Unit 4

Interoperable Communications

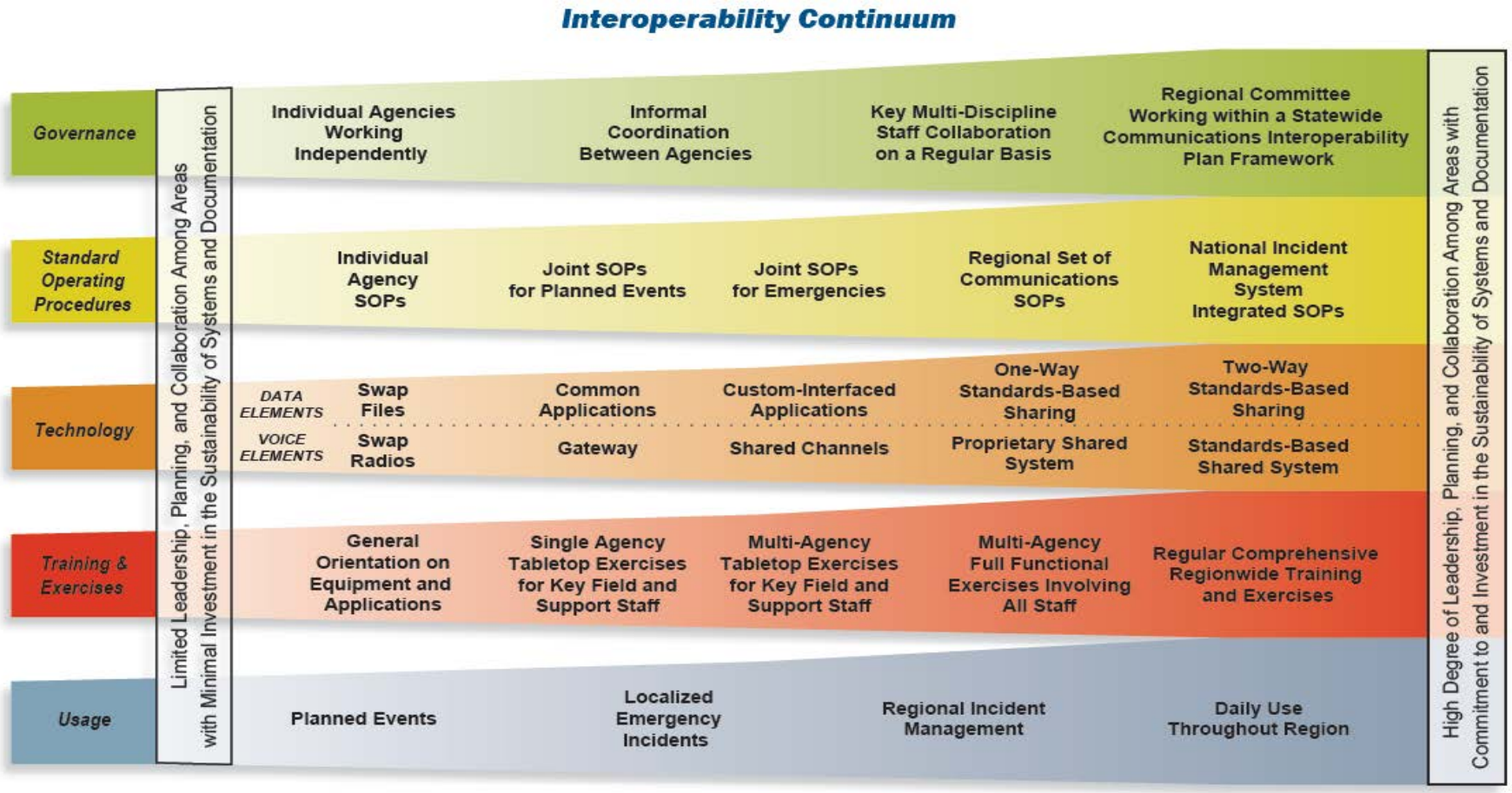
Unit Terminal Objective

Identify methods for the application, coordination, and use of interoperable communications.

