

The P25 Standards Process

What does it look like and where are we now?



A Joint Presentation by

**Public Safety Communications
Research**

and the

**Telecommunications Industry
Association**

Agenda



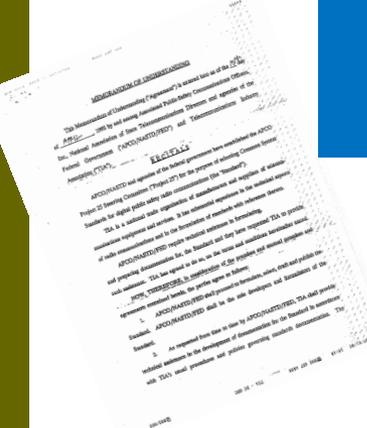
- ❑ P25 Process – What it is and is not.
- ❑ The relationship between system interfaces, the TIA-102 Suite of Documents, and P25
- ❑ The role of the P25 User Needs Statement of Requirements in the process.
- ❑ The current state of the Project 25 Compliance Assessment Program.
- ❑ Questions from the floor.

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

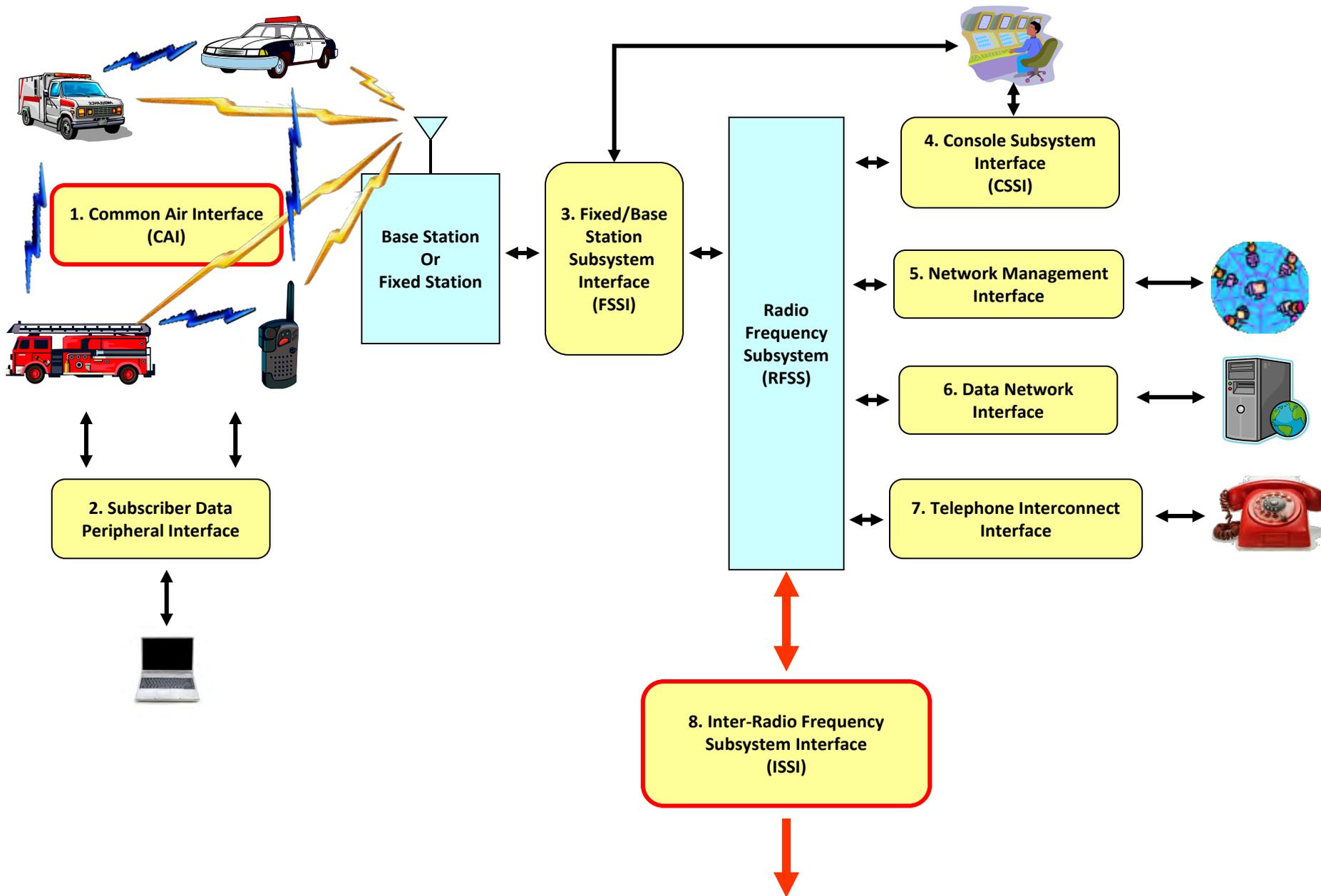
<i>P25 Goals</i>	<i>Impact on Public Safety Community</i>
Graceful Migration	Allows an agency to move from a legacy system to a new system easily
Competition in System Life-Cycle Procurements	Users can select from multiple vendors that build innovative products to the same standards
Interoperability	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
Spectrum Efficiency	Takes advantage of finite spectrum resources so more users can operate within limited bandwidths
Robust Compliance Assessment Program	A comprehensive P25 assessment program will ensure that vendor products are tested and can be trusted to be P25-compliant

