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Public Safety Communications Research (PSCR)

Department of Commerce – Boulder Labs, Colorado

Homeland Security

Work Sponsored by
DHS Office for Interoperability and Compatibility

Update on Project 25 Standards, Compliance Assessment Program, and Voice over IP (VoIP)

CITIG's Third National Voice Interoperability Workshop

November 15-18, 2009

Halifax, Nova Scotia

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Public Safety Communications Research Program

Located at the Department of Commerce Boulder Labs in Colorado

The PSCR Program is a joint effort between:

NIST's Office of Law Enforcement Standards (OLES)

and

NTIA's Institute for Telecommunication Sciences (ITS)

PSCR Sponsors

Department of Homeland Security

Office for Interoperability and Compatibility

Department of Justice

Office of Community Oriented Policing Services

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PSCR Snapshot

Vision The response community nationwide can exchange voice and data seamlessly to effectively respond to any incident or emergency.

Mission To fulfill this vision, PSCR will act as an objective technical advisor and laboratory to OIC and public safety to accelerate the adoption and implementation of only the most critical public safety communication standards and technologies.

PSCR Projects

LMR Standards and Technologies	Broadband Standards and Technologies	Interoperability Device Standards and Technologies	Emerging Standards and Technologies	Cross-cutting or Supporting Activities
P25 CAP	ROW-B	Multi-Band Radio	Public Safety Security	Program Management & Reporting
Project 25 (P25) Standards Development	Public Safety VoIP	Interim Interoperability Device Testing	Technical Services Projects (MANET, Security)	Statement of Requirements (SOR)
ISSI Test Tools	4.9 GHz Broadband Task Group		Video Quality	Public Safety Architecture Framework
Audio Quality	700 MHz Broadband Working Group			RF Propagation Studies
	Modeling and Simulation			

PSCR Approach

Update on the Project 25 Standards Development

November 17, 2009

Dereck Orr
Program Manager
Public Safety Communications Research (PSCR)

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Project 25

Project 25 Standards are Focused on Achieving Goals that Benefit the Public Safety Community

P25 Goals	*Impact on Public Safety Community*
Graceful Migration	Allows an agency to move from a legacy system to a new system easily
Competition in System Life-Cycle Procurements	Users can select from multiple vendors that build innovative products to the same standards
Interoperability	Supports the sharing of information via voice and data signals on demand, in real time, when needed, and as authorized
Practitioner Driven Approach	Vendors develop public safety communications products that are driven by practitioner needs and requirements
User Friendly Equipment	Radio systems operate in consistent and familiar ways requiring the least mental and physical interaction by the operator
Robust Compliance Assessment Program	A comprehensive P25 assessment program will ensure that vendor products are tested and can be trusted to be P25-compliant
Spectrum Efficiency	Takes advantage of finite spectrum resources so more users can operate within limited bandwidths

