



**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](http://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

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

# 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 on-going development of the Project 25 Standards

Set your browser to **[www.project25.org](http://www.project25.org)**



# Project 25 Technology Interest Group: Sustaining Members



**MOTOROLA**  
SOLUTIONS



# Project 25 Technology Interest Group: Commercial Members



# 34 Vendors for Project 25 Equipment and Services



15 fixed station/repeater suppliers

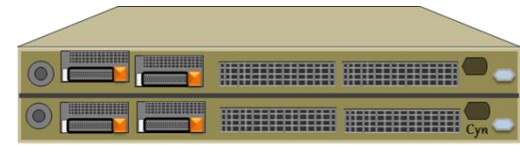
14 Subscriber suppliers

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



PTIG Member Organizations www.Project25.org	Fixed Stations & Repeaters	Mobile & Portable Radios	Consoles	Networks	Software	Test Equipment	Systems Integration	Consultant Services
AECOM								
AEROFLEX								
AIRWAVE SOLUTIONS								
AIRBUS DS COMMS (FORMERLY CASSIDIAN)								
ANRITSU								
AVTEC								
CATALYST COMMUNICATIONS								
COBHAM AVIONICS								
CODAN RADIO (FORMERLY DANIELS)								
CYNERGYZE								
DVSI								
EF JOHNSON								
ETHERSTACK								
FEDERAL ENGINEERING, INC								
GENESIS GROUP								
HARRIS CORPORATION								
ICOM AMERICA								
IDA CORPORATION								
JVC KENWOOD								
MIDLAND RADIO								
MOD-U-COM								
MOTOROLA SOLUTIONS								
PANTEL INTERNATIONAL								
POWERTRUNK								
RELM WIRELESS								
SIMOCO								
SPECTRA ENGINEERING								
STANDARD COMM PTY LTD - GME								
TAIT COMMUNICATIONS								
TECHNISONICS								
TELEX RADIO DISPATCH								
VERTEX STANDARD								
WIRELESS PACIFIC								
ZETRON								
<b>34</b>	<b>15</b>	<b>14</b>	<b>13</b>	<b>15</b>	<b>5</b>	<b>4</b>	<b>15</b>	<b>5</b>

# P25 Scalable Solutions

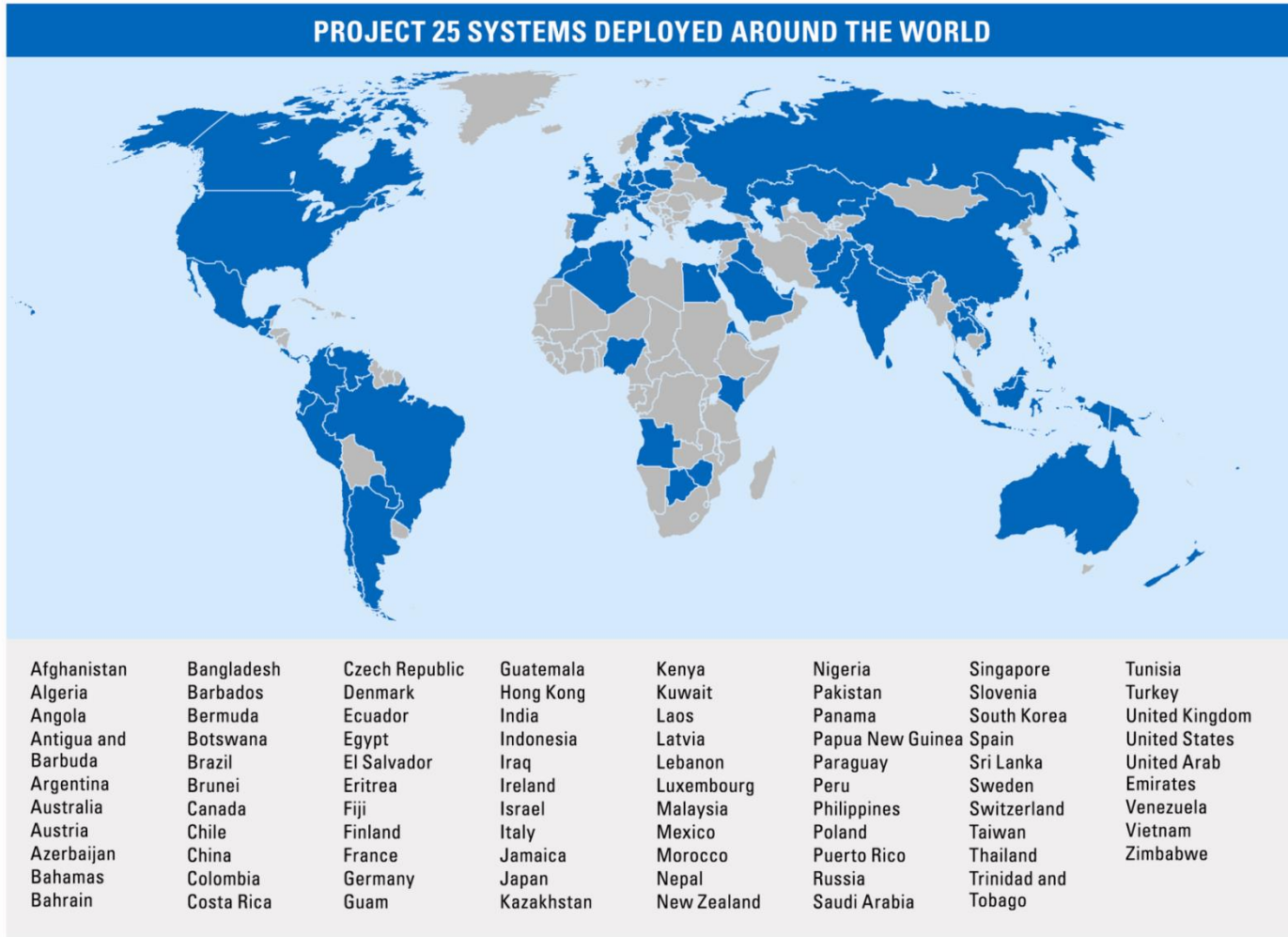


Mix-match between Trunked, Conventional, Site Linking, Wide Area, or Stand Alone

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

# Worldwide Adoption

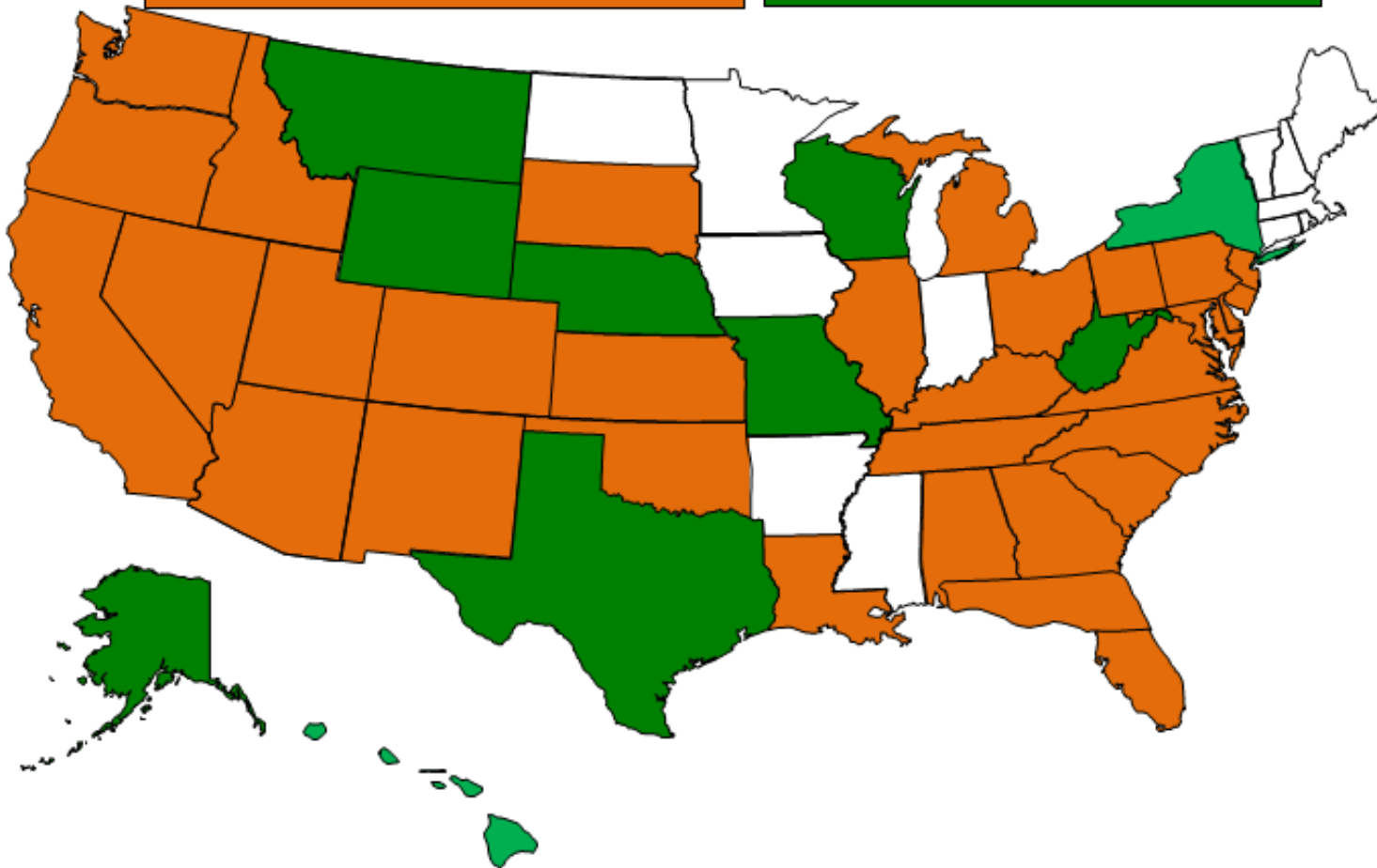
Project 25 systems are deployed in 83 countries