APCO/NASTD/FED Project 25 – TIA

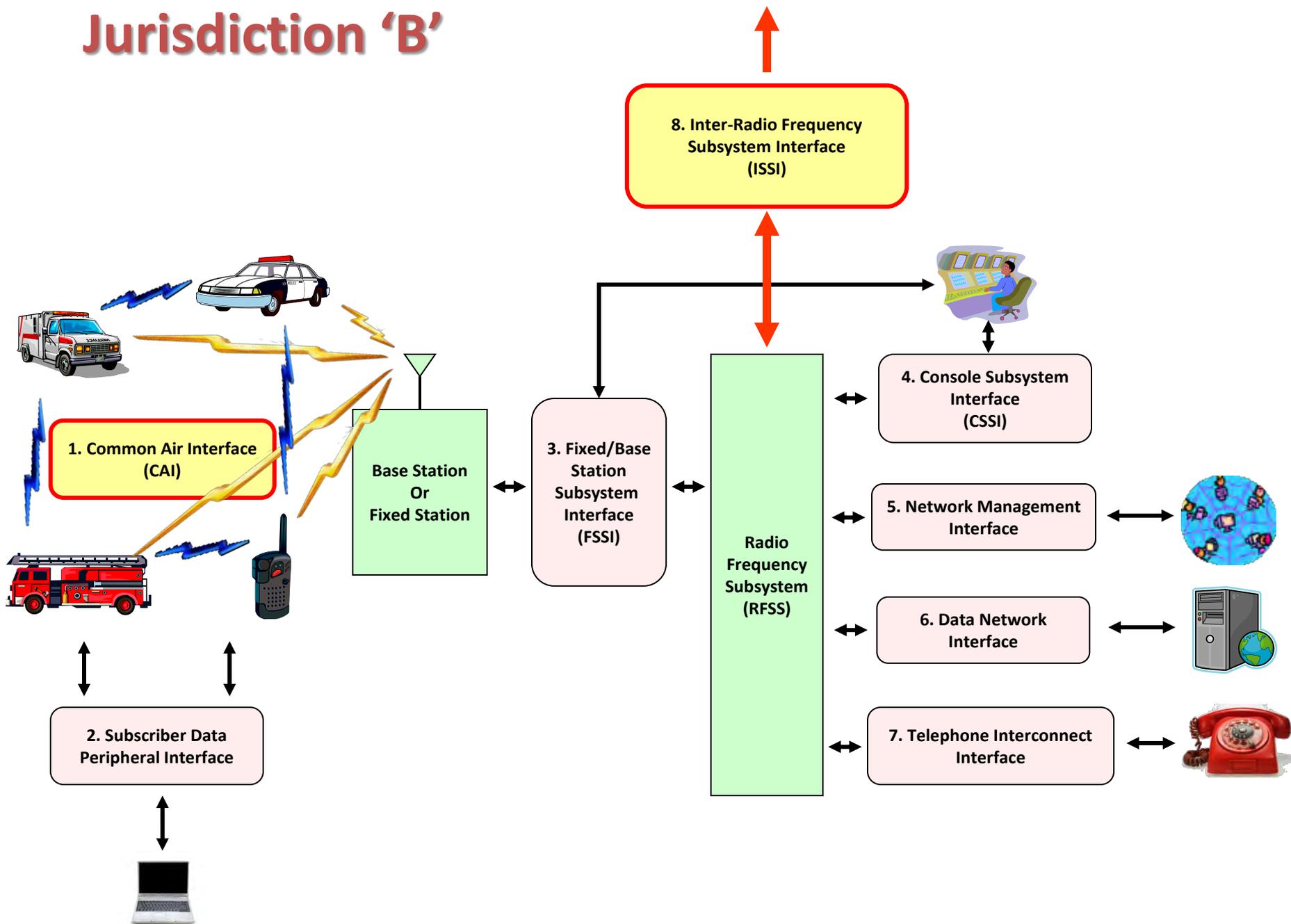
Memorandum of Understanding (1992, amended 1993)

- 
- APCO/NASTD/FED shall be the sole developers & formulators of “the Standard”
 - APCO/NASTD/FED to create & publish “the Standard.”
 - APCO/NASTD/FED & TIA to develop standard IAW their own rules respectively
 - TIA, as requested, will provide technical assistance in the development of documentation for “the Standard”
 - TIA to use reasonable effort, to the extent its members are willing to participate, to provide the desired technical assistance.
 - TIA may adopt documents compatible with the APCO/NASTD/FED developed standards.
 - APCO/NASTD/FED has no obligation to select any TIA recommendation or standard
 - TIA & APCO/NASTD/FED are separate organizations & neither is the agent or representative of the other.
 - APCO & NASTD can obtain ANSI certification, and APCO/NASTD/FED can seek the assistance of other SDOs

Jurisdiction 'A'



Jurisdiction 'B'