SAFECOM Definition of Interoperable Communications

The ability of Public Safety responders to share information via voice and data communications systems on demand, in real time, when needed, and as authorized.

Interoperability Continuum



Governance Lane

- May establish authority through elected officials or executive councils
- The ability to codify relationships and make relationships sustainable
- Provides for Operations and Technical working groups
- Strategic Plan
- Identifies future funding sources
- Establishes agency rights and responsibilities

Standard Operating Procedures Lane

- Establishes Rules of Use
- Procedures for the activation, response, and deactivation of communication resources
- Provides a process for problem resolution
- Adopt Incident Command System (ICS) to integrate communications into the National Incident Management System (NIMS)
- Technology is not an unconditional solution to interoperability
- SOPs are essential to effective interoperable communications

Technology Lane

- Cache radios (swap radios):
  - Both large and small caches have great utility
  - Small caches can be agile
    - Six portable radios in the back of a police sergeant's car can be deployed quickly to fill gaps in interoperability

Other Swap Radio Resources

- NIFC: National Interagency Fire Center
  - Manages USFS, BLM, and aviation frequencies for primarily wildland fire fighting to provide a coordinated effort between Federal and State land management agencies
  - Manages portable communication equipment and systems
  - May provide a Communications Coordinator, depending on size, complexity, and number of incidents

Other Resources

National Incident
Radio Support Cache
User's Guide

2009

National Interagency Incident Communications Division
National Interagency Fire Center
3833 S. Development Ave.
Boise, Id. 83705

CDO Phone	(208) 387-5644
Toll Free	(877) 775-3451
FAX	(208) 387-5892

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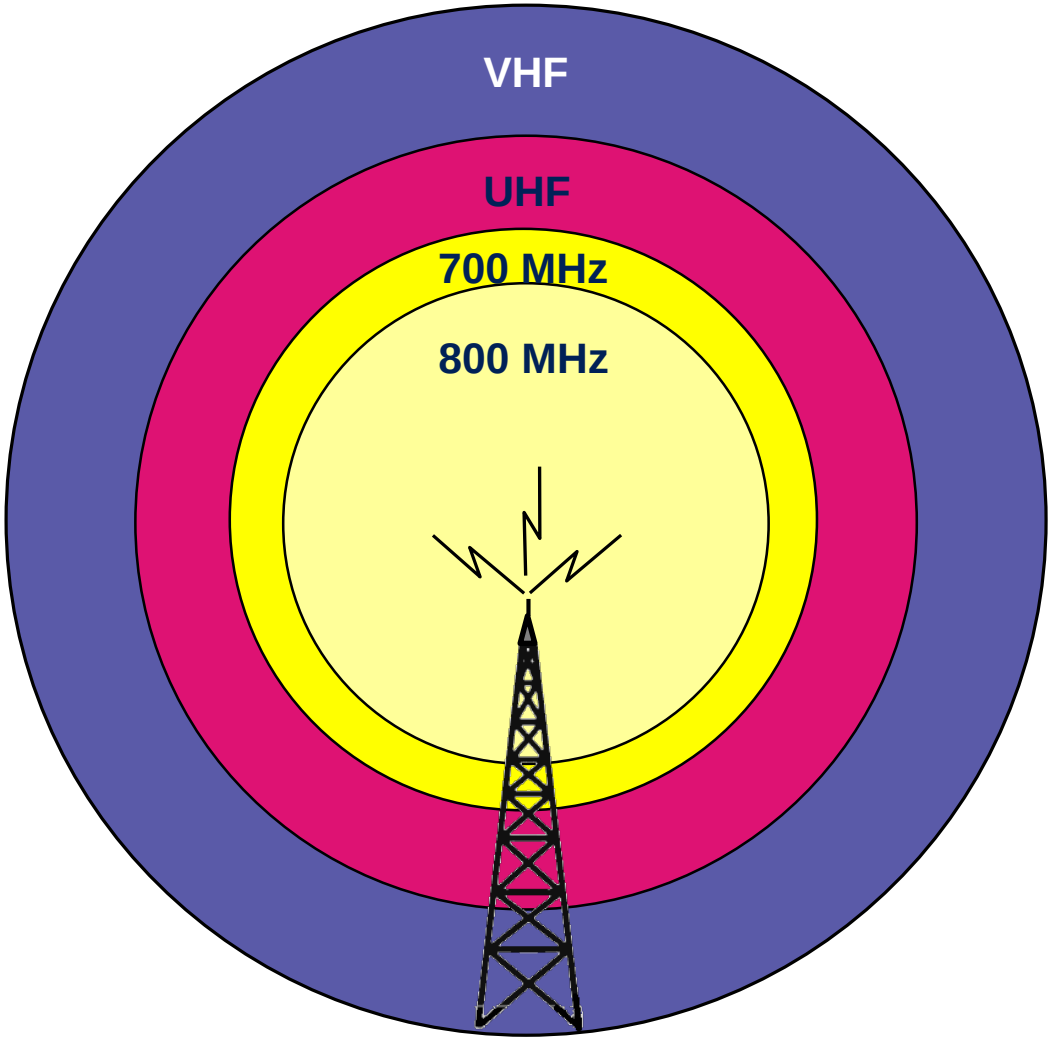
Technology Lane (cont'd)