Source: Project 25 Technology Interest Group (PTIG), July 2011

City, County, or Multiple County  
V/U P25 Trunked Systems

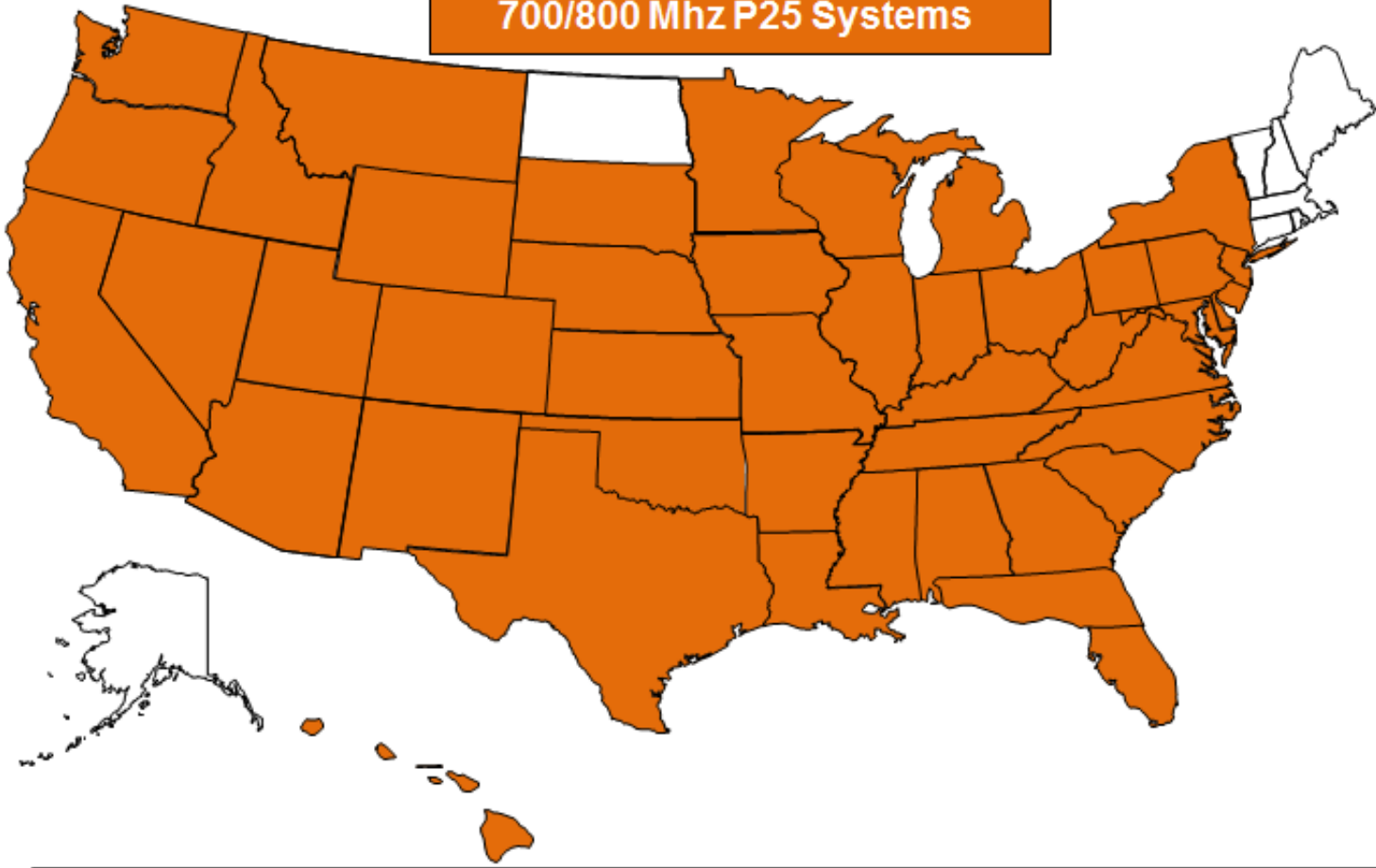
Wide Area or statewide  
V/U P25 Trunked Systems



All states have multiple P25 V/U conventional systems

VHF/UHF P25 interoperability possible in every state

**700/800 Mhz P25 Systems**



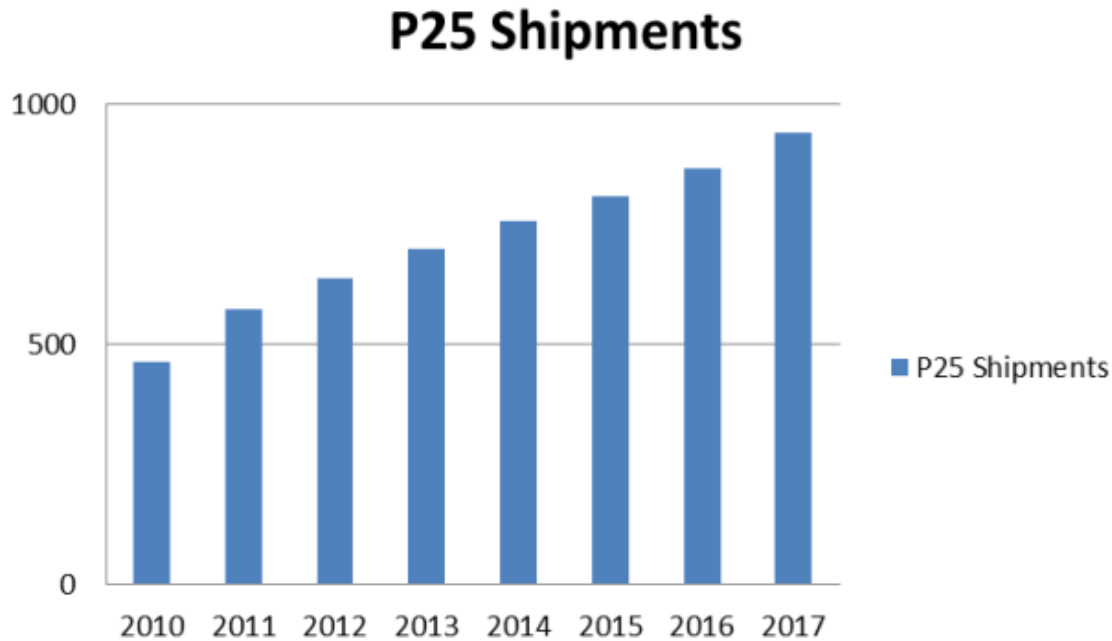
**Every state except North Dakota, Maine, Vermont, New Hampshire and Alaska**

700/800 MHz P25 interoperability possible in 45 states



# 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”



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 Latest News

- **P25 Standards Meeting Notes now available from the TIA TR-8 Denver Meetings**  
Friday, January 30, 2015
- **NPSTC Recommends P25 for Communications Interoperability**  
Friday, January 30, 2015
- **The Project 25 Technology Interest Group Releases a New List of P25 CAP Tested Radios**  
Friday, January 30, 2015

### Upcoming Events

**TIA TR-8 Project 25 Standards Meetings February 2015, Phoenix AZ**

## 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 4<sup>th</sup> column.

The Table can be reviewed or downloaded using the link below.

[P25\\_Cap\\_tested\\_radios\\_REV\\_8\\_\\_150129.pdf](#)

# Project 25 Technology Interest Group PTIG



**New Documents available at [www.Project25.org](http://www.Project25.org)**

- **P25 Frequently 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*

# Project 25 Technology Interest Group PTIG



**New Documents available at [www.Project25.org](http://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.*

# Project 25 Technology Interest Group PTIG



## 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 Australasia*

- 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

<u><b>Aeroflex *</b></u>	<u><b>1053</b></u>
<u><b>Airbus DS *</b></u>	<u><b>1521</b></u>
<u><b>Anritsu</b></u>	<u><b>1034</b></u>
<u><b>Avtec</b></u>	<u><b>1443</b></u>
<u><b>Catalyst</b></u>	<u><b>1567</b></u>
<u><b>Cobham *</b></u>	<u><b>1846</b></u>
<u><b>Codan *</b></u>	<u><b>8027</b></u>
<u><b>EFJohnson *</b></u>	<u><b>1031</b></u>
<u><b>Etherstack</b></u>	<u><b>1721</b></u>
<u><b>Genesis Group, The</b></u>	<u><b>521</b></u>
<u><b>Harris *</b></u>	<u><b>1361</b></u>
<u><b>Icom *</b></u>	<u><b>621</b></u>

<u><b>IDA Corporation</b></u>	<u><b>1371</b></u>
<u><b>JVCKenwood *</b></u>	<u><b>1221</b></u>
<u><b>Midland Radio</b></u>	<u><b>1153</b></u>
<u><b>ModUcom</b></u>	<u><b>1821</b></u>
<u><b>Motorola Solutions *</b></u>	<u><b>921</b></u>
<u><b>Powertrunk</b></u>	<u><b>1161</b></u>
<u><b>RELM *</b></u>	<u><b>1451</b></u>
<u><b>Simoco</b></u>	<u><b>441</b></u>
<u><b>Tait *</b></u>	<u><b>823</b></u>
<u><b>Telex Bosch</b></u>	<u><b>1261</b></u>
<u><b>Vertex Standard *</b></u>	<u><b>1041</b></u>
<u><b>Zetron</b></u>	<u><b>1121</b></u>

Visit  
Project 25  
Technology  
Interest  
Group

Booth #  
1853

\* Sustaining Member of  
PTIG





# Steve Nichols

Director, Project 25 Technology Interest Group

[Director@project25.org](mailto:Director@project25.org)