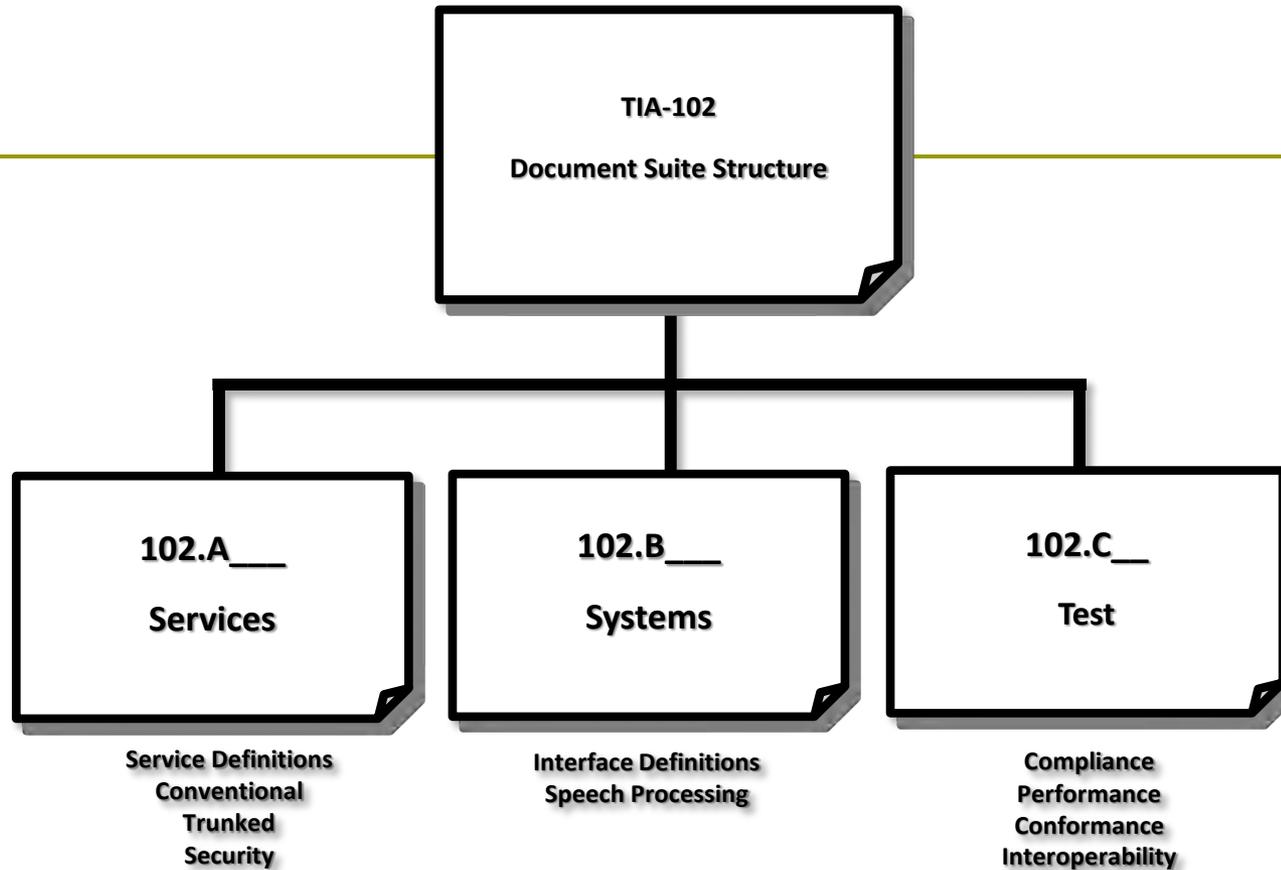


Hi-Level Interface – TIA-102 Document Cross Reference

CAI		E_c CSSI	G ISSI	E_f FSSI
U_m	U_{m2}			
TIA-102.BAAA	TIA-102.BBAB TIA-102.BBAC	TSB-102.BAGA ↓ TIA-102.BACA TIA-102.BACE	TSB-102.BAAC	TIA-102.BAHA

E_t Telephone Interconn.	E_d Data-Host Network	E_n Network Mgmt	A Subscriber- Mobile Data
TIA-102.BADA	TIA-102.BAEA TIA-102.BAEB	TIA-102.BAFA	TIA-102.BAEA TIA-102.BAEB

KFD-Mobile Radio	KMF-KFD	KMF-KMF
TIA-102.AACD	(Future Work Item)	(Future Work Item)



**TSB-102-B, to be published soon,
Clauses 2, 3, & 4, describes this
more completely and clearly.**

SOR Input to the Process

User OR Manufacturer (less freq.) idea submitted to UNS Chair

User comments

{ Request for Comments }

Manufacturer comments
(less freq.)

Working Document

User comments

{ Request for Comments }

Manufacturer comments
(less freq.)

Draft SoR

User comments

{ Request for Comments }

Manufacturer comments
(less freq.)

Finished SoR

P25 Steering Committee Approval

Approved SoR

User comments

APCO Project 25 Interface Committee (APIC)

Manufacturer comments
(less freq.)

User comments

TIA TR8 Technical Committees for Engineering

Manufacturer comments
(less freq.)

Living List of Issues

Triad (P25/APIC/TIA)

Process Considerations

- MoU identifies the domains shown on the subsequent slides and describes the boundaries, relationships, roles, responsibilities, etc. enabling collaborative creation of documents
 - Enable Interoperable implementation of Public Safety Mission Critical functionality by multiple manufacturers
 - Enable consistent test methods for verifying and validating implementations
- **Each domain (P25/APIC/TIA) creates and maintains it's own Process Document describing operation within the respective domain.**
 - Process Document MUST be consistent with MoU dictates.
 - Participation and voting eligibility
 - Decision making processes
 - Operating guidelines
 - Document style manuals
 - etc.

TRIAD PROCESS VARIATIONS

□ Document Creation

- specifically P25 SOR-based
- not specifically P25 SOR-based

• **Reaffirmation** (renewal) of a published TIA document

• **Modification/Revision** of a published TIA documents

- P25 initiated
- TIA initiated

Remember – The following are only *illustrative* of the process applied to the P25/APIC/TIA (Triad) process. APCO/NASTD/FED has the right to obtain assistance wherever IAW accordance with whatever arrangement may exist or be created by APCO/NASTD/FED and such other entity.

The Output (generally speaking)



The cover features a red vertical bar on the left. At the top left is the TIA logo with the tagline 'ADVANCING GLOBAL COMMUNICATIONS'. At the top right is the ANSI logo with the text 'ANSI' and 'American National Standards Institute'. Below the ANSI logo is the text 'ANSI/TIA-102.AABA-B 2011' and 'APPROVED: APRIL 22, 2011'. The main title 'TIA STANDARD' is in large blue letters. Below it, 'Project 25' is enclosed in a blue dotted oval. The subtitle 'Trunking Overview' and 'Digital Radio Technical Standards' are in blue. At the bottom left is 'TIA-102.AABA-B' and '(Revision of TIA-102.AABA-A)'. At the bottom right is 'April 2011'. At the very bottom left is 'TELECOMMUNICATIONS INDUSTRY ASSOCIATION' and 'tiaonline.org'.

TIA
ADVANCING GLOBAL COMMUNICATIONS

ANSI
American National Standards Institute

ANSI/TIA-102.AABA-B 2011
APPROVED: APRIL 22, 2011

TIA STANDARD

Project 25

Trunking Overview
Digital Radio Technical Standards

TIA-102.AABA-B
(Revision of TIA-102.AABA-A)

April 2011

TELECOMMUNICATIONS
INDUSTRY ASSOCIATION
tiaonline.org



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TIA
ADVANCING GLOBAL COMMUNICATIONS

ANSI
American National Standards Institute

ANSI/TIA-102.AABB-B 2011
APPROVED: APRIL 22, 2011

TIA STANDARD

Trunking Control Channel Formats

TIA-102.AABB-B
(Revision of TIA-102.AABB-A)

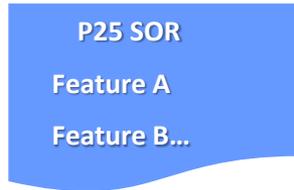
July 2011

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DOCUMENT CREATION

P25 SOR - based

Project 25
Domain



P25 UNS, describes user requirements in P25 SOR

P25 Steering Committee approves SOR and prioritizes work on features

NB: In this example work on "Feature A" is prioritized

APIC
Domain

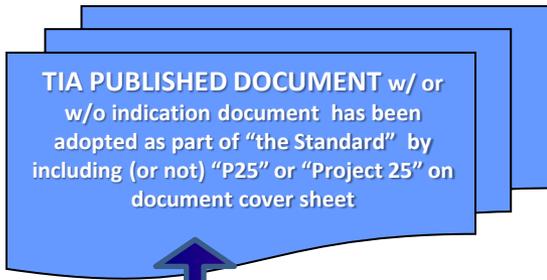


APIC Task Groups create draft documents for "Feature A"

Upon completion of TG work draft documents for "Feature A" are sent to the P25 Steering Committee for review/approval

When P25 Steering Committee approved, draft documents for "Feature A" are forwarded to TR-8 for completion pursuant to ANSI approved TIA procedures

