

# PROJECT 25 INTEROPERABLE COMMUNICATIONS FOR PUBLIC SAFETY AGENCIES

## WHITE PAPER

### PROJECT 25: INTEROPERABLE COMMUNICATIONS FOR PUBLIC SAFETY AGENCIES

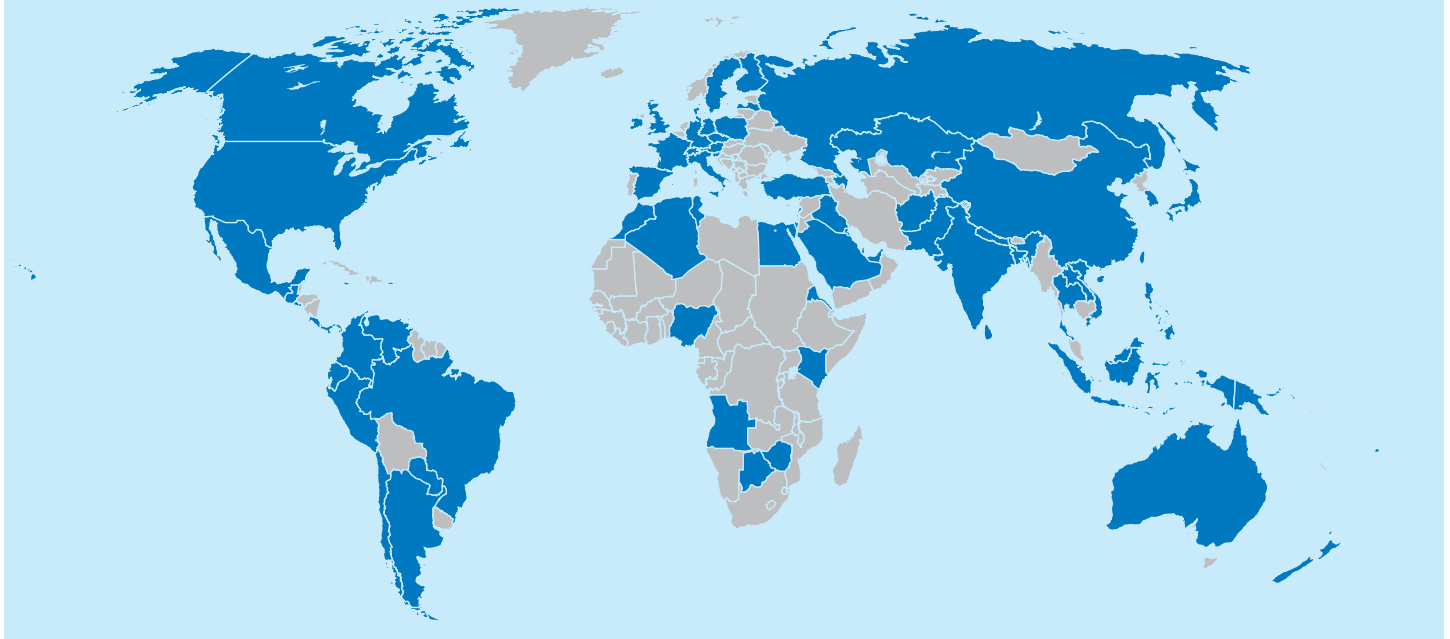
When an emergency strikes, whether it is a multi-car accident or a hurricane, first responders need to coordinate an effective response. And at the heart of an effective response is the radio communications between officers in the same agencies and across multiple agencies. Around the world public safety agencies have worked with industry leaders to develop and enhance a standard to enable interoperable communications.

The TIA-102 suite of standards is used for the design of Project 25 (P25) interoperable digital two-way wireless communication products. It is an evolving standard uniquely developed by both equipment manufacturers and public safety users to meet the needs of the public safety community around the world. The standard enables interoperability between multiple manufacturer's P25 products.

## ESTABLISHED AND FULLY VETTED STANDARD

Project 25 has a twenty-year history with the public safety community. It was established in October 1989 when APCO (Association of Public Safety Communications Officials), NASTD (National Association of State Telecommunications Directors), NCS (National Communications System), NTIA (National Telecommunications and Information Administration), and NSA (National Security Agency) agreed to the creation of the APCO-NASTD-FED Project 25. Since the beginning, the standard has been unique in that it has had the involvement of public safety agencies along side industry leaders.