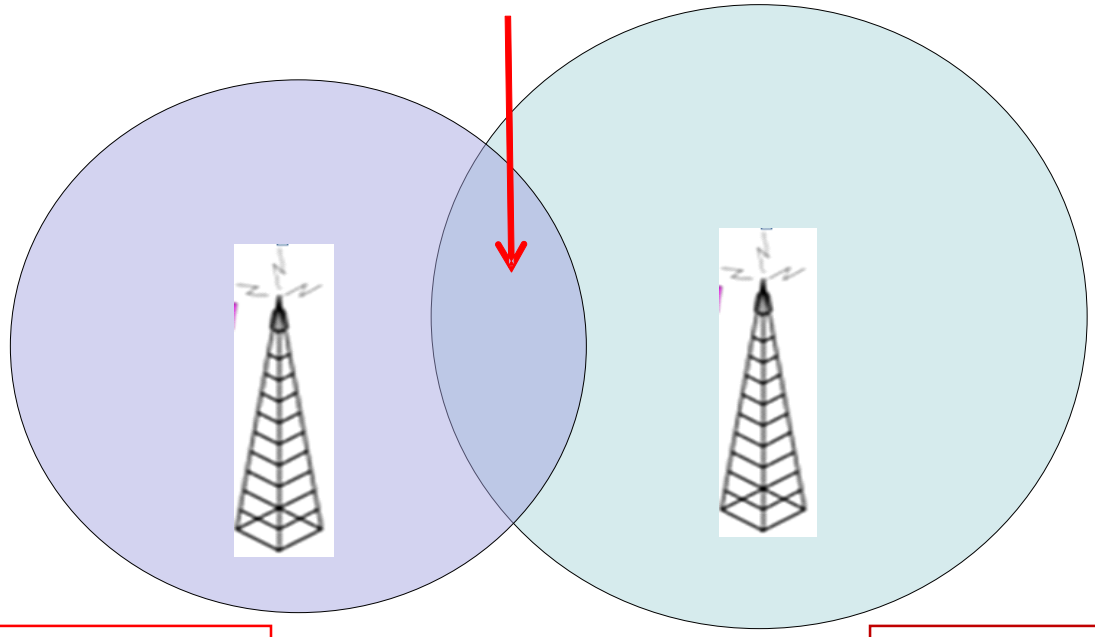
- **Gateways: Gateway systems interconnect channels of disparate systems**
  - **Fixed gateways, such as console patches, are in use in many dispatch centers**
  - **Mobile gateways, portable interconnect switches, require technical support**