TIA
Domain



TR-8 completes the document pursuant to ANSI approved TIA procedures

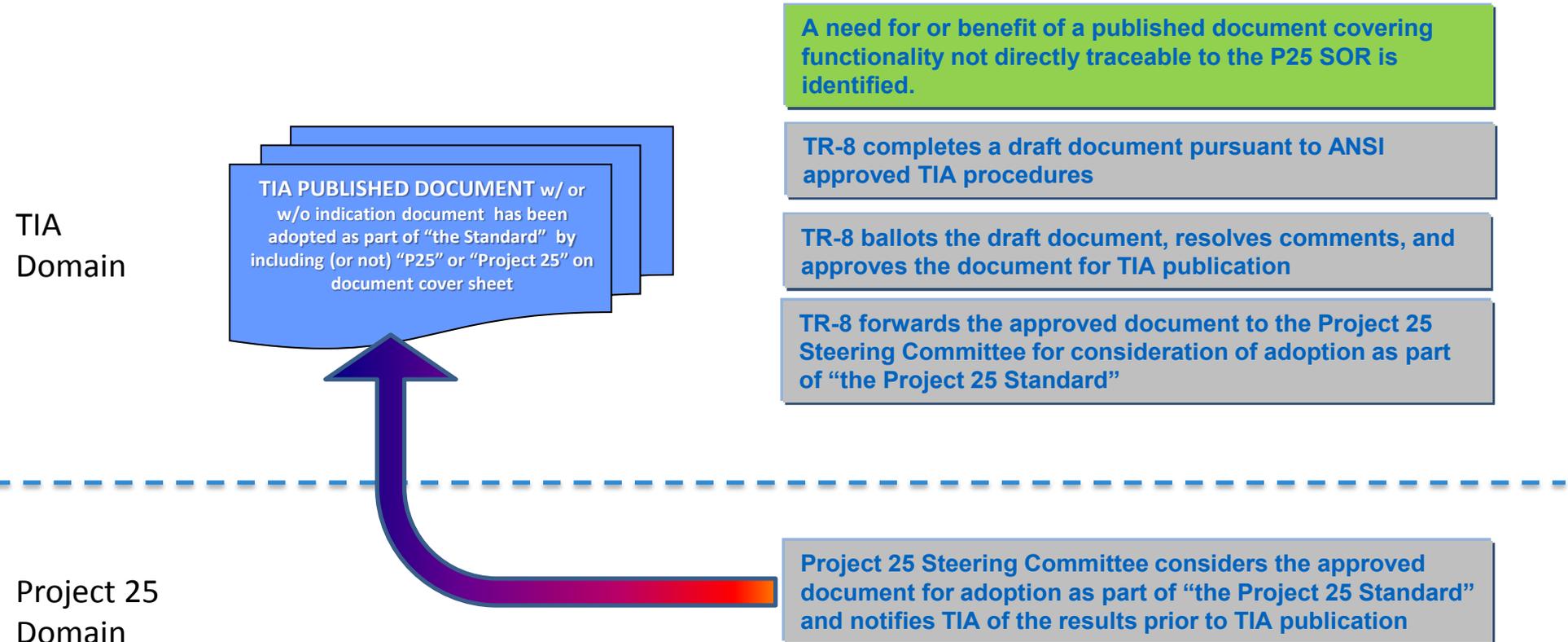
TR-8 ballots the completed document, resolves comments and approves the document for TIA publication

TR-8 forwards the approved document to the Project 25 Steering Committee for consideration of adoption as part of "the Project 25 Standard"

Project 25
Domain

Project 25 Steering Committee considers the approved document for adoption as part of "the Project 25 Standard" and notifies TIA of the results prior to TIA publication

DOCUMENT CREATION – Not P25 SOR based



DOCUMENT REAFFIRMATION(renewal)

TIA
Domain

TIA RE-PUBLISHED DOCUMENT w/ or w/o indication document has been adopted as part of "the Standard" by including (or not) "P25" or "Project 25" on document cover sheet

Project 25
Domain

Document published by TIA comes up for "reaffirmation"

TR-8 reviews document in question and determines no document modifications/revisions are required as part of "reaffirmation"

NB: If TR-8 determines modifications/revisions are necessary, TR-8 then follows the process for a TIA-initiated revision

TR-8 completes a "reaffirmation" ballot approving the "reaffirmed" document for TIA re-publication

TR-8 forwards the "reaffirmed" document to the Project 25 Steering Committee for consideration of adoption as part of "the Project 25 Standard"

Project 25 Steering Committee considers the "reaffirmed" document for adoption as part of "the Project 25 Standard" and notifies TIA of the results prior to TIA re-publication

DOCUMENT – MODIFICATION/REVISION

P25 - Initiated

Project 25
Domain



P25 UNS, documents **modified** user requirements in P25 SOR

P25 Steering Committee approves **modified** SOR & prioritizes work on features

NB: In this example work on **modified** “Feature A” is prioritized

APIC
Domain

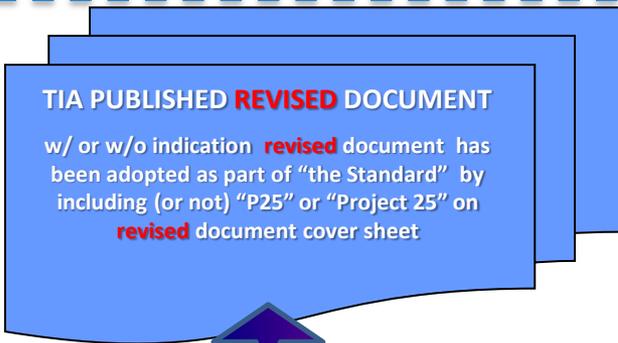


APIC Task Groups create draft **revised** documents for **modified** “Feature A”

Upon completion of TG work, draft **revised** documents for **modified** “Feature A” are sent to the P25 Steering Committee for review/approval

When P25 Steering Committee approved, draft **revised** documents for **modified** “Feature A” are forwarded to TR-8 for completion pursuant to ANSI approved TIA procedures

TIA
Domain



TR-8 completes the **revised** document pursuant to ANSI approved TIA procedures

TR-8 ballots the completed **revised** document, resolves comments, and approves the **revised** document for TIA publication

TR-8 forwards the approved **revised** document to the Project 25 Steering Committee for consideration of adoption as part of “the Project 25 Standard”

Project 25
Domain

Project 25 Steering Committee considers the approved **revised** document for adoption as part of “the Project 25 Standard” and notifies TIA of the results prior to TIA publication

DOCUMENT – MODIFICATION/REVISION

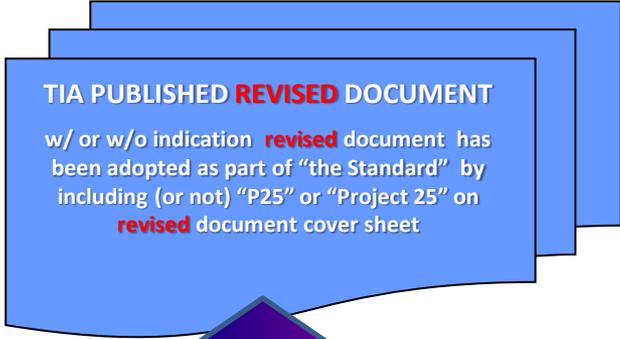
TIA - Initiated

TR-8 identifies a need or benefit to modify a published document

TR-8 prepares **revisions or addenda**, as appropriate, for the previously published TIA document pursuant to ANSI approved TIA procedures.