[www.project25.org](http://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

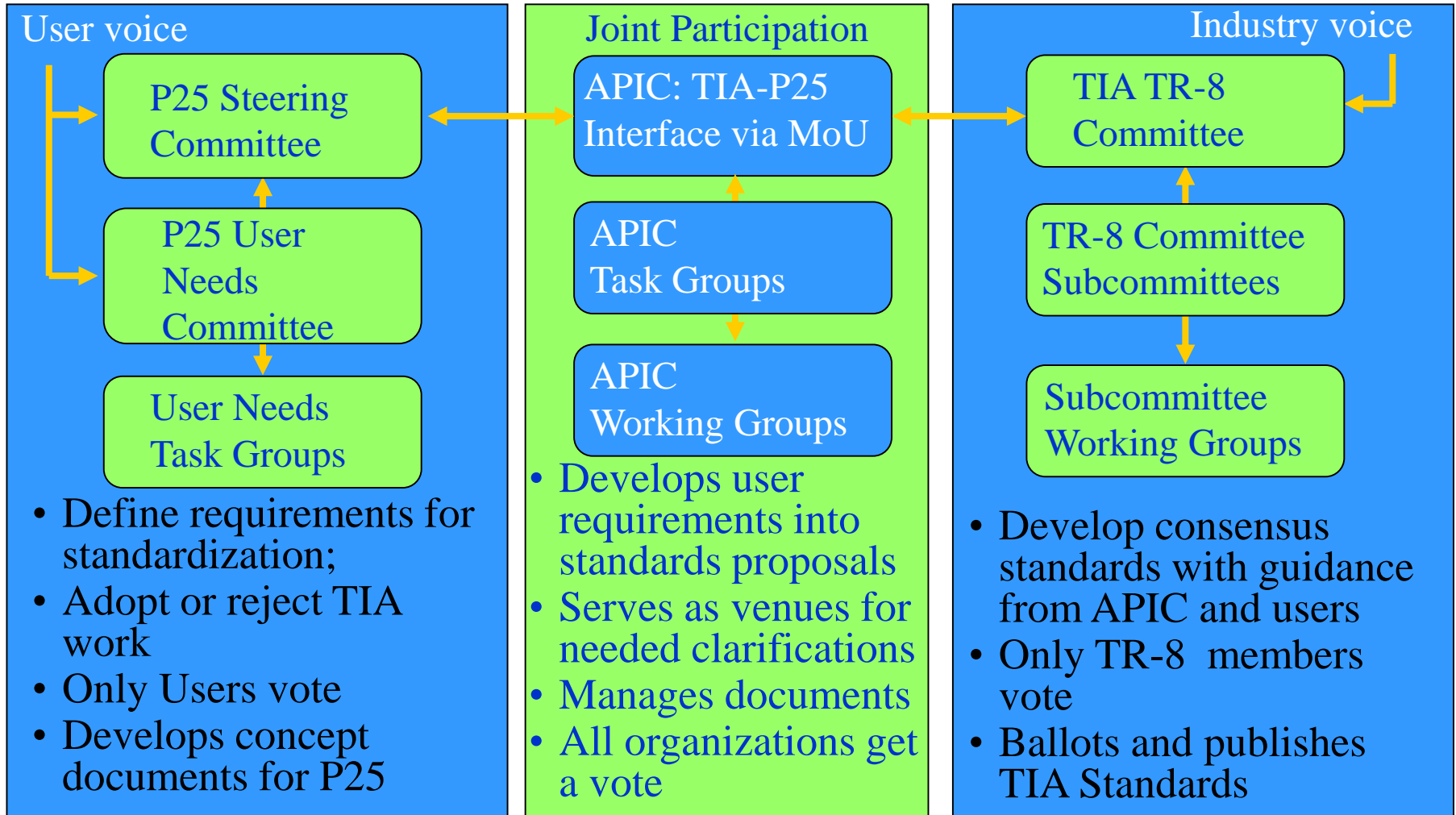
Deputy Director

US Department of Homeland Security  
Office of Emergency Communications

# Project 25 Background

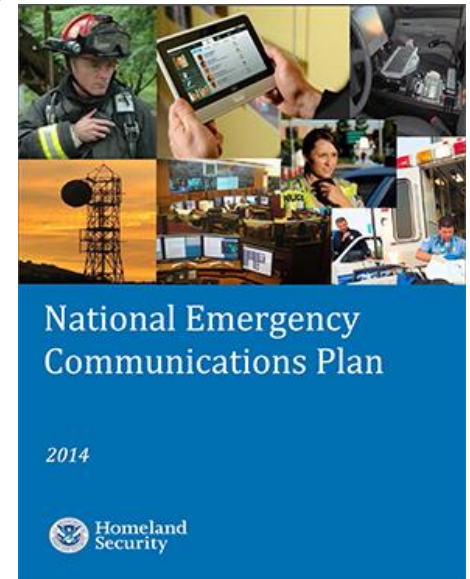
- Project 25 was created as a joint project between APCO, NASTD and the Federal Government in 1989
- Project 25 set out to address—
  - Spectral efficiency
  - Backwards compatibility
  - Enhanced interoperability
  - Ease of migration and scalability
  - Increase vendor competition
- Teamed with TIA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

# Project 25 Development Process



# 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



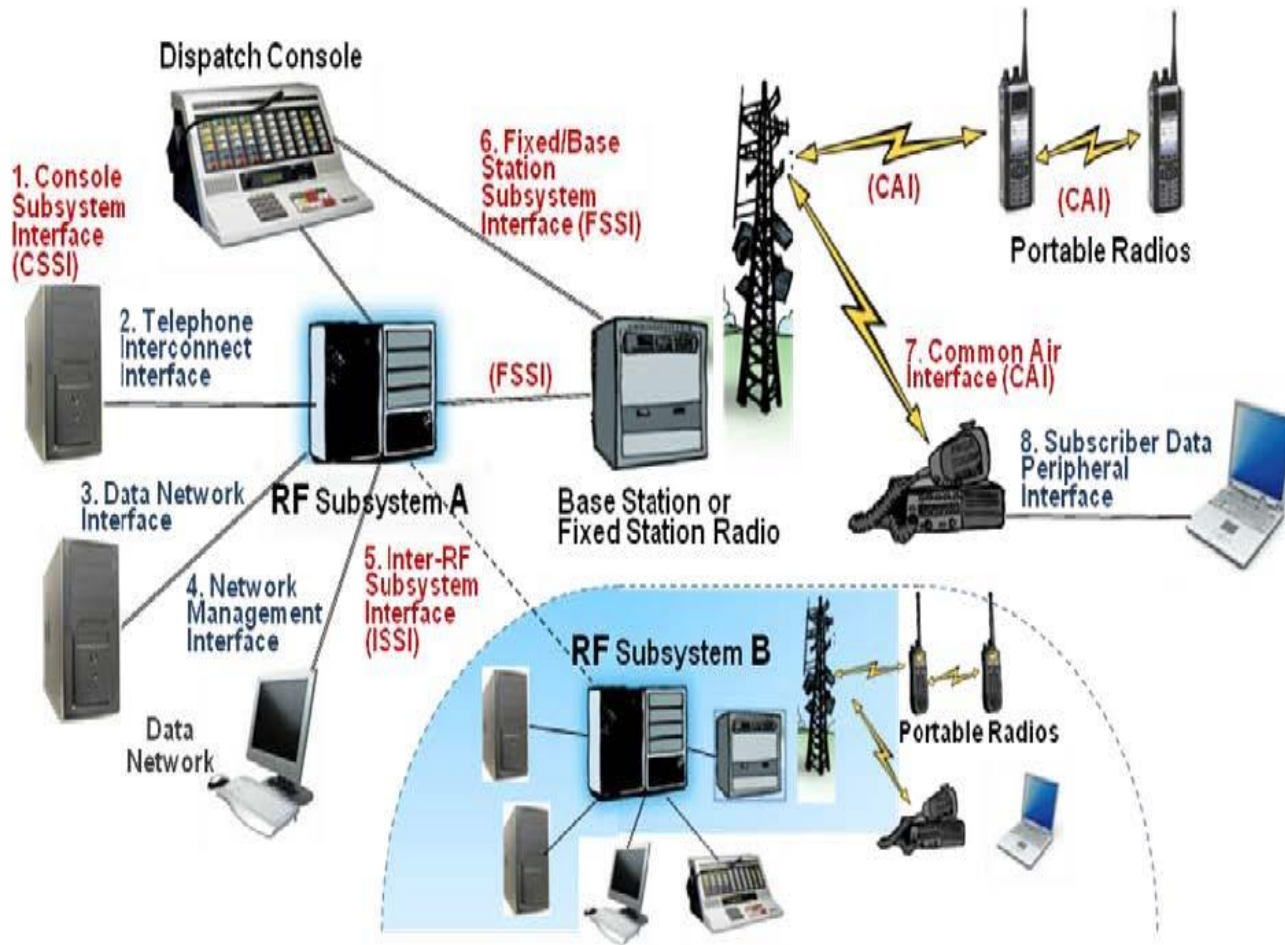
- Congress passed legislation creating the Project 25 Compliance Assessment Program (P25 CAP)
  - Senate Report 109-088 – Departments of Commerce and Justice, Science and Related Agencies Appropriations Bill, 2006
  - House Report 109-241 – Making Appropriations for the Department of Homeland Security for the Fiscal Year Ending September 30, 2006, and for Other Purposes
- The P25 CAP was implemented by DHS OIC in coordination with NIST

# Project 25 Compliance Assessment Overview (continued)



- 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](mailto: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