### PROJECT 25 SYSTEMS DEPLOYED AROUND THE WORLD



Afghanistan	Bangladesh	Czech Republic	Guatemala	Kenya	Nigeria	Singapore	Tunisia
Algeria	Barbados	Denmark	Hong Kong	Kuwait	Pakistan	Slovenia	Turkey
Angola	Bermuda	Ecuador	India	Laos	Panama	South Korea	United Kingdom
Antigua and Barbuda	Botswana	Egypt	Indonesia	Latvia	Papua New Guinea	Spain	United States
Argentina	Brazil	El Salvador	Iraq	Lebanon	Paraguay	Sri Lanka	United Arab Emirates
Australia	Brunei	Eritrea	Ireland	Luxembourg	Peru	Sweden	Venezuela
Austria	Canada	Fiji	Israel	Malaysia	Philippines	Switzerland	Vietnam
Azerbaijan	Chile	Finland	Italy	Mexico	Poland	Taiwan	Zimbabwe
Bahamas	China	France	Jamaica	Morocco	Puerto Rico	Thailand	
Bahrain	Colombia	Germany	Japan	Nepal	Russia	Trinidad and Tobago	
	Costa Rica	Guam	Kazakhstan	New Zealand	Saudi Arabia		

## WORLDWIDE ADOPTION

Project 25 is widely adopted by public safety agencies across North America including local, county, tribal, state and federal agencies. It also has the support of the U.S. Department of Homeland Security (DHS). The DHS Office of Emergency Communications, in coordination with the Office of Interoperability and Compatibility, developed the annual SAFECOM Recommended Guidance for Federal Grant Programs. The guidance for fiscal year 2011 specifies, "Grantees must ensure that digital voice systems and equipment purchased with Federal grant funding is compliant with the Project 25 (P25), unless otherwise noted in a program's grant guidance."\*

Around the world government agencies from Australia to Russia to South America have also adopted Project 25 systems for their mission critical communications.

P25 has also been adopted by many industries such as utilities, airports, transit, petroleum and chemical companies that rely on mission critical communications and interoperability with governmental public safety agencies in an emergency.

## EVOLVING SUITE OF STANDARDS

The suite of Project 25 standards continue to expand as new technological enhancements and innovations become available. There are air interfaces, wireline interfaces, security interfaces, data interfaces, and data applications that make up the suite of standards with the most recent additions being the trunked P25 TDMA Common Air Interface (CAI) and the trunked Inter-RF Subsystem Interface (ISSI).

### COMMON AIR INTERFACE

The common air interface specifies the type and content of signals transmitted by compliant radios. There are two P25 CAI's, the P25 FDMA CAI and the P25 TDMA CAI.

P25 FDMA CAI supports both trunking and conventional modes. P25 TDMA CAI supports trunking only.

The P25 FDMA CAI is the most widely deployed Project 25 interface in the suite of standards. The P25 TDMA trunked suite of TIA-102 standards adds TDMA voice service to the existing P25 FDMA trunked voice and packet data services.

P25 TDMA trunking operation will meet the 2011 FCC equipment certification requirement for 6.25 kHz channel equivalence mode in UHF and VHF bands and the 2015 FCC equipment certification requirement for 6.25 kHz equivalence mode in 700 MHz band plans. It will also meet the 6.25 kHz channel equivalence 2015 FCC regulatory requirement for operation by new licensees in the 700 MHz band plans and the 2017 FCC regulatory requirement for operation by all licensees in the 700 MHz band plans. It is important to note that 700 MHz interoperability channels remain FDMA 12.5 kHz and are not affected by these FCC regulatory requirements for 6.25 kHz channel equivalence.

### INTER-RF SUBSYSTEM INTERFACE (ISSI)

The P25 ISSI is a wireline, network IP-based solution that builds on today's P25 CAI.

A key advantage of wireline interoperability solutions is that P25 systems with different system IDs, different user databases and different RF bands can be interconnected. Wireline solutions keep the traffic digitally vocoded and encrypted for greater performance and security. ISSI allows public safety agencies to:

- Utilize the coverage areas of existing connected networks, which might span thousands of square miles.
- Maintain secure, encrypted traffic across the networks.
- Roam on to connected networks and still talk back to their home users and home dispatcher.