TR-8 ballots the completed **revised** document, resolves comments, and approves the **revised** document for TIA publication

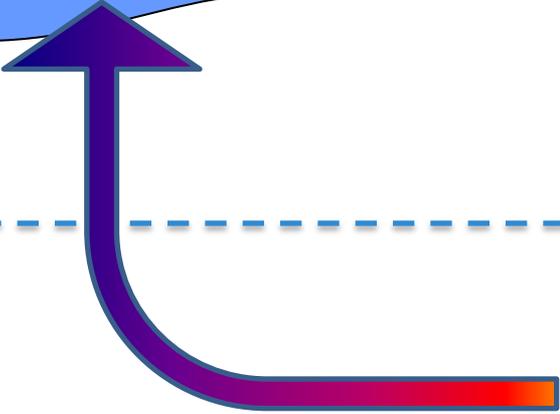
TR-8 forwards the approved **revised** document to the Project 25 Steering Committee for consideration of adoption as part of “the Project 25 Standard”



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TIA Domain

Project 25 Domain



Where are we with Audio Intelligibility in P25?



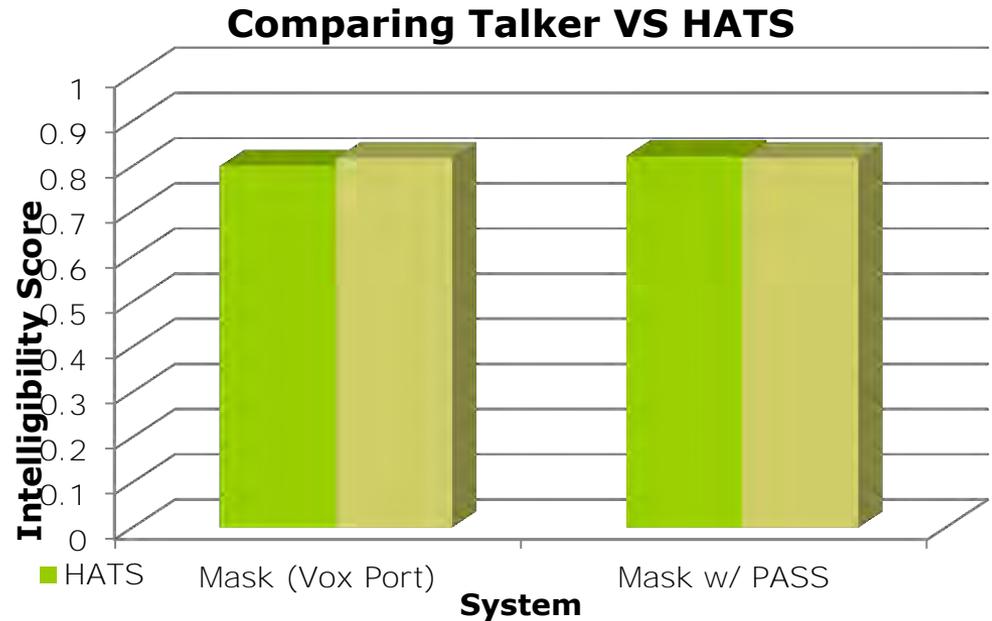
DJ Atkinson - PSCR

Audio Quality Testing

- Firefighter reports showed that some background noises created by firefighting equipment can interfere with digital communication.
- PSCR worked with practitioners to develop and implement tests that measure the operation of digital radios, and also tested mitigation techniques for the problems.



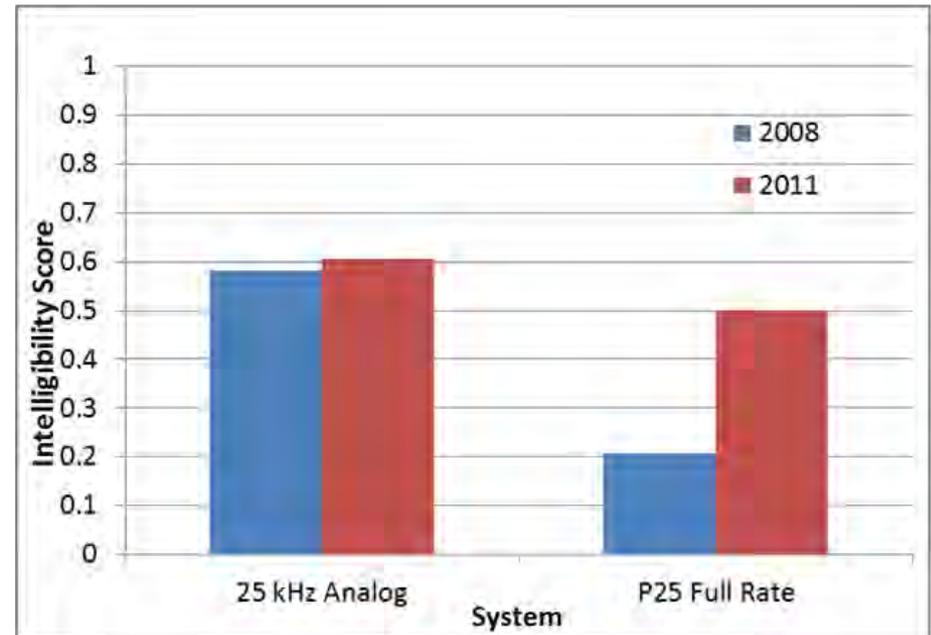
How valid are the testing methods?



No significant differences were observed in intelligibility between the use of a talker vs the HATS.