# Tough Terrain





# P25 Trunked Radio Systems

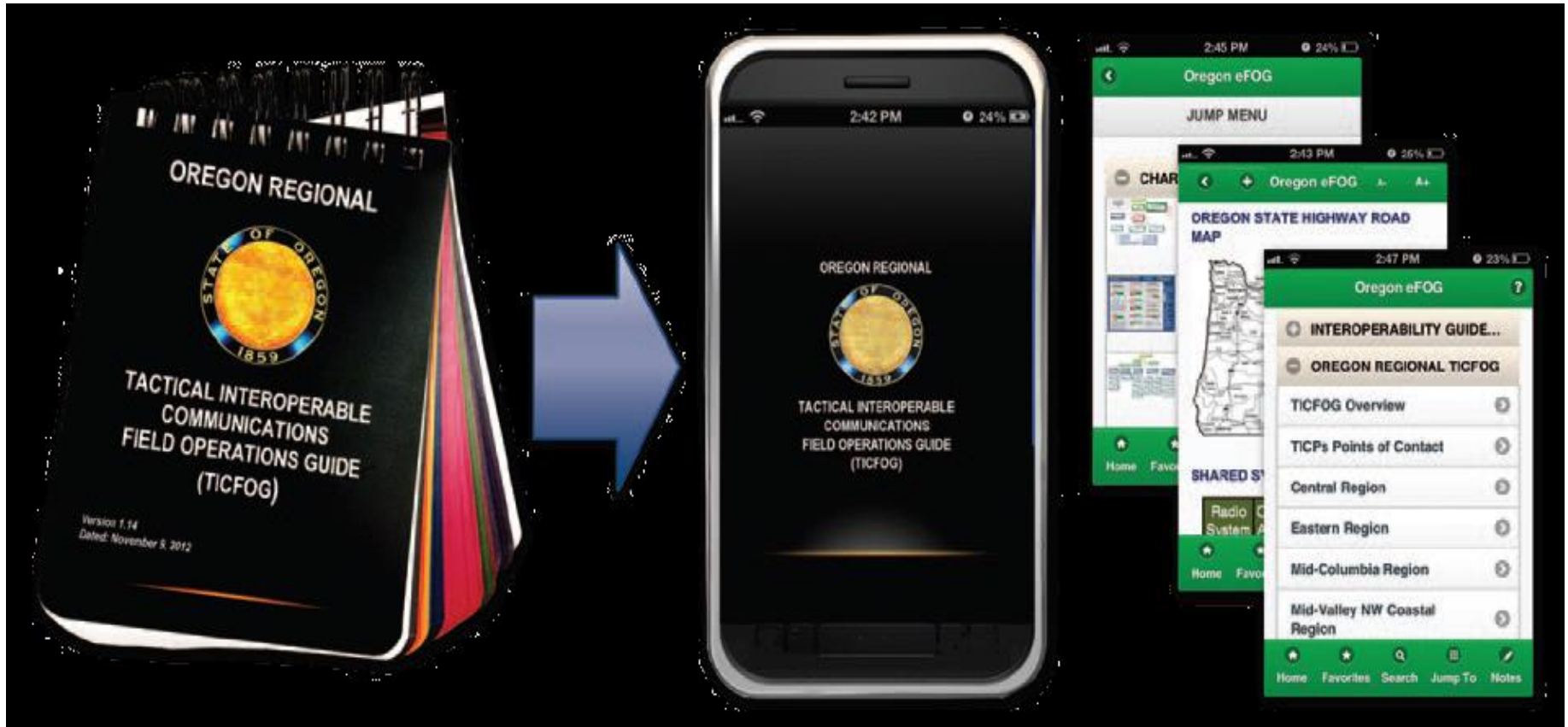
## Regional and City Systems

- 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

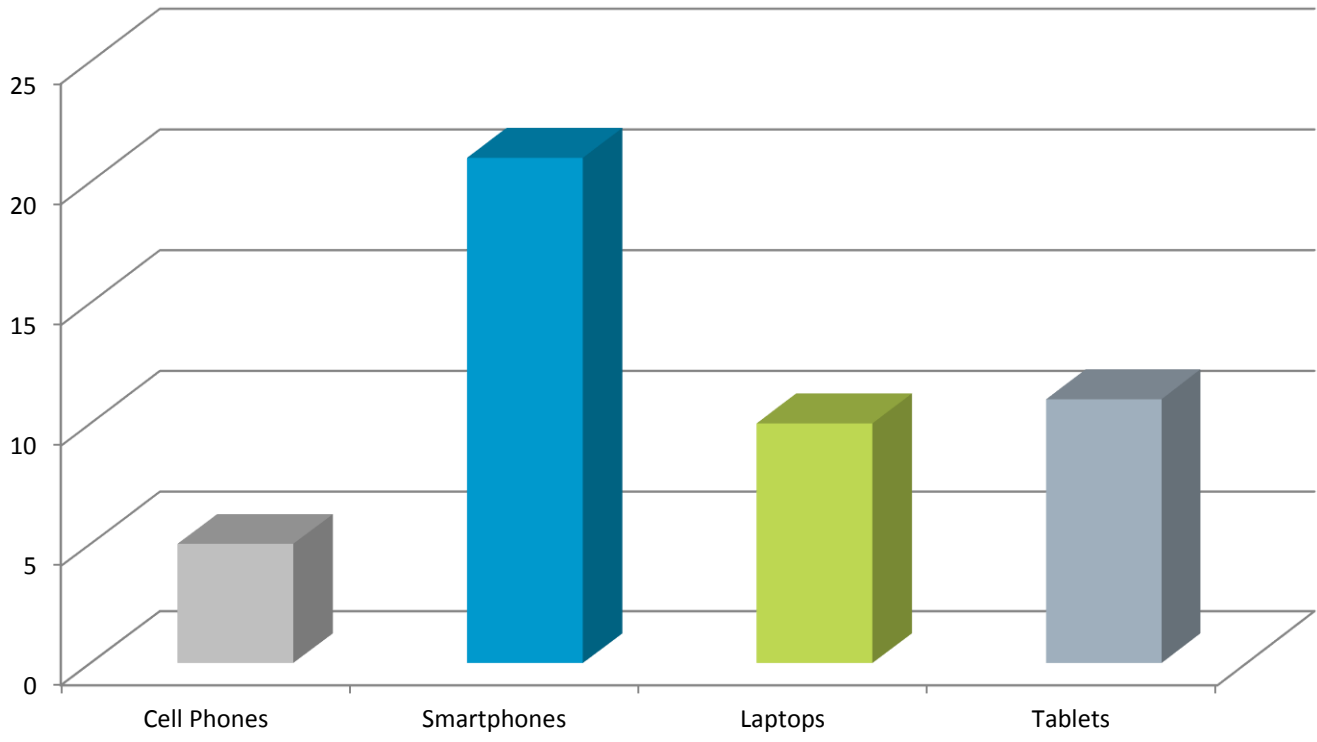
Current smart device uses by public safety officials

- 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





# Personal vs. Issued Devices

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



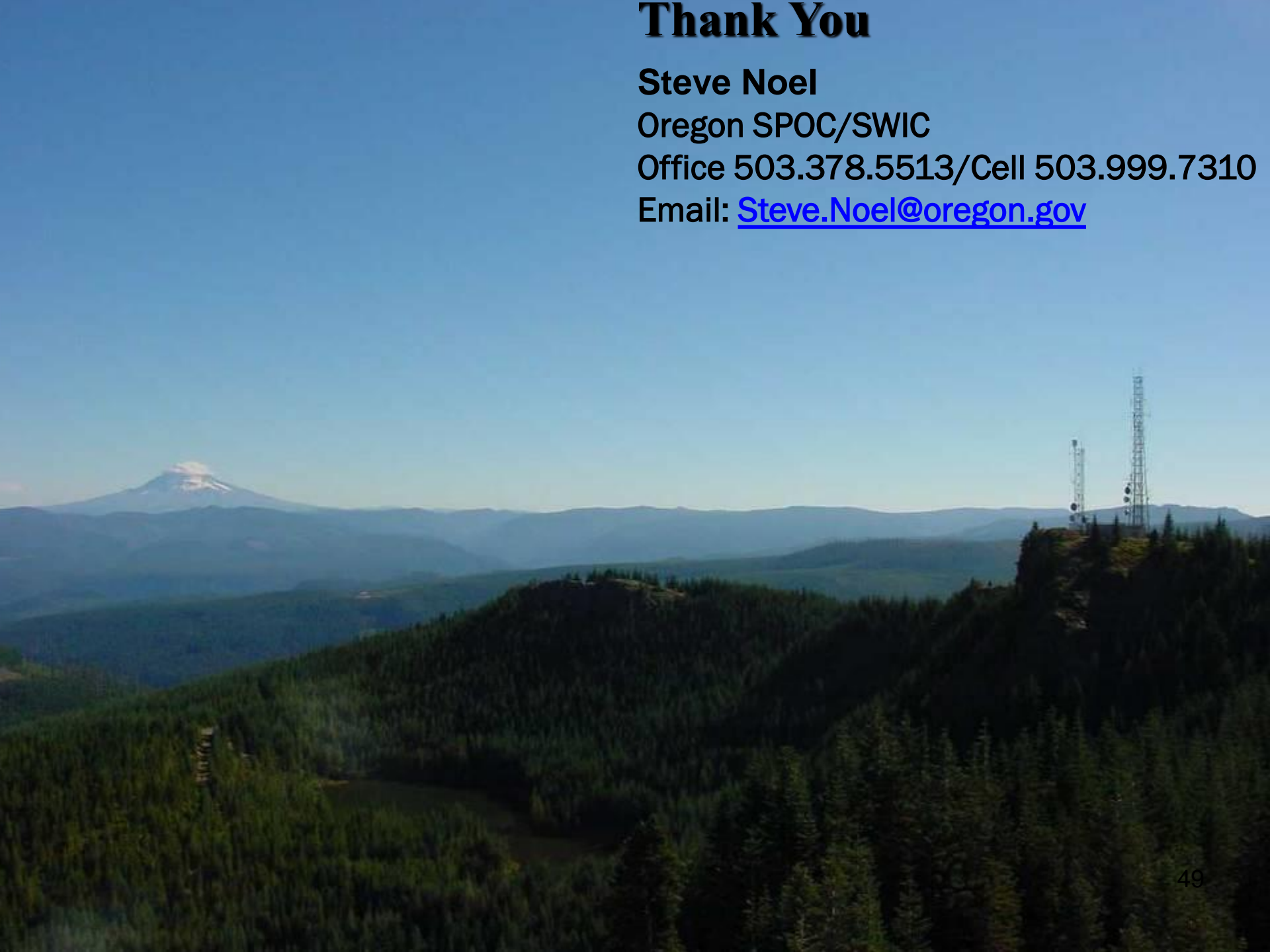
# Thank You

Steve Noel

Oregon SPOC/SWIC

Office 503.378.5513/Cell 503.999.7310

Email: [Steve.Noel@oregon.gov](mailto:Steve.Noel@oregon.gov)