For more details regarding these interfaces, please see the TIA Telecommunication Industry Association web site: [www.tiaonline.org/standards/](http://www.tiaonline.org/standards/)

COMMON AIR INTERFACE		
ATTRIBUTES	P25 FDMA	P25 TDMA
Vocoder	Full-rate vocoder	Half-rate vocoder
Channel Bandwidth	12.5 KHz FDMA	12.5 KHz TDMA (6.25e)
Modulation	C4FM	H-CPM / H-DQPSK
Encryption	AES	AES
Voice Channel Data Rate	9.6 kbps	12 kbps
Control Channel Data Rate	9.6 kbps	9.6 kbps

\*View the 2011 SAFECOM Recommended Guidance for Federal Grant Programs [http://www.safecomprogram.gov/SiteCollectionDocuments/FY\\_2011\\_SAFECOM\\_Guidance\\_121510.pdf](http://www.safecomprogram.gov/SiteCollectionDocuments/FY_2011_SAFECOM_Guidance_121510.pdf)

## OTHER INTERFACES

Project 25 has other interfaces including:

- **Subscriber Data Peripheral Interface** – specifies the port through which mobile and portable radios connect to laptops or data networks
- **Fixed Station Interface (FSI)** – specifies a set of mandatory messages to support digital voice, data, encryption and telephone interconnect for wireline communication to a conventional fixed station
- **Console Subsystem Interface (CSSI)** – specifies the basic messaging to interface a console subsystem to a P25 RF subsystem
- **Data Network Interface** – specifies the RF subsystem's connections to computers, data networks, or external data sources
- **Telephone Interconnect Interface** – specifies the interface to Public Switched Telephone Network (PSTN) to support both analog and ISDN telephone interfaces

## MULTI-VENDOR SOURCING

There are thirty-six Project 25 equipment manufacturers and service providers offering a wide array of P25 equipment: stations, repeaters, mobiles, portables,

consoles, software, test equipment, and services such as system integration and consultant services\*\*. The depth and diversity of these Project 25 offerings provides public safety agencies with the confidence that they have options to meet their needs.

Additionally, the competition within the Project 25 market space continues to grow and to drive new P25 product and service enhancements and innovations.

\*\*Source: Project 25 Technology Interest Group (PTIG) - Project 25 Equipment Manufacturers List, Revised July 2011" [http://www.project25.org/images/stories/ptig/docs/Manufacturer\\_Information/P25\\_PTIG\\_Member\\_List\\_2011\\_07\\_v1.pdf](http://www.project25.org/images/stories/ptig/docs/Manufacturer_Information/P25_PTIG_Member_List_2011_07_v1.pdf)

## JOIN THE STANDARDS PROCESS

Project 25 is unique in that public safety practitioners are a part of the standards development process.

Public Safety practitioners can participate in the standards development process thru the P25 User Needs Sub-committee which defines and prioritizes user requirements for possible P25/TIA standardization. A Public Safety practitioner can also be a member of an APIC Task Group such as the TDMA task group which serves as the venue for drafting the standard documents.

To learn more information or to join go to the TIA web site.

## MOTOROLA COMMITMENT

Motorola is proud to be part of the Project 25/TIA-102 standardization process and, along with other manufacturers, provide extensive technical resources in the development and maintenance of the standard.

Since the 1990's Motorola has invested in Project 25, developing the ASTRO® 25 portfolio of networks, devices, applications and services. With over 350 ASTRO 25 systems and over 2 million P25 capable units deployed worldwide, we are committed to the standard and support thousands of public safety agencies as they meet their interoperability requirements.

As the standard evolves in the future, Motorola looks forward to a continued relationship with the standard body and public safety users to enhance interoperability for first responders.

## PROJECT 25 INFORMATION SOURCES

- Project 25 Technology Interest Group (PTIG) [www.project25.org](http://www.project25.org)
- TIA (Telecommunication Industry Association) [www.tiaonline.org/standards/](http://www.tiaonline.org/standards/)
- Motorola [www.motorola.com/project25](http://www.motorola.com/project25)

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