Changes in P25 Intelligibility Since 2008

- Improvements to best practices and vocoder make a difference
- There are still differences between analog and P25, but the gaps are narrowing



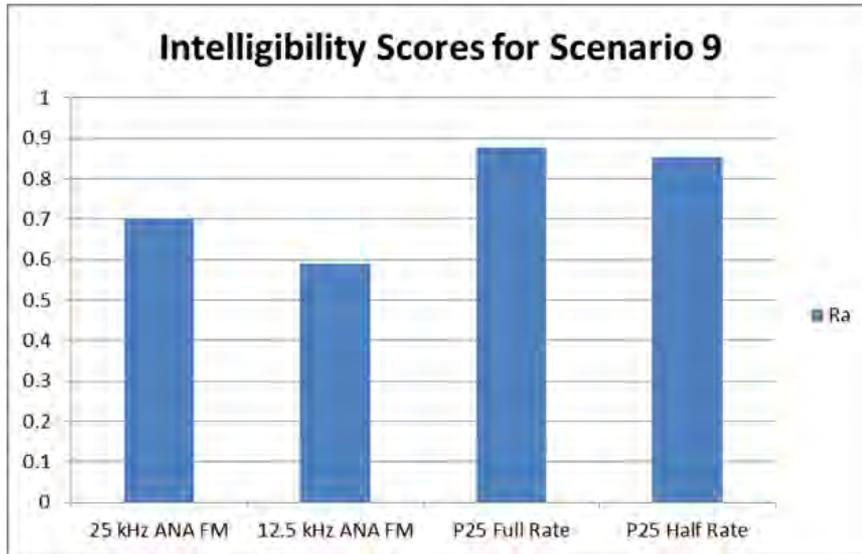
Intelligibility scores of mask with voice port and PASS alarm noise.

Changes in P25 Intelligibility Since 2008

(Audio Samples)

<p>Mask 2008 (no background noise)</p>  <p>59%</p>	<p>PASS Alarm 2008</p>  <p>21%</p>
<p>Mask 2011 (updated best practices)</p>  <p>69%</p>	<p>PASS Alarm 2011 (updated vocoder)</p>  <p>50%</p>

New Information



Intelligibility scores for static degraded channels with no mask and no background noise.

- Different PASS alarms do not have different impacts on intelligibility
- Using a mask with an internal mic improves intelligibility, but comes at a price
- There are channel conditions where P25 has higher intelligibility than analog FM.

Project 25 Compliance Assessment Program (CAP)



Jeff Bratcher - PSCR

P25 CAP Vision

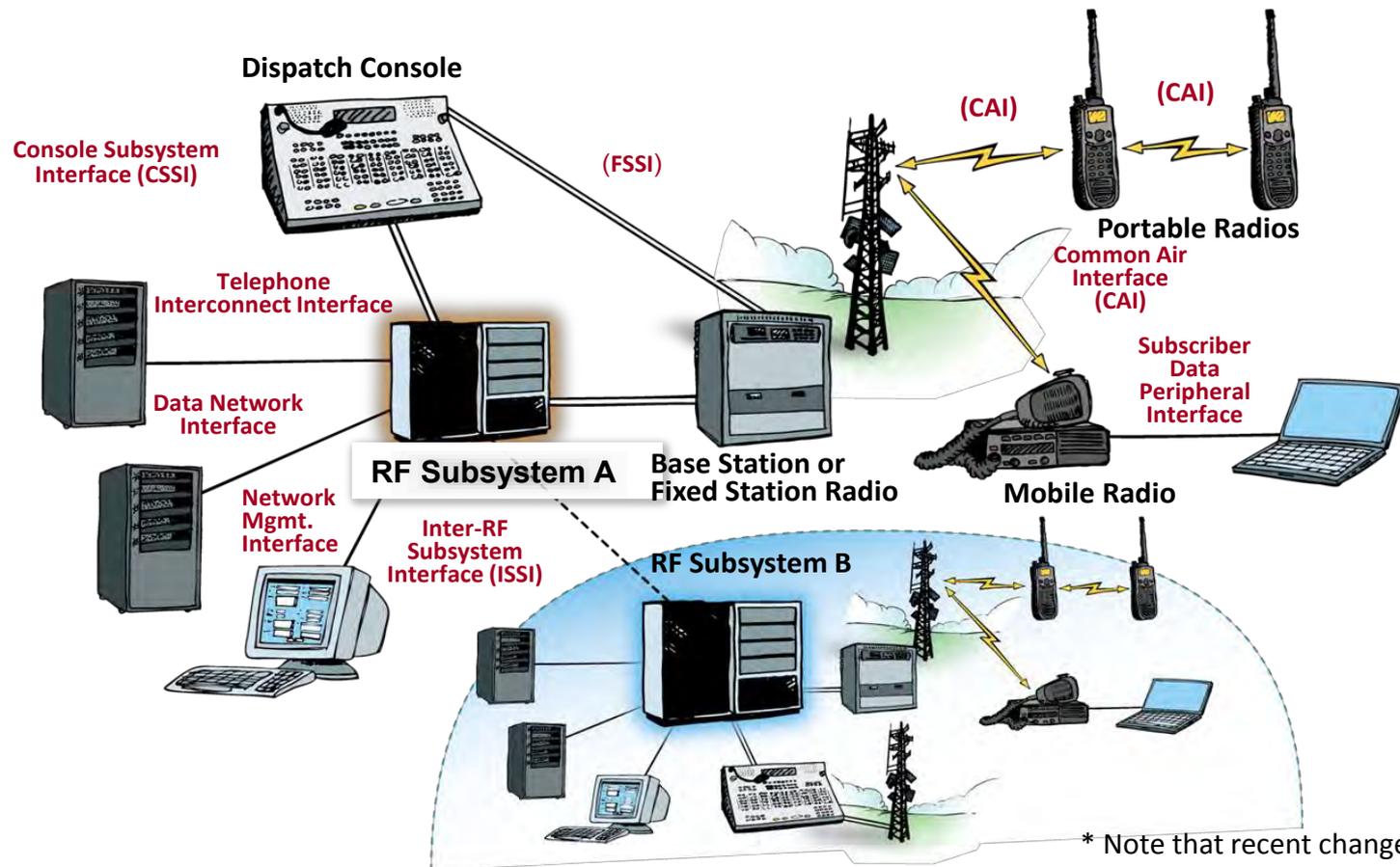
- The P25 CAP provides the more than 60,000 emergency response agencies in the United States in addition to International interest with a:
 - Consistent and tractable perspective of P25 product compliance.
 - Means of verifying that Federal grant dollars are invested in standardized solutions and equipment that promote interoperability.

Why P25 CAP

- ❑ Past research has indicated that some radios marketed as Project 25 (P25) compliant do not meet all parts of the standard
- ❑ Public safety has no independent way to verify compliance consistently across manufacturers
- ❑ Every other major wireless standard has some form of compliance program
- ❑ P25 Compliance Assessment Program (CAP) was created to fill this gap

Project 25

There are eight* P25 interfaces to be standardized



* Note that recent changes in P25 indicate more interfaces for items such as key management

Congressional Mandate

- The P25 CAP was established on the basis of requests from the United States Congress:
 - 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.