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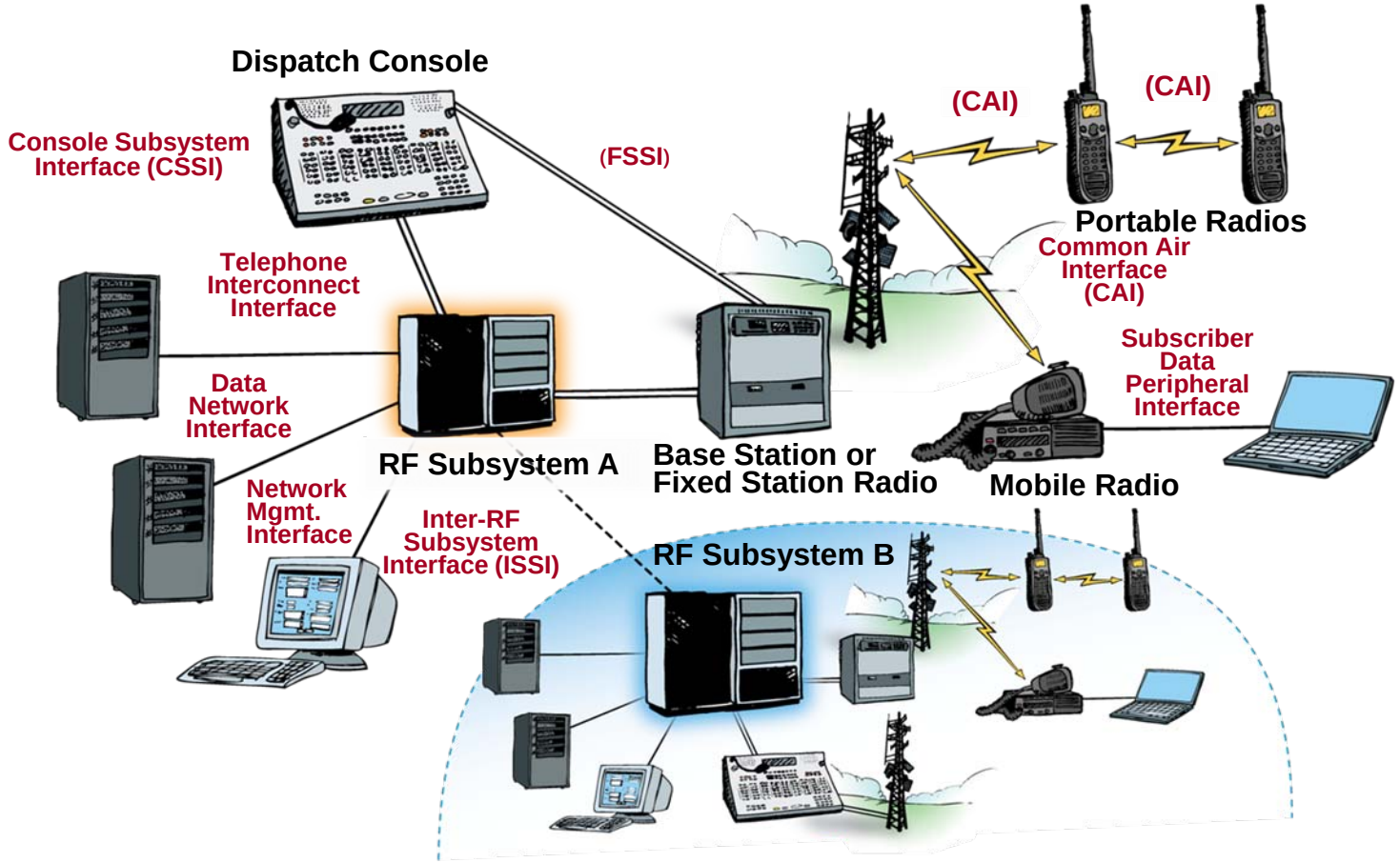
Project 25

There are eight P25 interfaces to be standardized, however…



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Project 25

…there are four P25 interfaces that we are focusing on right now.

- **The interfaces that are key to interoperability**
  - The Common Air Interface (CAI)
  - The Inter-subsystem Interface (ISSI)
- **Two other important interfaces**
  - The Console Subsystem Interface (CSSI)
  - The Fixed Station Subsystem Interface (FSSI)

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Update on the Project 25 Compliance Assessment Program

November 17, 2009

Luke Berndt
Program Manager
DHS Office for Interoperability and Compatibility

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Guiding Principles

- Independent oversight
- Auditable processes
- Definition of compliance jointly developed by users and manufacturers
- Content of declarations and reports jointly defined by users and manufacturers

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Key P25 CAP Program Features

- The program will review 1st, 2nd, or 3rd party labs who will participate in the CAP program
- Manufactures must use approved laboratory to participate in the program
- Participating manufacturers must publish a Suppliers Declaration of Compliance (SDoC) with standardized test report
- SDOCs will be housed on a common website, and DHS grantees are expected to purchase equipment with approved SDOCs.
- Initial phase of the program is focused on the Common Air Interface (CAI)

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Roles and Responsibilities

- **DHS S&T Office of Interoperability and Compatibility (OIC)**
  - Sets overall policy for the P25 CAP program
  - Recognizes assessed labs to participate in the program
  - Maintains clearinghouse of manufacturer Supplier's Declaration of Compliance and test reports participating in the program

- **NIST Office of Law Enforcement Standards (OLES)**
  - Performs laboratory assessments and provides recommendation for recognition to DHS OIC

