<td>RELM *</td>
<td>1451</td>
</tr>
<tr>
<td>Simoco</td>
<td>441</td>
</tr>
<tr>
<td>Tait *</td>
<td>823</td>
</tr>
<tr>
<td>Telex Bosch</td>
<td>1261</td>
</tr>
<tr>
<td>Vertex Standard *</td>
<td>1041</td>
</tr>
<tr>
<td>Zetron</td>
<td>1121</td>
</tr>
</tbody>
</table>

* Sustaining Member of PTIG

Visit Project 25 Technology Interest Group
Booth # 1853