Concentric Coverage



Overlapping Coverage

The only area you have interoperable radio coverage is here

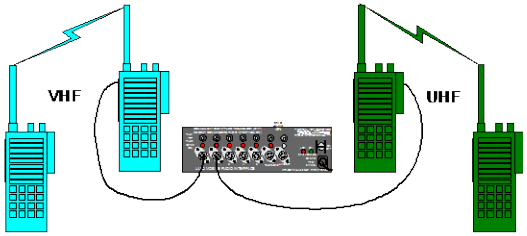


Agency "A"'s UHF Repeater System Coverage

Agency "B"'s VHF Repeater System Coverage

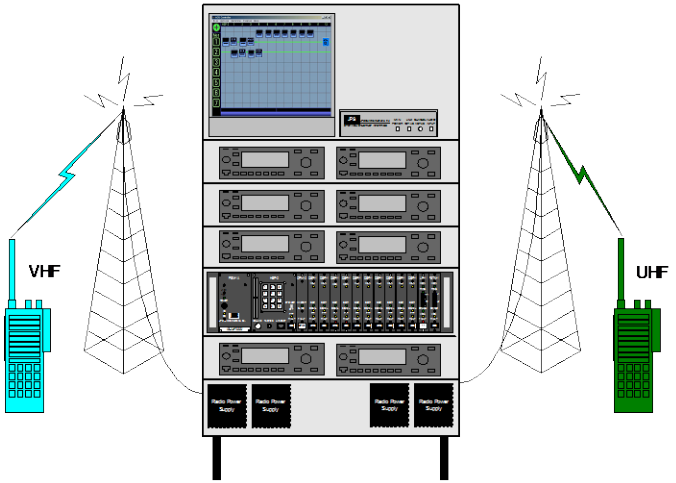
Cross-Connect Deployment

Portable Cross-connect



Used on a ***temporary*** basis to link two more radio nets

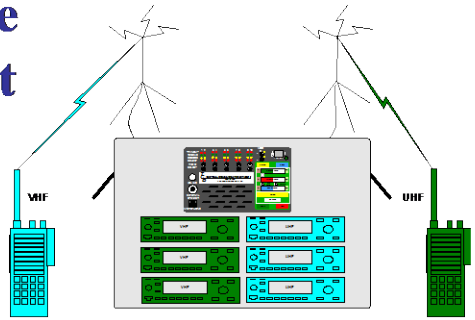
Fixed Cross-connect



Used on either a permanent or a temporary basis to provide real-time on-demand communication interoperability

Transportable Cross-connect

Used on a temporary basis to link two more radio nets (turn-key solution)



Technical and Operational Resources

Gateways

Gateways - Pros

- Gateways provide a connection between unlike audio sources or radio systems
- Gateways can make interoperability a reality, with quality audio and clean signals
- Properly configured gateways will allow all radios to hear all the traffic, taking system delays, etc., into consideration
- Fixed gateways can be engineered, tested, and exercised

Gateways - Cons

- Coverage is only equivalent to the smallest footprint created by the overlap of all interconnected systems
- Incorrectly managed, joined audio sources can create major operational problems
- Mobile Gateways are not “plug and play” and have the potential to cause connected communications networks to fail
- Failure to adjust audio levels correctly will result in difficult-to-understand audio from different sources

Gateways - Cons (cont'd)

- Not fully understanding the methodology used in the gateway can result in the "Ping-Pong" effect and other issues that make a combined system unusable
- Gateways require knowledgeable personnel with the skills to troubleshoot problems at all times
- Gateways must be used as a part of a coordinated plan at an incident; knowing where they are and what they are patching is essential for the COML
- Gateways are not plug and play

Technology Lane (cont'd)

Shared channels: Common frequencies or talkgroups that have been established and are programmed into radios to provide interoperable communications among agencies.

Technology Lane (cont'd)

Shared system: The use of a single radio system infrastructure to provide service to several first responder agencies within a region.

Technology Lane (cont'd)

- **Standards-based Shared System - P25 is synonymous with Public Safety Digital Radio Standards in the United States**
- **Ongoing joint effort since 1989 between Association of Public-Safety Communications Officials, Intl. (APCO), the National Association of State Technology Directors (NASTD), the Telecommunications Industry Administration (TIA) and agencies of the Federal Government**