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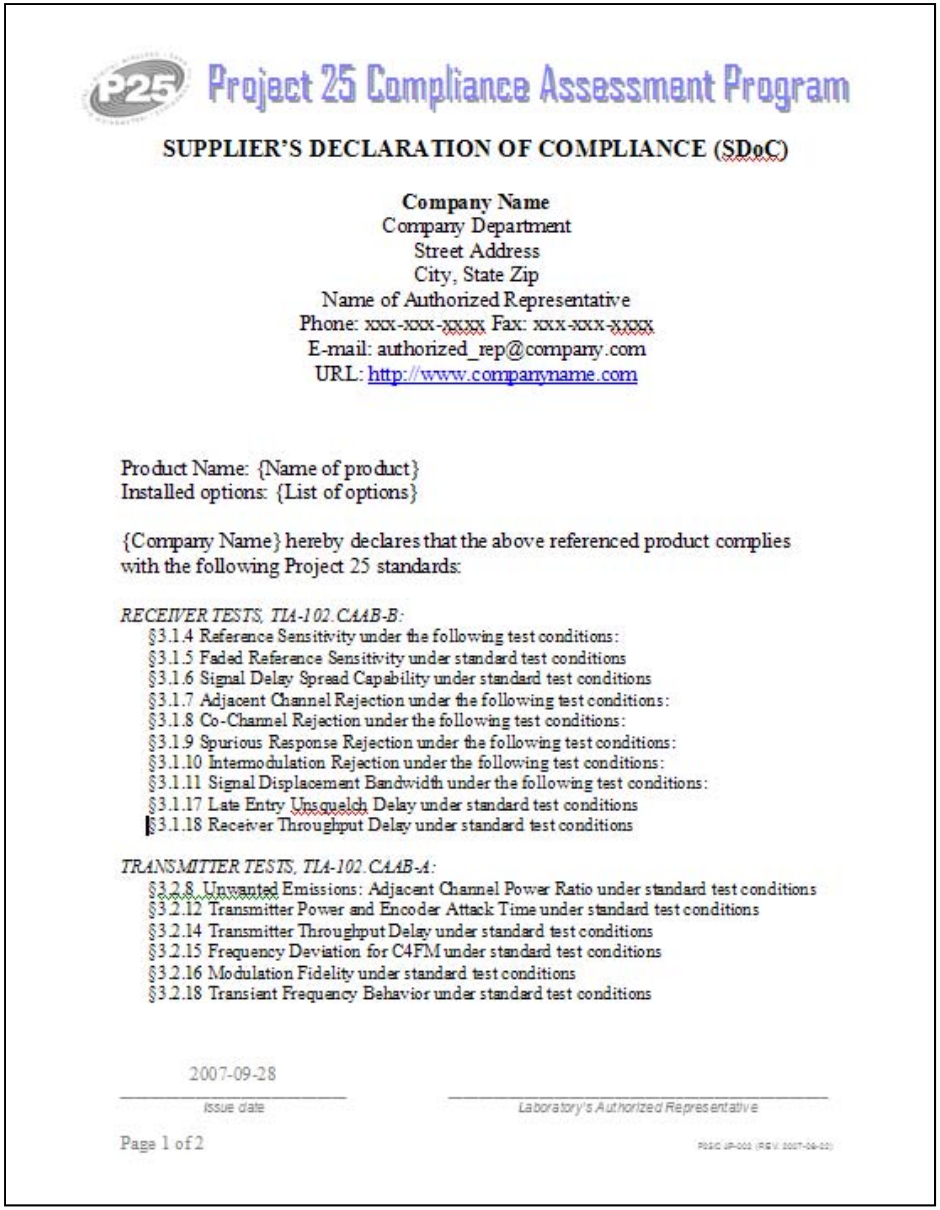
Suppliers Declaration of Compliance



Project 25 Compliance Assessment Program

SUPPLIER'S DECLARATION OF COMPLIANCE (SDoC)

Company Name
Company Department
Street Address
City, State Zip
Name of Authorized Representative
Phone: xxx-xxx-xxxx Fax: xxx-xxx-xxxx
E-mail: authorized_rep@company.com
URL: http://www.companyname.com

Product Name: {Name of product}
Installed options: {List of options}

{Company Name} hereby declares that the above referenced product complies with the following Project 25 standards:

RECEIVER TESTS, TIA-102.CAAB-B:
- §3.1.4 Reference Sensitivity under the following test conditions:
- §3.1.5 Faded Reference Sensitivity under standard test conditions
- §3.1.6 Signal Delay Spread Capability under standard test conditions
- §3.1.7 Adjacent Channel Rejection under the following test conditions:
- §3.1.8 Co-Channel Rejection under the following test conditions:
- §3.1.9 Spurious Response Rejection under the following test conditions:
- §3.1.10 Intermodulation Rejection under the following test conditions:
- §3.1.11 Signal Displacement Bandwidth under the following test conditions:
- §3.1.17 Late Entry Unsquelch Delay under standard test conditions
- §3.1.18 Receiver Throughput Delay under standard test conditions