# 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 Hi-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



Project 25 Technology Interest Group



## 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



- 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





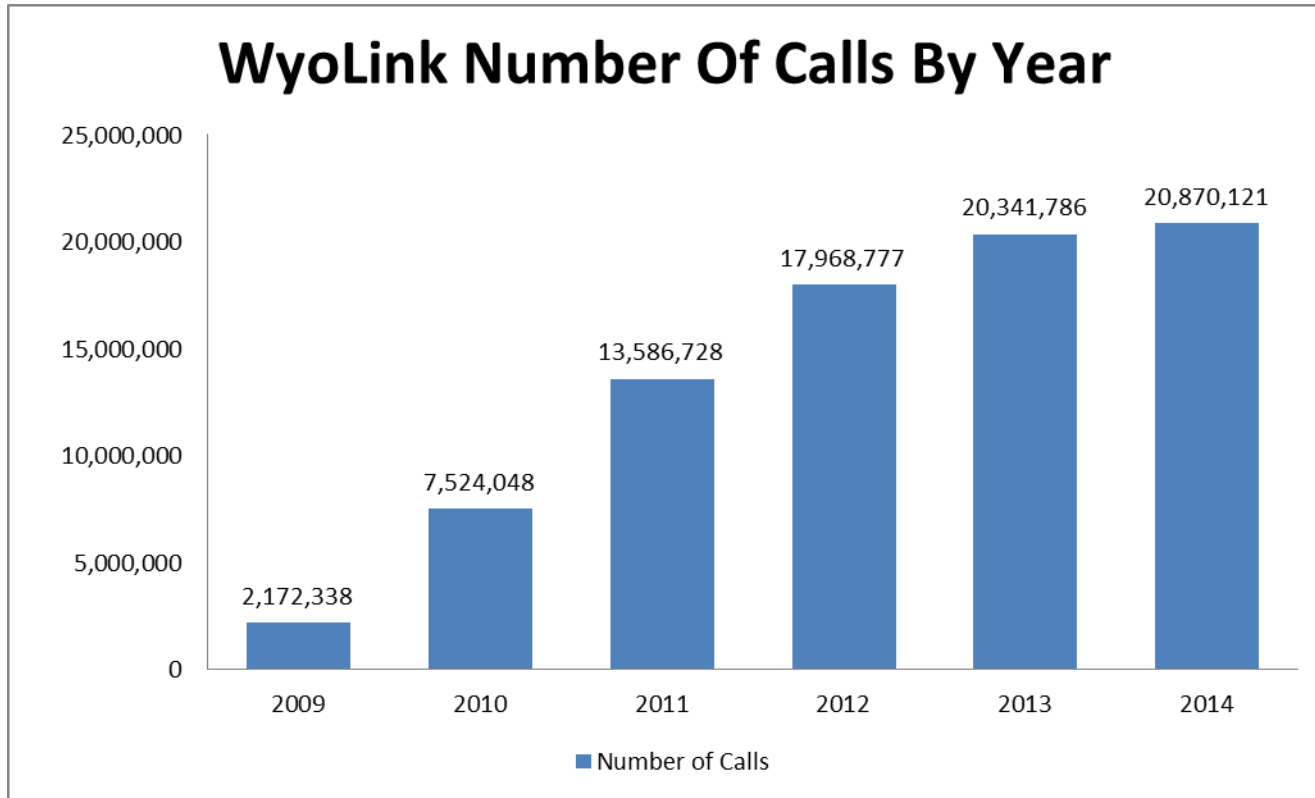
# Federal Agencies Using WyoLink



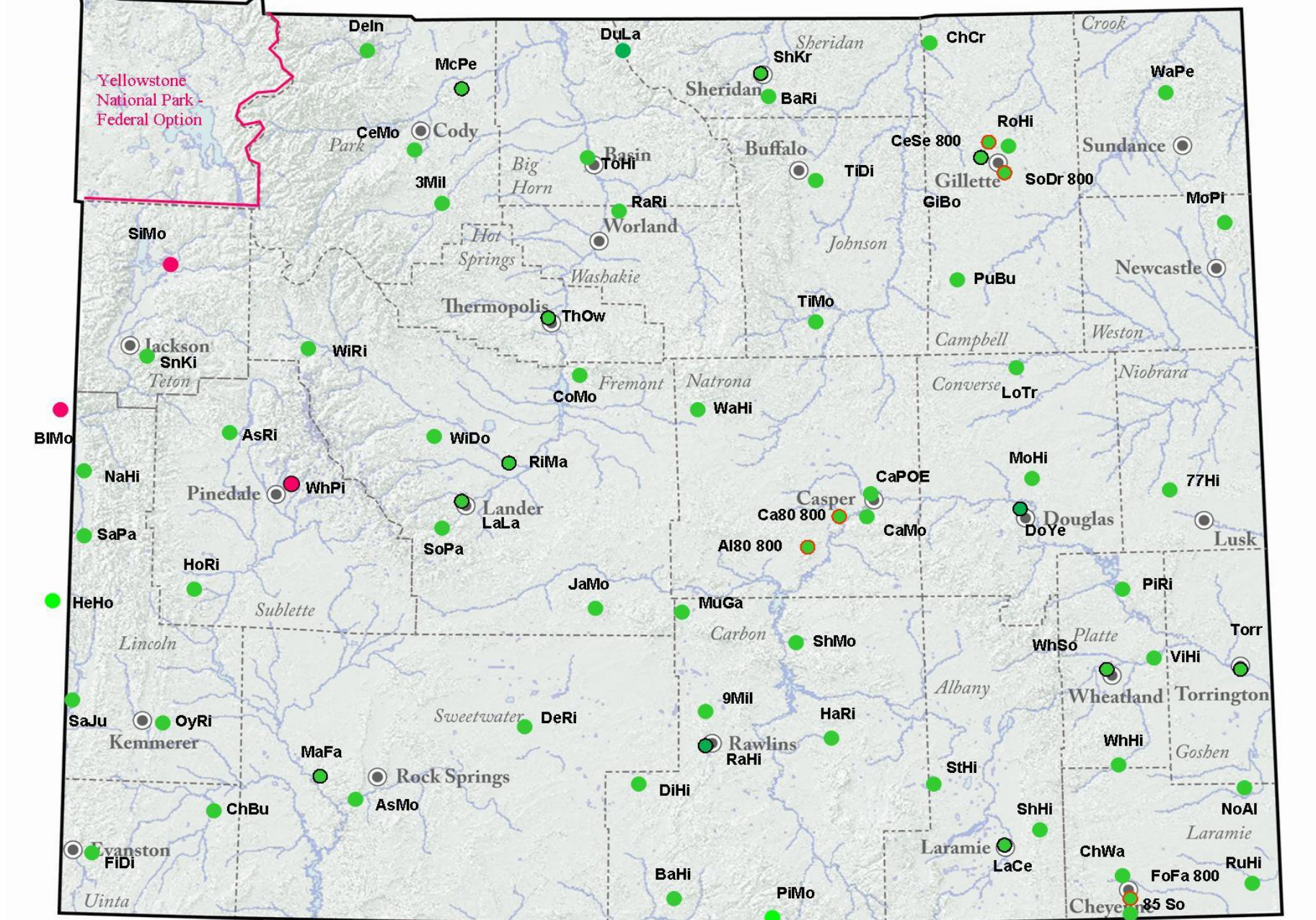
- Federal Bureau of Investigation
- Drug Enforcement Agency
- Alcohol Tobacco & Firearms
- IRS – Criminal Investigations
- Bureau of Land Management
- DOI -Fish and Wildlife
- U.S. Marshal's Office
- Bureau of Reclamation
- Forest Service – Law Enforcement
- National Park Service
- Transportation Security 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 Site Map December 8, 2014



- PCE Sites In Service
- Core Sites In Service
- 800 MHz Locally Owned Sites In Service
- 2015 Completion



- Robert (Bob) Symons
- Wyoming Public Safety Communications Commission
- Wyoming Statewide Interoperable Coordinator (SWIC)
- [bob.symons@wyo.gov](mailto:bob.symons@wyo.gov)
- 307-777-5065
- <http://pscc.wyoming.gov/>
- <http://wyolink.wyoming.gov/>

# Federal Partnership for Interoperable Communications



## Project 25 – The Federal User View

March 2015

# 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 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

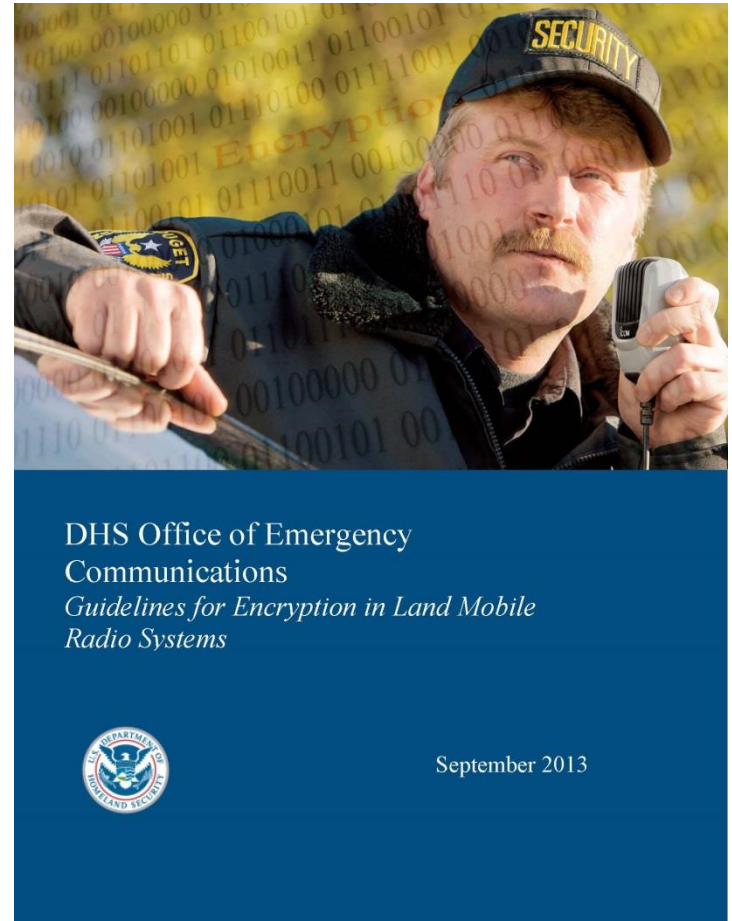
- Federal agencies have had long standing requirements to provide encrypted communications
  - Security Policies vary by department and component, but are often driven by National Institute of Standards and Technology (NIST) Federal Information Processing Standards (FIPS) requirements
  - FIPS requirements 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*
  - *Guidelines for Encryption in Land Mobile Radio Systems – Sept 2013*
  - *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](mailto: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

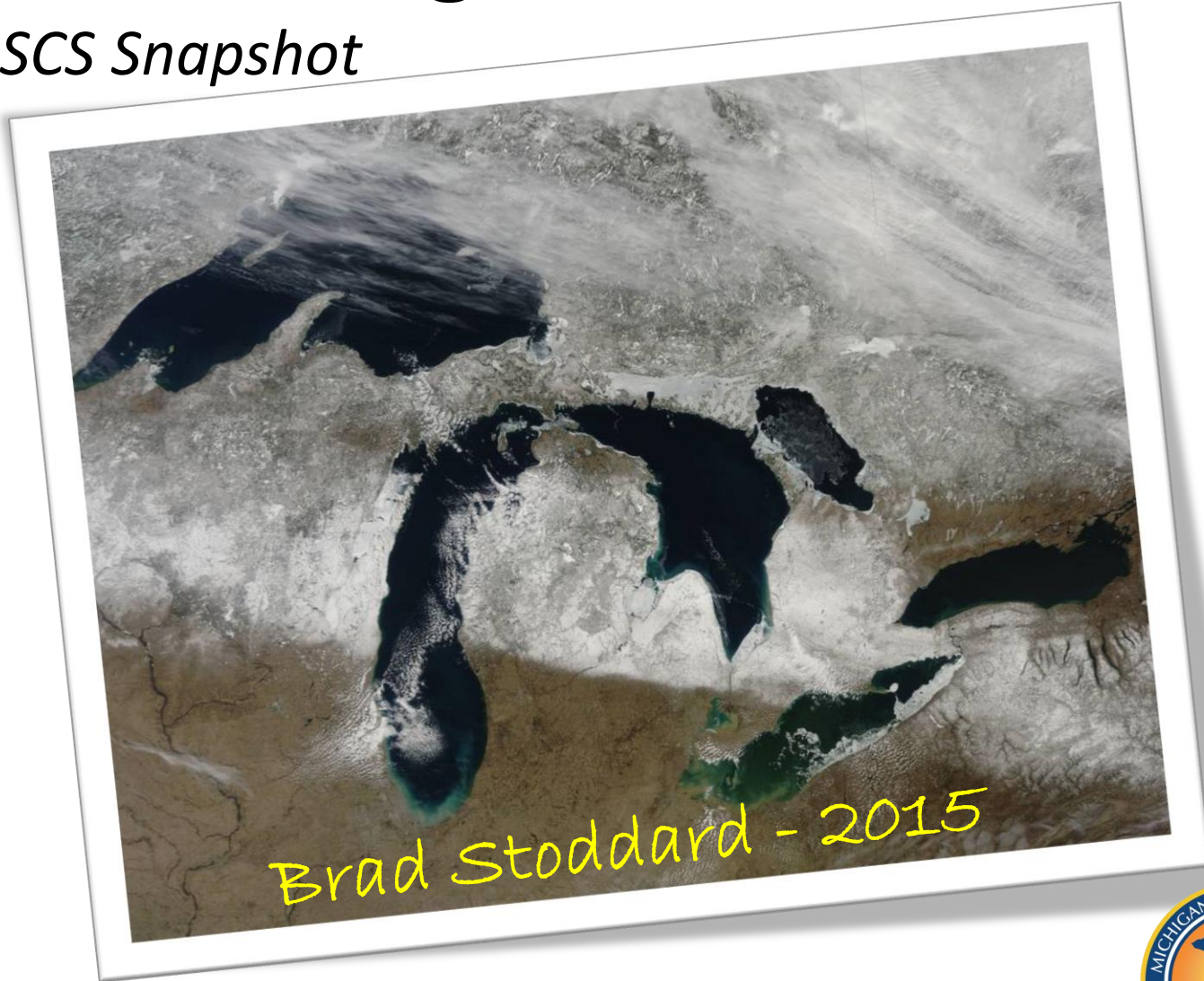
- In addition to the two documents previously developed, the FPIC Security Working Group is drafting additional document(s) detailing the process for implementing a key management system.
- The whitepapers focus on establishing key management in today's operational environment and key management capabilities 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

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

# State of Michigan

*An MPSCS Snapshot*



## Michigan's Public Safety Communications System





# State of Michigan

## 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.
- 1992 – System specifications finalized and published for response. Included system availability requirement for all State, Local, Tribal First Responders.
- 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

# MPSCS Timeline 1984-Present



2000 – Phase 3 (Northern Lower Peninsula) Complete

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

2001 – US FBI, US ATF, US Marshals become first Federal agencies to join

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.*

# MPSCS Timeline 1984-Present



- 2004 – Mason, Oceana, Monroe, US Forestry
- 2005 – Kalamazoo, City of Detroit, UP Consortium, US DHS, US DOJ, US Secret Service, US C&BP
- 2005 – MPSCS recognized with ACT/IAC Intergovernmental Solutions Award
- 2006 – Macomb, Genesee, Antrim, NMU, US ICE, US SSA
- 2007 – Calhoun, St. Clair, Monroe expands, US Fish & Wildlife
- 2007 – Michigan Receives \$25M PSIC Grant
- 2008 – UP Consortium expands , Wayne, WSU, U of D Mercy, US DVA
- 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 – Lapeer, Eastern Wayne, US DEA, US TSA
- 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...*