Partnership

- The P25 CAP is a joint program between:
 - **Department of Homeland Security's Office for Interoperability and Compatibility (DHS/OIC)**
 - **Department of Commerce's NIST Office of Law Enforcement Standards (NIST/OLES)**
- The P25 CAP partners with industry and the public safety community

P25 CAP Goals

- P25 CAP will:
 - Operate a recognition program that fulfills, as applicable, ISO/IEC 17011;
 - Promote confidence in the technical competence of DHS/OIC recognized laboratories and the reliability of their results;
 - Communicate frequently with laboratories, public safety users, and other stakeholders to ensure the P25 CAP is meeting public safety needs and requirements; and
 - Meet the highest professional standards for integrity, impartiality, and ethical conduct.

Key P25 CAP Program Features

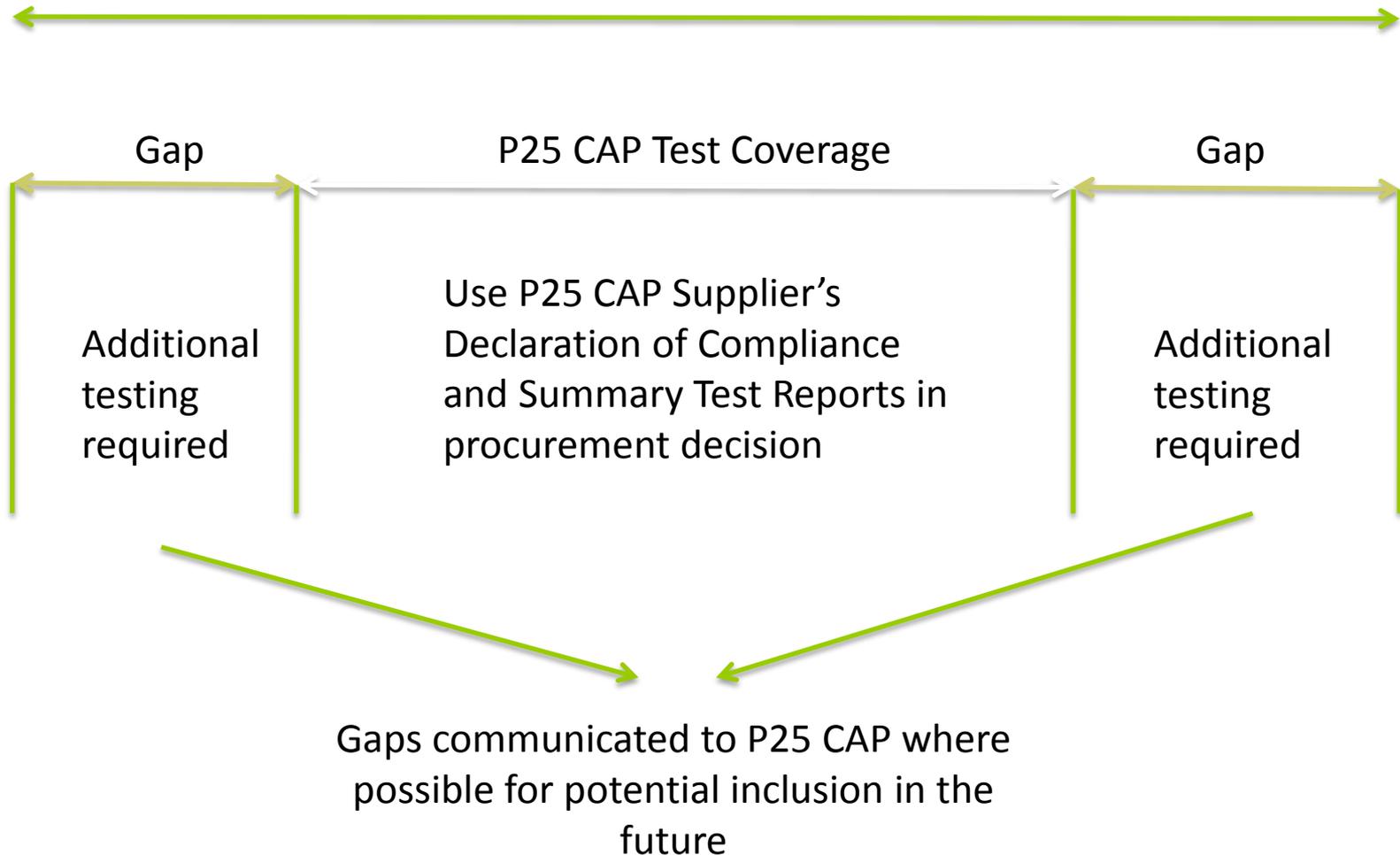
- ❑ Program will review 1st, 2nd, or 3rd party labs who will participate in the P25 CAP program
- ❑ Manufacturers must use approved laboratory to participate in the program
- ❑ Participating manufacturers must publish a Suppliers Declaration of Compliance (SDoC) and a Summary Test Report (STR)
 - SDOCs/STRs will be housed on a common website (www.rkb.us), and DHS grantees are expected to purchase equipment with approved SDOCs/STRs
- ❑ Initial phase of the program is focused on the Common Air Interface (CAI) and the Inter-RF SubSystem Interface (ISSI)

P25 CAP Assessment Recognition Process

- Once a laboratory is recognized by DHS, manufacturers wanting to participate can submit their equipment to the laboratory for assessment.
- Equipment assessment is based on DHS Compliance Assessment Bulletins (CABs)
- **Next, manufacturers publish a Supplier's Declaration of Compliance (SDoC) and a Summary Test Report (STR).**

What are your LMR Requirements?

Public Safety Agency LMR Requirements



Documentation

- **Supplier's Declaration of Compliance**
 - A formal declaration of compliance created in accordance for a particular set of P25 compliance tests defined by the P25 CAP.
- **Summary Test Report**
 - A predefined format for manufacturers to present results to a subset of tests.