TRANSMITTER TESTS, TIA-102.CAAB-A:
- §3.2.8 Unwanted Emissions: Adjacent Channel Power Ratio under standard test conditions
- §3.2.12 Transmitter Power and Encoder Attack Time under standard test conditions
- §3.2.14 Transmitter Throughput Delay under standard test conditions
- §3.2.15 Frequency Deviation for C4FM under standard test conditions
- §3.2.16 Modulation Fidelity under standard test conditions
- §3.2.18 Transient Frequency Behavior under standard test conditions

2007-09-28
Issue date

Laboratory's Authorized Representative

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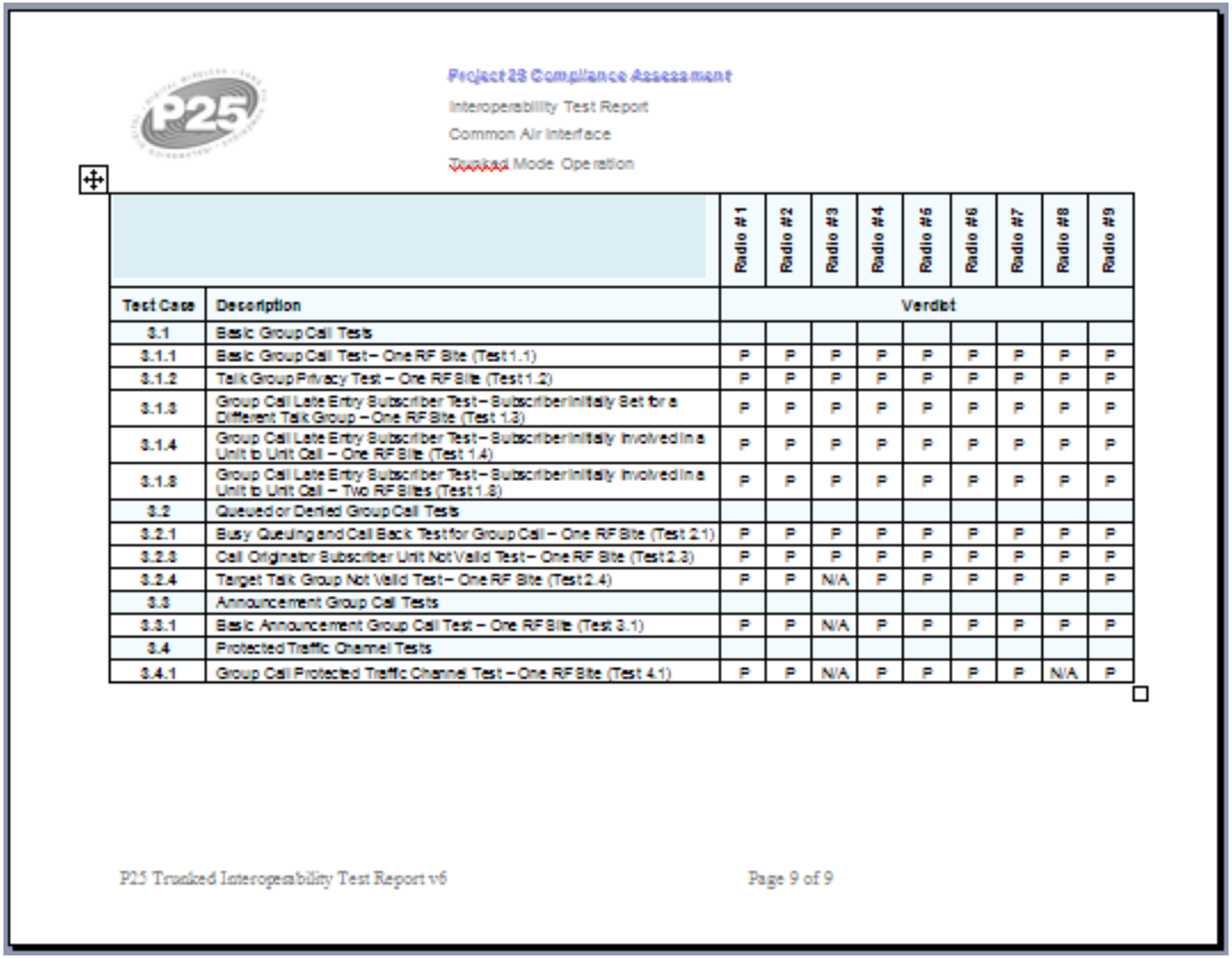
Summary Test Report