The Blackout



1-96 Pile Up



Floods



Wildfires



Riots



Enbridge Oil Spill

- 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

March 2015

Project

*... to planned events*



MIS - NASCAR



All Star Game



Super Bowl



NCAA Tournament

## *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 & defensible 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

2002	2014
8,000 mobile and portable radios	68,575 mobile and portable radios (757% increase)
180 tower sites	244 tower sites (64 sites are locally owned but integrated into the MPSCS)
6 Dispatch Centers 38 console positions	55 Dispatch Centers 248 console positions
2 million/month Push-To-Talks (PTT)	11 million/month Push-To-Talks (PTT) (450% increase)
152 agencies with interoperable voice and data communications	1,468 agencies with interoperable voice and data communications (866% increase)



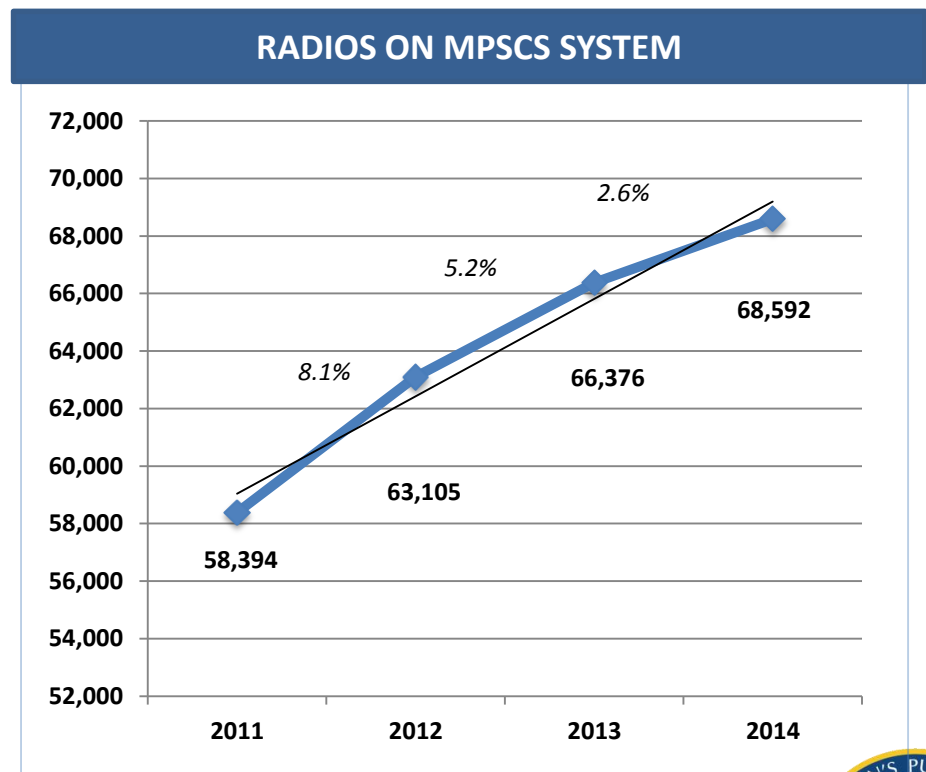
# Standards = Strategic Options

## So many vendors, so many choices

# Subscriber Radios



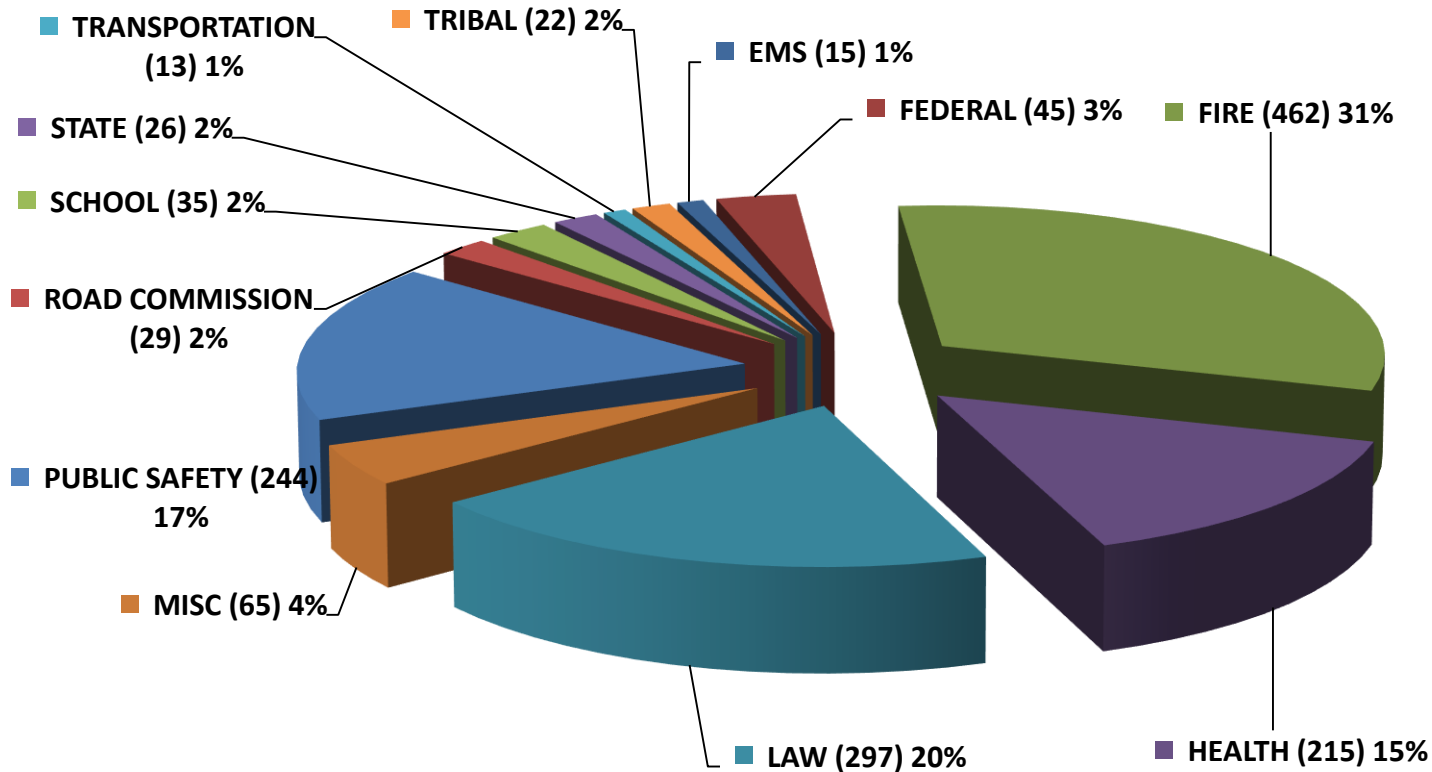
- 6 Mobile Manufacturers
  - 39 radio models
- 7 Portable Manufacturers
  - 37 radio models
- Motorola, Harris, Tait, Kenwood, EF Johnson, Bendix King (portable )



*It's not just a radio. It's a partnership.*



# Who has a radio?



EMS	15
FEDERAL	45
FIRE	462
HEALTH	215
LAW	297
MISCELLANEOUS	65
PUBLIC SAFETY	244
ROAD COMMISSION	29
SCHOOL	35
STATE	26
TRANSPORTATION	13
TRIBAL	22
Grand Total	1468



- Agency breakdowns by discipline : <http://www.mcgi.state.mi.us/mpscs/>

# Michigan's forward-thinking strategy

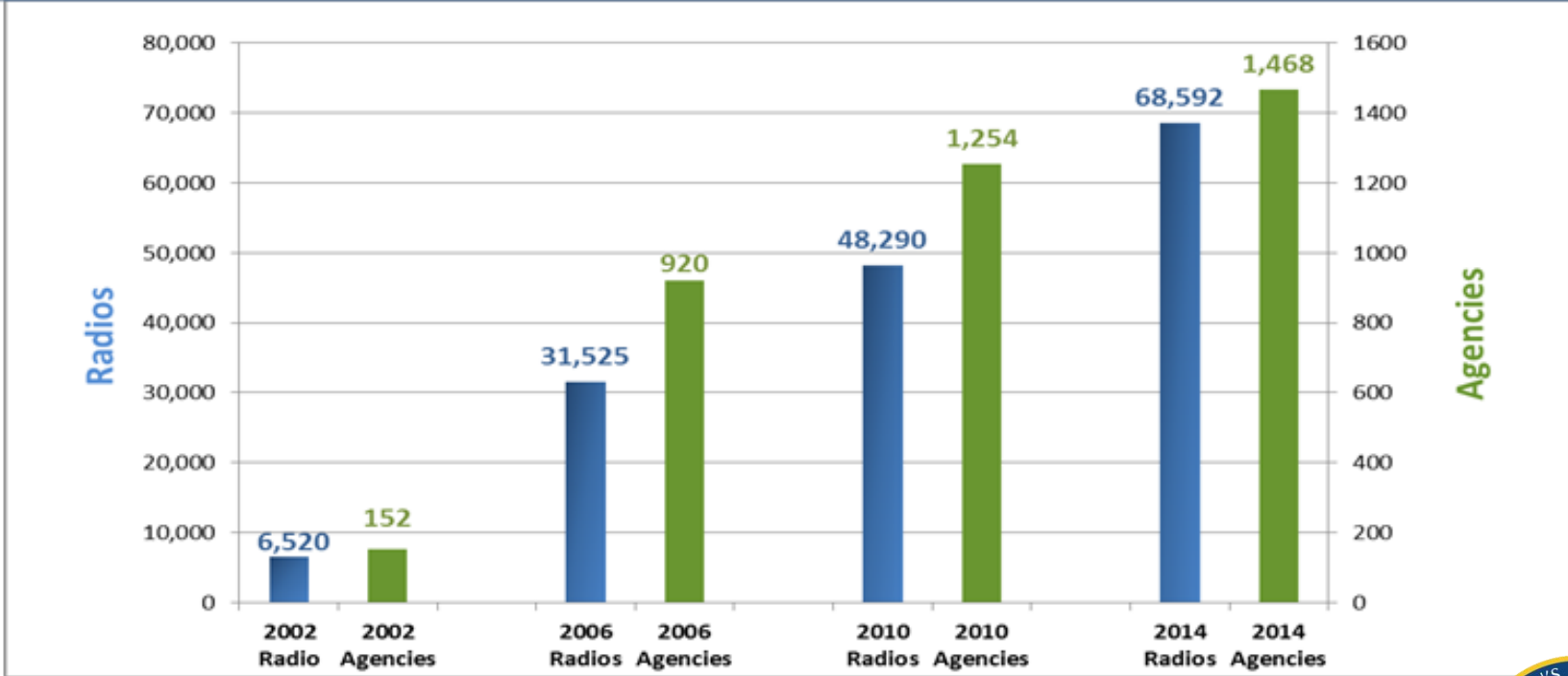
## Shared System = Increased Interoperability