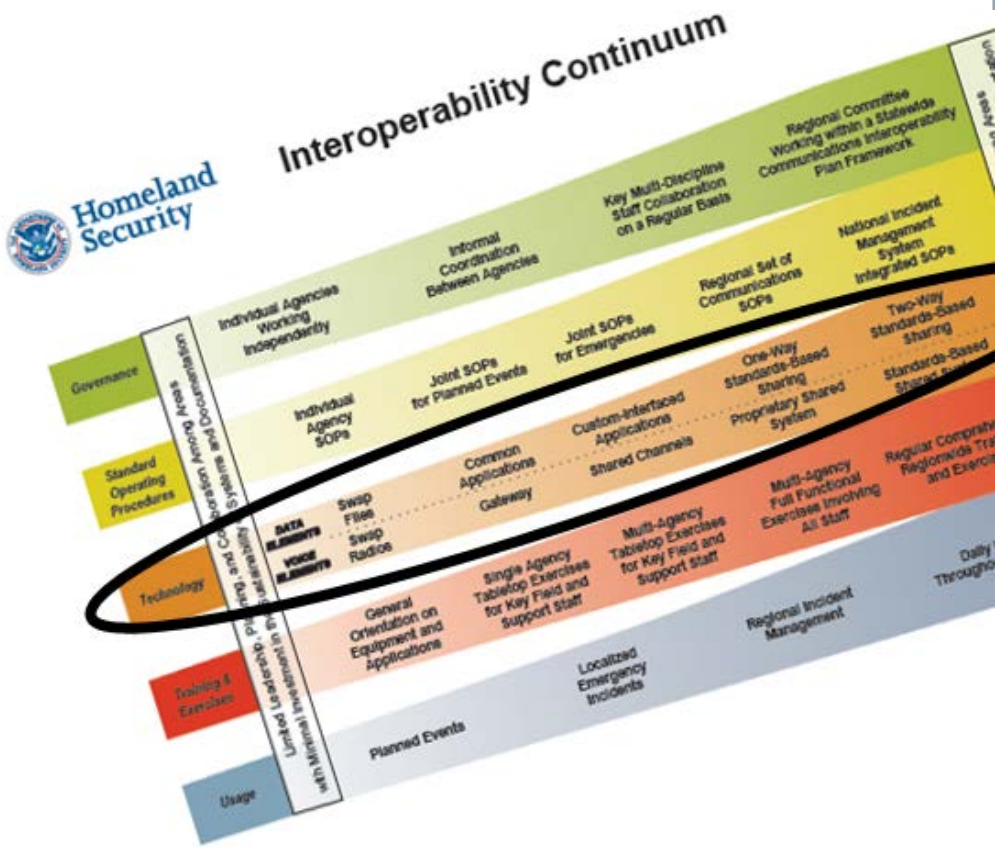
Standards-based Shared Systems

- The goal of P25 is to ensure a future with an open standards-based alternative for Public Safety digital radio systems
- Phase One is for 12.5 kHz channels and Phase Two is for 6.25 kHz channels

- P25 has eight defined interfaces
  - Common Air Interface (CAI)
  - Console Subsystem Interface (CSSI)
  - Data Interface
  - Fixed Station Interface (FSI)
  - Inter-RF Subsystem Interface (ISSI)
  - RF Subsystem Interface (RFSS)
  - Subscriber Data Peripheral Interface (MDTs, etc.)
  - Telephone Interconnect Interface

SAFECOM Interoperability Continuum

- **Technology Lane (Data Elements)**
  - **Swap Files**
  - **Common Applications**
  - **Custom-Interfaced Applications**
  - **One-way Standards-Based Sharing**
  - **Two-way Standards-Based Sharing**



Technology Lane (DATA Elements)

- **Vision**
  to provide emergency responders with the first nationwide high-speed, wireless broadband network dedicated to public safety

FirstNet (cont'd)

The Middle Class Tax Relief and Job Creation Act of 2012

- **Provide Singular Focus**
- **Creates FirstNet as an independent entity within the NTIA**
- **The First Responder Network Authority shall:**
  - **Hold the single public safety wireless license**
  - **Take all actions necessary to ensure the building, deployment, and operation of the nationwide public safety broadband network**

FirstNet (cont'd)

- First time, lawmakers legislated a technology –
  - Long Term Evolution or LTE
  - Ensures interoperability
  - Fosters the availability of low cost user devices
- Act's dedicated 20 MHz of 700 MHz public safety broadband spectrum
- FirstNet service must cover 95 percent of the United States including all 50 states, the District of Columbia, and all territories