Project 25 Compliance Assessment

Interoperability Test Report

Common Air Interface

Trunked Mode Operation

		Radio #1	Radio #2	Radio #3	Radio #4	Radio #5	Radio #6	Radio #7	Radio #8	Radio #9
Test Case	Description	Verdict								
3.1	Basic Group Call Tests									
3.1.1	Basic Group Call Test – One RF Site (Test 1.1)	P	P	P	P	P	P	P	P	P
3.1.2	Talk Group Privacy Test – One RF Site (Test 1.2)	P	P	P	P	P	P	P	P	P
3.1.3	Group Call Late Entry Subscriber Test – Subscriber Initially Set for a Different Talk Group – One RF Site (Test 1.3)	P	P	P	P	P	P	P	P	P
3.1.4	Group Call Late Entry Subscriber Test – Subscriber Initially Involved in a Unit to Unit Call – One RF Site (Test 1.4)	P	P	P	P	P	P	P	P	P
3.1.5	Group Call Late Entry Subscriber Test – Subscriber Initially Involved in a Unit to Unit Call – Two RF Sites (Test 1.5)	P	P	P	P	P	P	P	P	P
3.2	Queued or Denied Group Call Tests									
3.2.1	Busy Queuing and Call Back Test for Group Call – One RF Site (Test 2.1)	P	P	P	P	P	P	P	P	P
3.2.3	Call Originator Subscriber Unit Not Valid Test – One RF Site (Test 2.3)	P	P	P	P	P	P	P	P	P
3.2.4	Target Talk Group Not Valid Test – One RF Site (Test 2.4)	P	P	N/A	P	P	P	P	P	P
3.3	Announcement Group Call Tests									
3.3.1	Basic Announcement Group Call Test – One RF Site (Test 3.1)	P	P	N/A	P	P	P	P	P	P
3.4	Protected Traffic Channel Tests									
3.4.1	Group Call Protected Traffic Channel Test – One RF Site (Test 4.1)	P	P	N/A	P	P	P	P	N/A	P

P25 Trunked Interoperability Test Report v6

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The Status of the P25 CAP

- **In May 2009, DHS OIC recognized 8 laboratories that can now perform compliance testing as part of the P25 CAP:**
  - These labs were recognized to perform Performance and/or Interoperability tests for products implementing the P25 Common Air Interface (CAI).
    - Conformance tests were not included because the CAI conformance test documents were yet to be published.
  - These labs are a mix of manufacturer and private test laboratories.
- **OIC established the P25 CAP Governing Board:**
  - This board is comprised of users and operators of P25 systems from local, state, and federal agencies.
  - The purpose of the P25 CAP Governing Board is to provide recommendations to DHS OIC on issues related to the governance of the P25 CAP:
    - Types of tests (performance, conformance, and interoperability)
    - Specific tests within these test types
    - Timelines for required implementation
- **DHS OIC is currently developing the policy documents that will incorporate the P25 Inter-RF-Subsystem Interface (ISSI) into the P25 CAP:**
  - The best estimates for availability of P25 ISSI products is November/December of 2009.
  - In expectation of these new products, the P25 Governing Board requested that DHS incorporate ISSI testing into the CAP in a time frame that would as closely coincide with ISSI product availability as possible.

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The Project 25 User Needs Subcommittee (P25 UNS)

November 17, 2009

Scott Bradford
Chairman
P25 UNS

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P25 User Needs Subcommittee

The Project 25 User Needs Subcommittee (P25 UNS) is a subcommittee of P25 Steering Committee, which establishes the priorities and scope for technical development by TIA of new and revised P25 standards

- Responsible for the Project 25 Statement of Requirements (P25 SOR)
  - Plays an essential role in not only developing standards that meet users' needs but also to establish the basis upon which equipment and systems can be assessed as being compliant with the P25 standards
  - Establishes a feasible migration path for P25 equipment and systems to take advantage of emerging technologies
  - Establishes a balance between user needs and what industry is able to implement based on current physical, technological, and regulatory constraints