### Numbers Through the Years



RADIOS AND AGENCIES ON SYSTEM 2002 - 2014

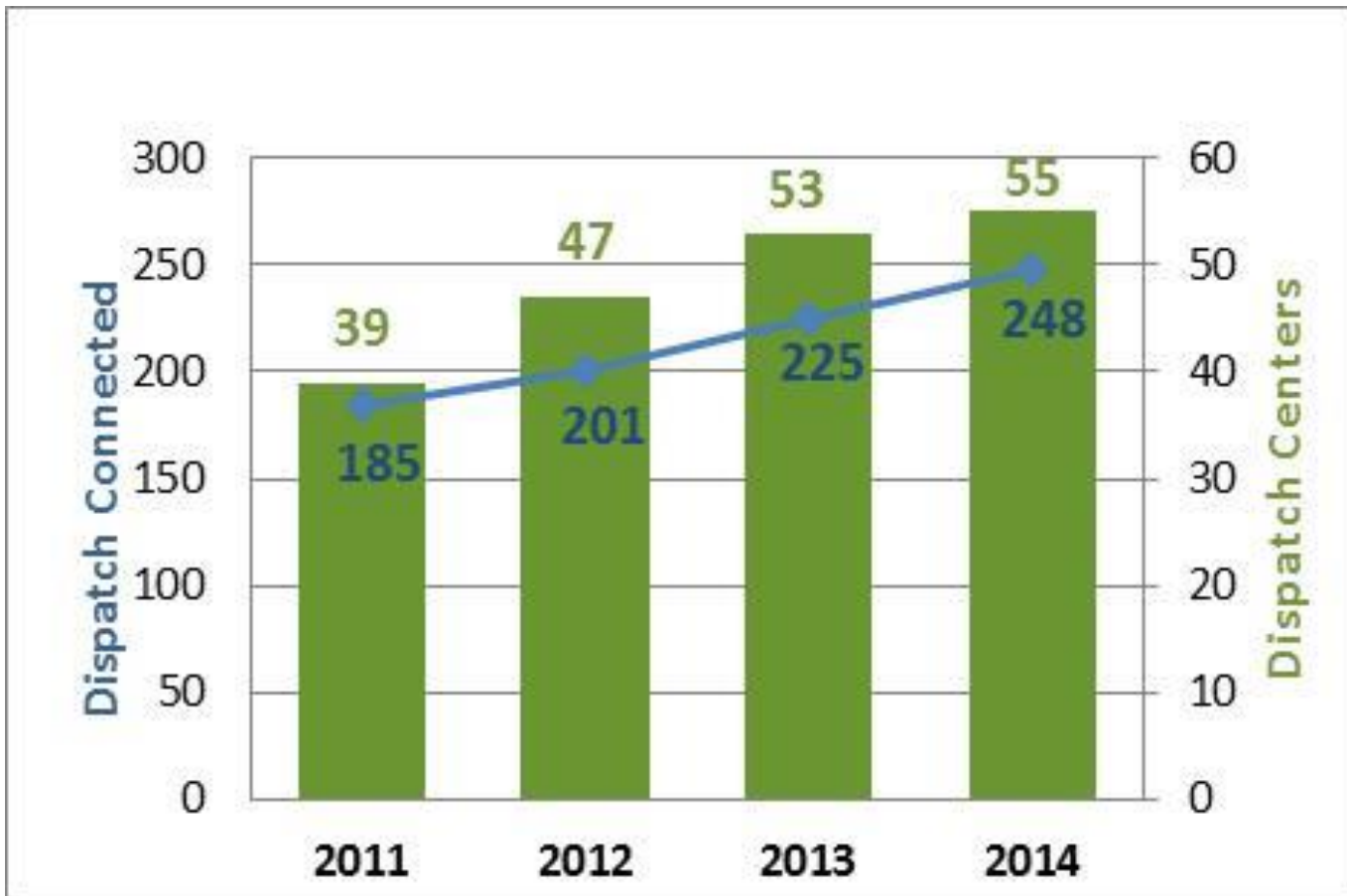


# Michigan's forward-thinking strategy



# Voice + Data = Interoperability

## Dispatch Connected Consoles



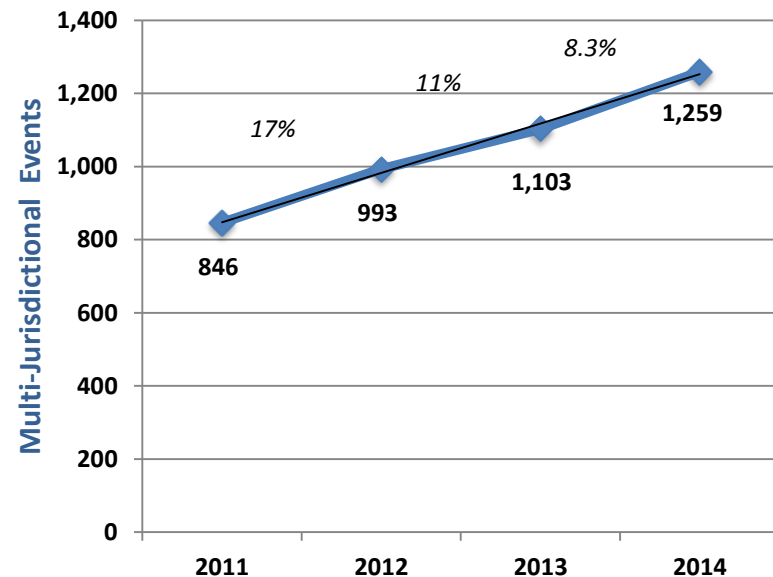
*Michigan's forward-thinking strategy*



# Voice + Data = Interoperability

## Multi-Jurisdictional Events

### 193 Car Pile Up on Michigan Highway I-94



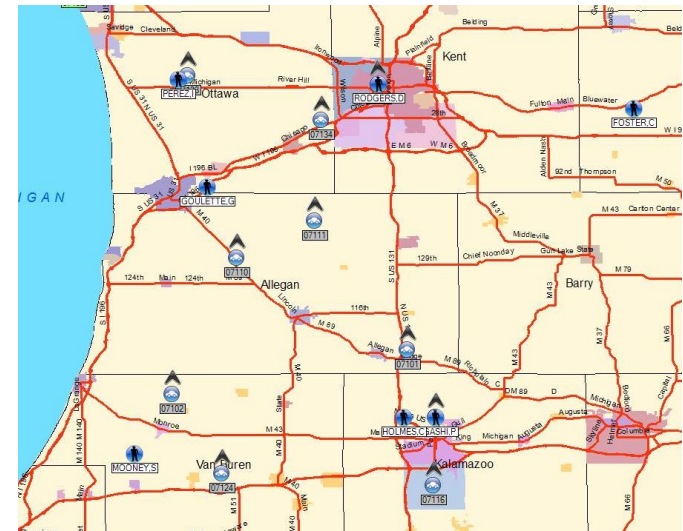


# Michigan's forward-thinking strategy

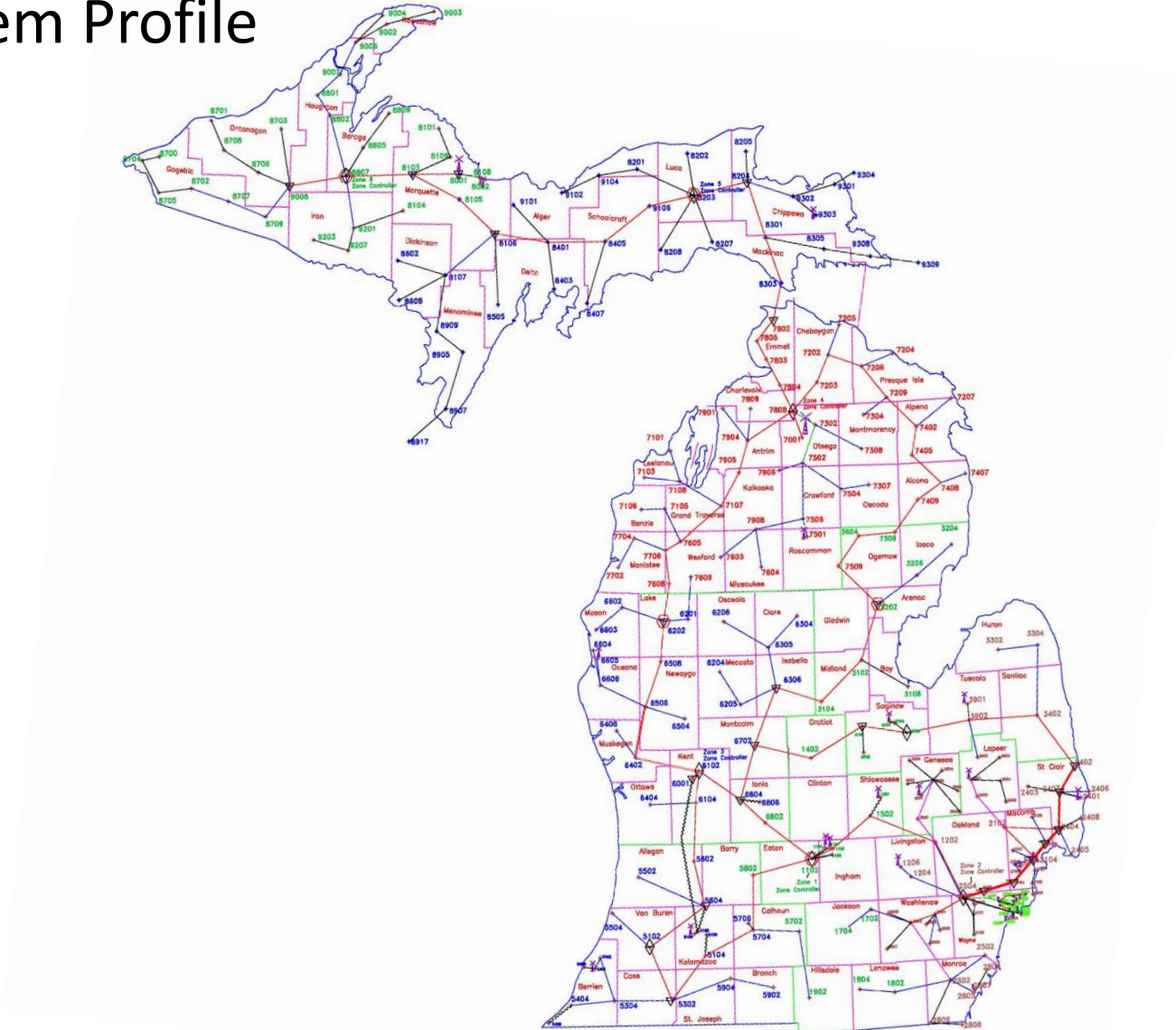


## Voice + Data = Interoperability

- 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.