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 Unqualch 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

Summary Test Report



Project 25 Compliance Assessment

Interoperability Test Report

Common Air Interface

Trunked Mode Operation



Motorola A STRO 25		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
3.1.8	Group Call Late Entry Subscriber Test – Subscriber Initially Involved in a Unit to Unit Call – Two RF Sites (Test 1.8)	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 CAP Status

- ❑ P25 has 8 (now potentially more) interfaces
- ❑ 4 were called out in Congressional language
 - The Common Air Interface (CAI)
 - The Inter-subsystem Interface (ISSI)
 - The Console Subsystem Interface (CSSI)
 - The Fixed Station Subsystem Interface (FSSI)
- ❑ Currently P25 CAP for:
 - CAI is operational with 92%+ of the manufacturers represented¹
 - ISSI is ready and waiting for laboratory and manufacturer participation
 - CSSI and FSSI will increase intra-system competition and will be added to the P25 CAP as appropriate test standards are completed

¹ *Land Mobile Radio Systems 2008 Global Market Demand Analysis, 2nd edition, Volume I: Americas, Mobile and Wireless Practice, David Krebs, Director.*

P25 CAP Status

- **In May 2008, DHS 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) and specific tests within these types
 - Timelines for required implementation
- **In May 2009, DHS OIC recognized 8 laboratories that can now perform compliance testing as part of the P25 CAP:**
 - Labs were recognized for Performance and Interoperability testing for products implementing the P25 CAI.
 - SDOCs/STRs are required for CAI purchases using Federal grant money as of November 6, 2009

P25 CAP Status

- In January 2010, the first **Supplier's Declaration of Compliance and Summary Test Reports** were posted on the **DHS Responders Knowledgebase Website** – www.rkb.us
 - Thirteen manufacturers have posted their SDoCs and STRs on the publicly available website.
- **ISSI is now included in the P25 CAP**
 - Grant guidance states that March 5, 2011 is the date by which ISSI's procured with Federal grant money must have been tested in the P25 CAP

P25 CAP Status

- **In January 2011, NIST began development of P25 CAI Conventional Conformance tests**
 - P25/TIA indicated that it did not have the ability to develop conformance tests for compliance assessment
 - NIST began the process of developing conformance tests outside of P25/TIA through the Federal Register Notice (FRN) process to ensure open environment and stakeholder participation
 - Several tests published along with test development criteria to allow stakeholders to develop and submit tests into the process
 - Further FRN to provide the final list of tests and criteria for inclusion in the P25 CAP to be released in November/December

- **In November 2011, DHS OIC began an investigation into transitioning assessment and recognition of P25 CAP laboratories to ISO/IEC 17011/17025 process**
 - ISO/IEC 17011 accreditation bodies in the United States are A2LA and NVLAP and IANZ in New Zealand
 - NIST/OLES would no longer perform assessment
 - DHS OIC would no longer recognized laboratories
 - DHS OIC would continue to develop testing policy through Compliance Assessment Bulletins

Where is the TIA-102 Document Suite in Relation to the Interfaces?

	Subject	Overview	Protocol	Conf/Perf Test Procedures	Measure Methods	Perf. Recsommend	Interop Test Procedures	CAP Documents
CAI	General CAI Documents	*	ANSI/TIA-102-BAAC-C	*	*	*	*	*
	FDMA Conventional Digital Phase 1	TSB-102.BAJA-A	ANSI/TIA-102-BAAA-A ANSI/TIA-102.BAAD-A TIA-102.BAJB TIA-102-BAJC TIA-102-BAJD TIA-102-AABF-C TIA-102-AABG	ANSI/TIA-102-BAAB-B TIA-102.CAEA TIA-102.CAEB	ANSI/TIA-102.CAAA-C ANSI/TIA-102.CAAA-C-1	ANSI/TIA-102.CAAB-C TIA-102.BABG	TSB-102.CABA TIA-102.CABA	TSB-102.CBBE
	FDMA Trunked Digital Phase 1	No docs planned	ANSI/TIA.AABA-B ANSI/TIA-102.AABB-A TIA-102.AABD-A TIA-102.AABD-A-1 TIA-102.AABC-C TIA-102.AABC-C-1 TIA-102.AABF-C TIA-102.AABG TIA-102.AACE-A TIA-102.AABB-B	TIA-102.CAEC	No specific documents planned, but the following also applies: ANSI/TIA-102.CAAA-C ANSI/TIA-102.CAAA-C-1	No specific documents planned, but the following also applies: ANSI/TIA-102.CAAB-C TIA-102.BABG	ANSI/TIA-102.CABC-B TIA-102.CABC-B-1	TSB-102.CBBC TSB-102.CBBH TSB-102.CBBJ-B TSB-102.CBAF
	TDMA Trunked Digital Phase 2	TSB-102.BBAA	TIA-102-BBAB TIA-102-BBAC	TIA-102.BCAE TIA-102-BCAD TIA-102.CAEC	TIA-102.CCAA	TIA-102.BABG TIA-102.CCAB	*	TSB-102.CBAF TSB-102.CBBJ-B TSB-102.CXXX

* No documents are currently under development

PSCR Document Suite

http://www.pscr.gov/outreach/p25dsr/menu_top/p25_documents_quick_status.php

Where is the TIA-102 Document Suite in Relation to the Interfaces?

(continued)

	Overview	Protocol	Conf/Perf. Test Procedures	Measurement Methods	Performance Recommend.	Interop Test Procedures	CAP Documents
ISSI	TSB-102.BACC-A TSB-102.BACC-B	TIA-102.BACA-A TIA-102.BACA-A-1 TIA-102.BACA-A-2 TIA-102.BACA-A-3 TIA-102.BACD-B TIA-102.BACF TIA-102.BACA-A-4	TIA-102.CACC TIA-102.CACC-1 TIA-102.CACx	TIA-102.CACA TIA-102.CACA-1	TIA-102.CACB TIA-102.CACB-1	TIA-102.CACD-A TIA-102.xxxx TIA-102.CACx TIA-102.CACx TIA-102.BAxx	TSB-102.CBBK-A
FSSI	*	TIA-102.BAHA TIA-102.BAHA-A	TIA-102.CADA	*	*	*	*
CSSI (conv)	SB-102.BAGA	TIA-102.BACE	*	*	*	*	*
CSSI (trunked)	TSB-102.BAGA	TIA-102.BACA-A TIA-102.BACA-A-1 TIA-102.BACA-A-2 TIA-102.BACA-A-3 TIA-102.BACA-A-4	TIA-102.xxxx	TIA-102.CACA TIA-102.CACA-1	TIA-102.CACB TIA-102.CACB-1	TIA-102.xxxx	*
A & E _d	No docs planned	ANSI/TIA-102.BAEA-A ANSI/TIA-102.BAEB-A ANSI/TIA-102.BAEE-B ANSI/TIA-102.BAEA-B ANSI/TIA-102.BAEB-B	*	*	ANSI/TIA-102.CAAB-C	*	TSB-102.CBBC
E _n	TSB-102.BAFA-A	No docs necessary or applicable	No docs planned	No docs planned	No docs planned	No docs planned	*
E _t	*	ANSI/TIA-102.BADA ANSI/TIA-102.BADA-1 TIA-102.BADA-A	*	*	*	*	*

* No documents are currently under development