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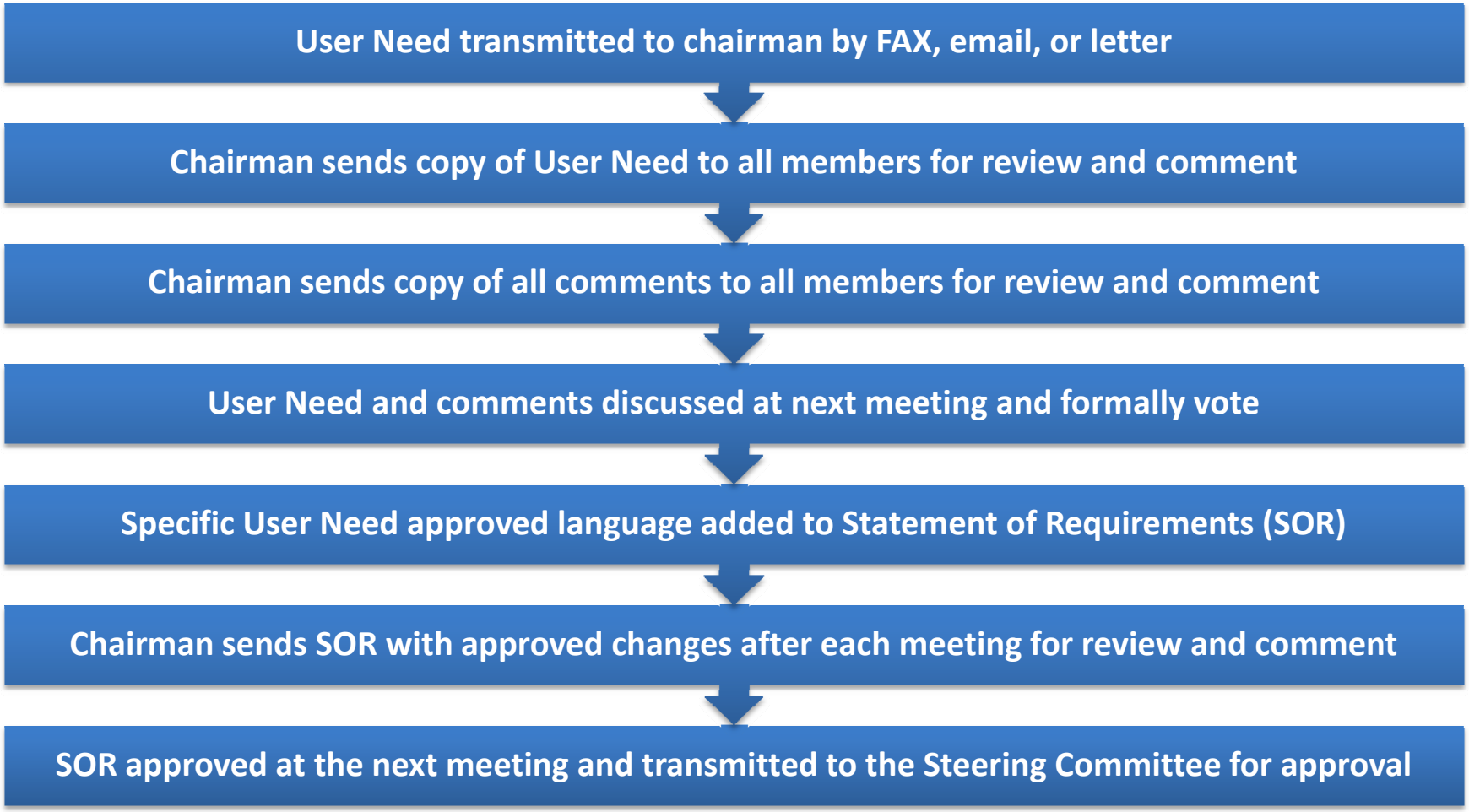
P25 UNS Process



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Join the Standards Process

- P25 is unique in that public safety practitioners are a part of the standards development process
  - User Needs Subcommittee
  - APIC Task Groups
- Contact me for more information

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Update on Public Safety VoIP Bridging

November 17, 2009

Jeff Bratcher
Technical Manager
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The Need for VoIP Bridging

- The nation's emergency responders traditionally have used two-way radios—known as Land Mobile Radios—to communicate. Even the most powerful of these radios are often not interoperable with each other because they broadcast in different frequency bands or use proprietary equipment.

- Public safety agencies are investing millions of dollars in devices that patch these non-interoperable radio systems together.

- Large-scale incidents require the cooperation of multiple public safety disciplines and agencies, who often rely on VoIP bridging solutions to communicate and to link disparate communications technologies with conventional equipment.

    - The $1 billion Federal Public Safety Interoperable Communications Grant Program will be funding the purchase of many these VoIP-based bridging systems over the next three years.

    - **But**…while IP itself is a formal standard that allows for interoperability, the VoIP technology built on top of that standard is often proprietary and prevents interoperability.