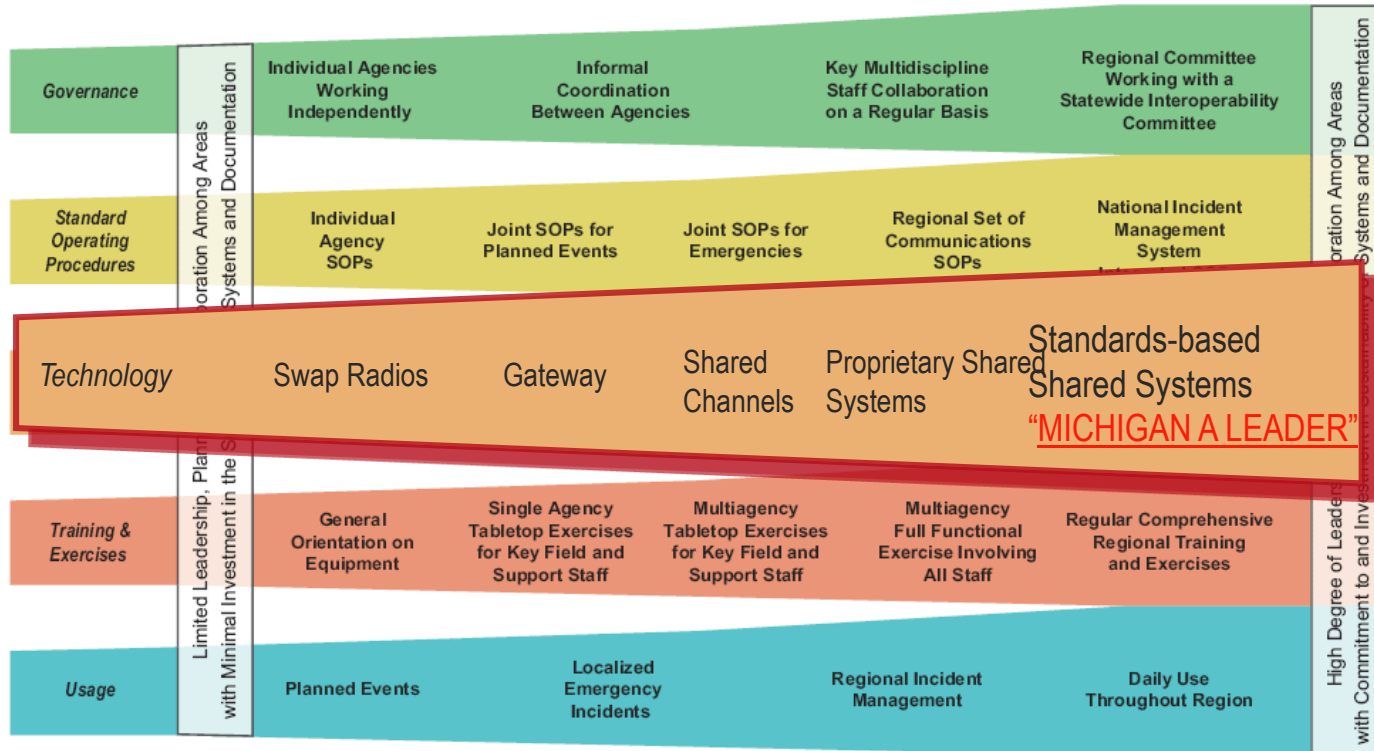
# State of Michigan System Profile



# State of Michigan – A Leader



## Interoperability Continuum



# Questions



**Brad Stoddard, Director**  
Michigan's Public Safety Communications System  
Department of Technology, Management & Budget  
Statewide Interoperability Coordinator (SWIC)  
[StoddardB@michigan.gov](mailto: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
- Avtec 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

1. Console patch setup issues. Getting levels & delays squared away. Configuration for dispatchers.
2. Timeline and schedule delays.
3. Delays between training & use of system.
4. Radio behavior issues. Lots of firmware revisions.
5. Coverage issues between VHF & 800MHz. “The old system worked here.”
6. Mixed mode scan issues.
7. P25 doesn’t mean “interoperability”.
8. 3rd party interface equipment – headsets, SCBAs, etc.



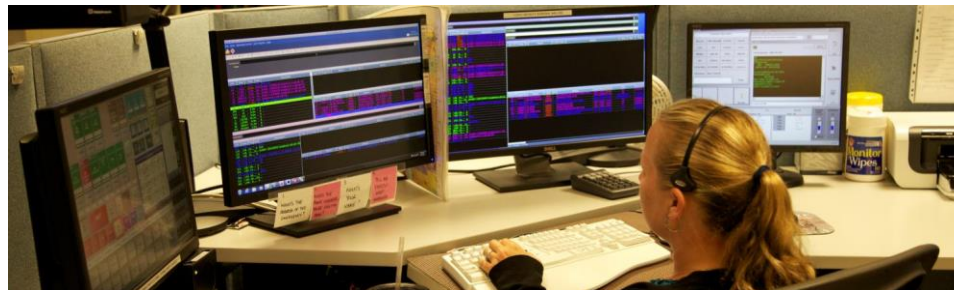
# Migration Issues

## 1. Testing and Deployment Issues

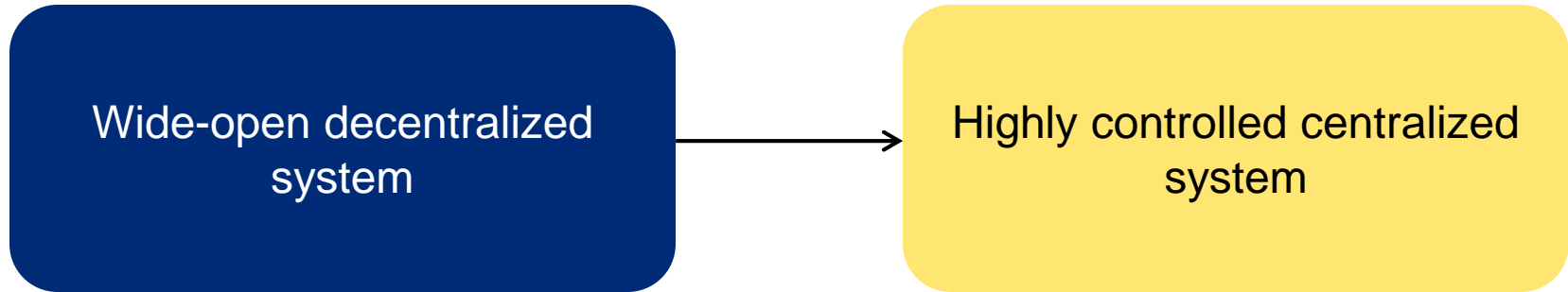
- A couple rounds of “two steps forward, one step back”.
- Radio firmware issues and enhancements.
- In the beginning it was very good – mostly because of small sample sizes and controlled testing. Real deployment showed issues with radio “behavior”.
- Vendor did an excellent job of solving issues in 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

- 3. Go-ahead/talk permit tone.**
- 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.
3. Great vendor relationship. No customer/vendor lines. True partnership.
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



# RESCUE 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



# RESCUE 21

- 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**

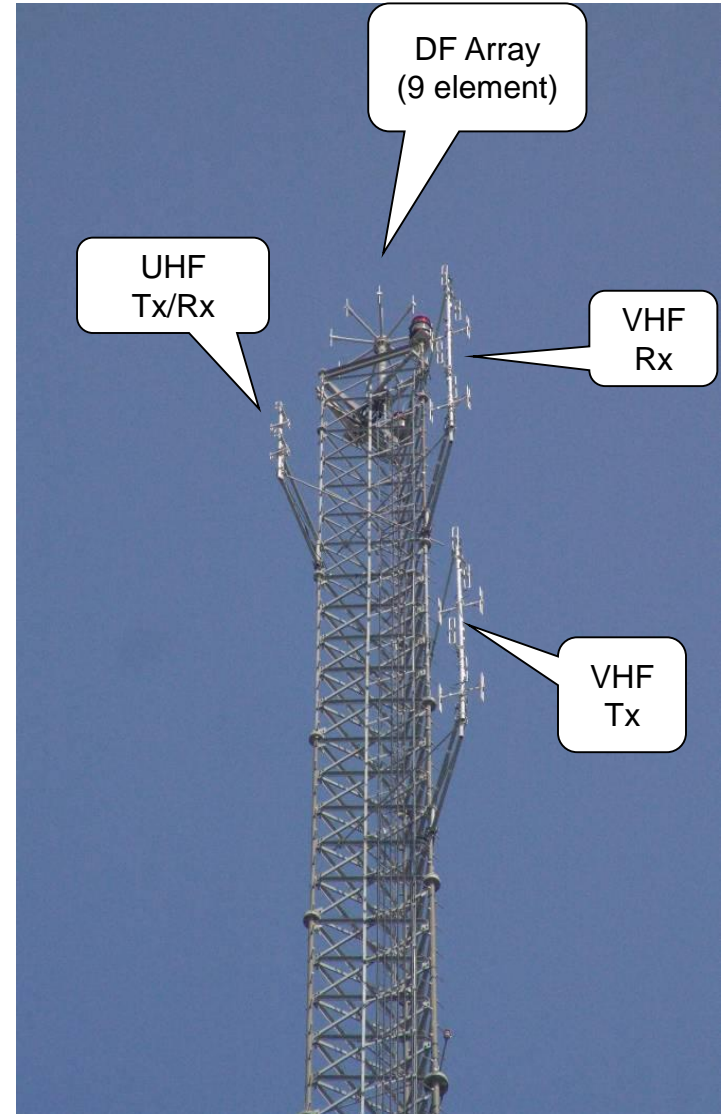
- Interoperability
  - Federal
  - State
  - Local
  - National Law Enforcement and Incident Response interoperability frequencies
  - Region-specific mutual aid frequencies
  - DHS first responder frequencies
- APCO Project 25 (P25) compliant
  - P25 otar capable
  - Clear or encrypted
- Phone patch 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





# R21 Coverage



# Thank You



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# Questions

# and

# Answers



# OUR MEMBER ORGANIZATIONS AS IWCE EXHIBITORS THANK YOU

<u><b>Aeroflex *</b></u>	<u><b>1053</b></u>
<u><b>Airbus DS *</b></u>	<u><b>1521</b></u>
<u><b>Anritsu</b></u>	<u><b>1034</b></u>
<u><b>Avtec</b></u>	<u><b>1443</b></u>
<u><b>Catalyst</b></u>	<u><b>1567</b></u>
<u><b>Cobham *</b></u>	<u><b>1846</b></u>
<u><b>Codan *</b></u>	<u><b>8027</b></u>
<u><b>EFJohnson *</b></u>	<u><b>1031</b></u>
<u><b>Etherstack</b></u>	<u><b>1721</b></u>
<u><b>Genesis Group, The</b></u>	<u><b>521</b></u>
<u><b>Harris *</b></u>	<u><b>1361</b></u>
<u><b>Icom *</b></u>	<u><b>621</b></u>

<u><b>IDA Corporation</b></u>	<u><b>1371</b></u>
<u><b>JVCKenwood *</b></u>	<u><b>1221</b></u>
<u><b>Midland Radio</b></u>	<u><b>1153</b></u>
<u><b>ModUcom</b></u>	<u><b>1821</b></u>
<u><b>Motorola Solutions *</b></u>	<u><b>921</b></u>
<u><b>Powertrunk</b></u>	<u><b>1161</b></u>
<u><b>RELM *</b></u>	<u><b>1451</b></u>
<u><b>Simoco</b></u>	<u><b>441</b></u>
<u><b>Tait *</b></u>	<u><b>823</b></u>
<u><b>Telex Bosch</b></u>	<u><b>1261</b></u>
<u><b>Vertex Standard *</b></u>	<u><b>1041</b></u>
<u><b>Zetron</b></u>	<u><b>1121</b></u>

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