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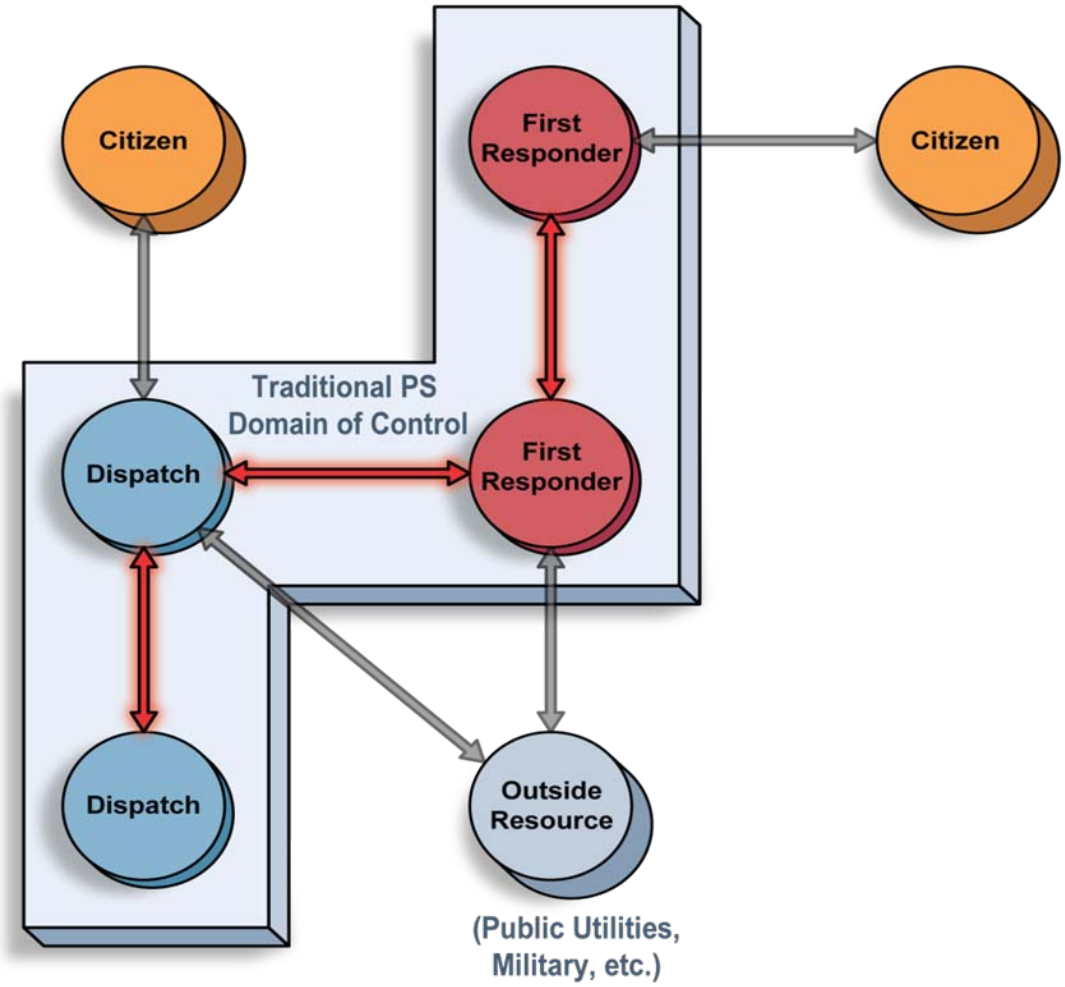
Solution

Partner with public safety to develop VoIP specifications for public-safety to public-safety communications



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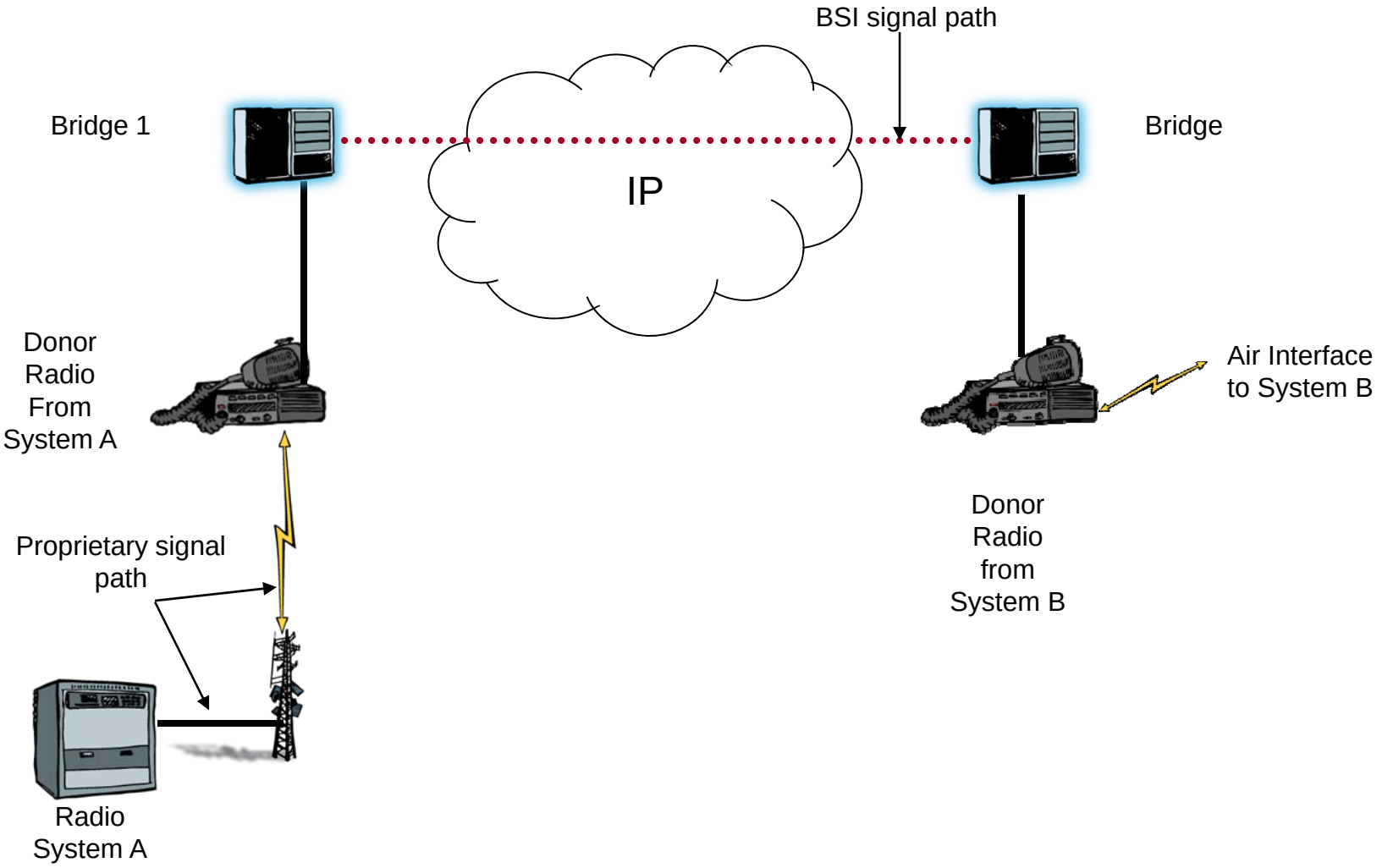
First Priority: Bridging Systems Interface (BSI)

A typical BSI network scenario



Results

- **Developed and published the BSI Core Profile 1.0 with key features that can be implemented quickly.**
  - A VoIP implementation profile is a collection of existing standards, parameters, and values necessary for VoIP-based devices to connect with one another.
  - Contains technical information for system operators, network staff, etc.
  - Supports group voice communications across multiple-vendors' bridging solutions.
  - Brought together six of the leading VoIP vendors to demonstrate interoperability using the specification.

- **BSI Core 1.0 was tested at three different Plugfest events**
  - Various manufacturers brought their bridging devices and connected to one another using the BSI Core Profile specification

- **Developing BSI Core Profile 1.1 and planning real-world demonstrations**

- **Finalizing BSI Best Practices Document**
  - Administrative information for contracting officials, chiefs, etc.

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Value

- Serves as an example of how the Federal government can act as a catalyst to address an interoperability gap quickly and outside of the formal standards process.

- Reduces costs for system design and installation, saving Federal, State, and local dollars.

- Coalesces industry and public safety representatives around a technical solution that closes an interoperability gap that would have widened with new Federal grant funding.

- Informs and accelerates industry's development of interoperable public safety products.

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VoIP Efforts

Known BSI Implementers

- C4i
- Catalyst
- Mutualink
- Raytheon JPS
- TracStar
- Twisted Pair Solutions
- Cisco
- Motorola
- National Interop
- SyTech
- VoiceInterop
- Zetron

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Breakout Session #2 – P25/VoIP Outcomes

1. Do homework on which interfaces/features are Project 25 specific
2. Leverage the DHS Compliance Assessment Program materials on http://www.rkb.us to find out what testing has been performed and associated results
3. Investigate providing funding for Canadian P25 Users to attend the quarterly Project 25 Standards meetings (next meeting is in Mesa, Arizona in January)
4. Develop draft template RFP language that leverages the CAP

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Documents and Information:

- http://www.safecomprogram.gov/SAFECOM/currentprojects/project25cap
- http://www.pscr.gov

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