FirstNet (cont'd)

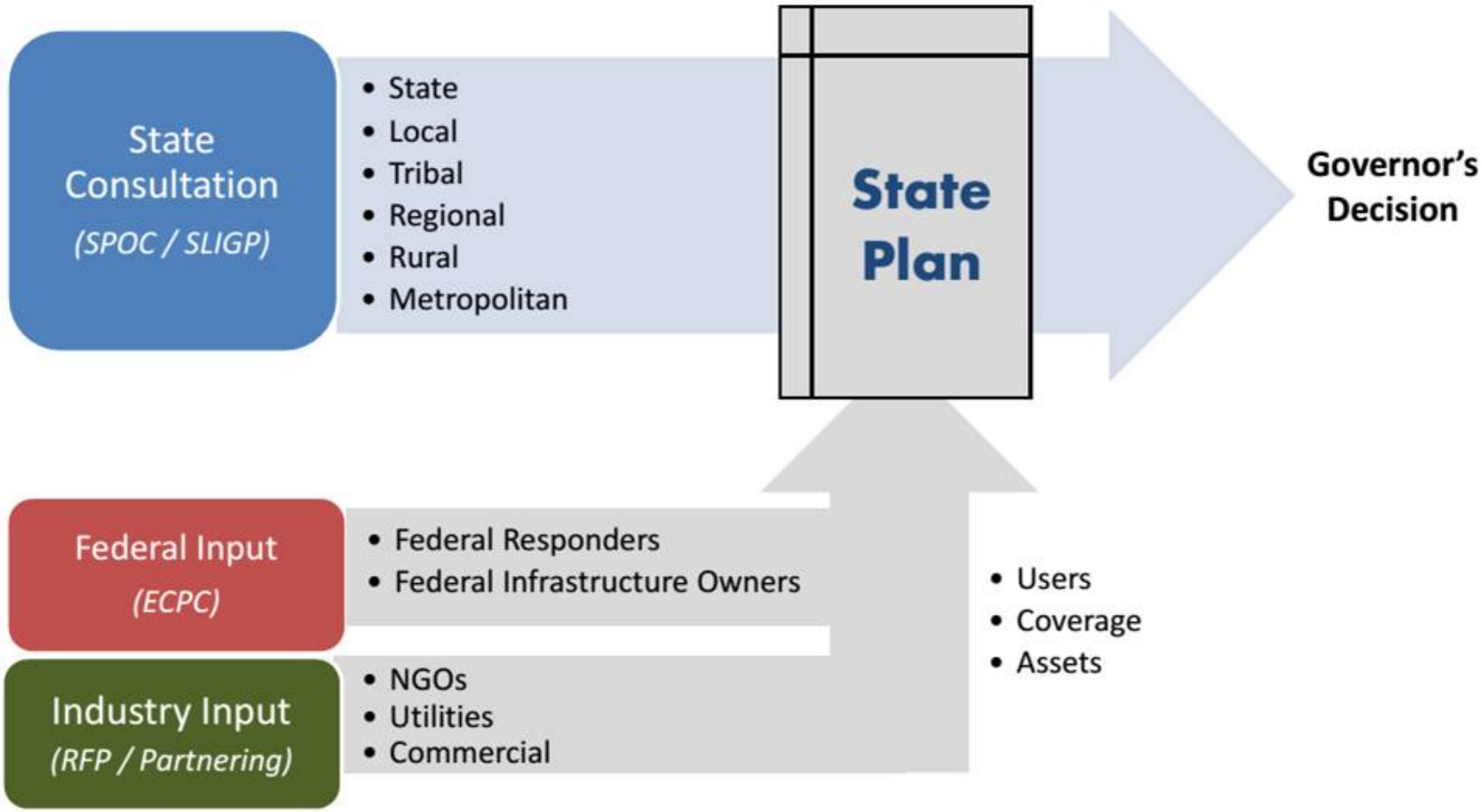
- Why FirstNet?
- Public safety community has been frustrated by the lack of progress in realizing a dedicated, reliable, interoperable network
- Ten years after 9/11, public safety users still have interoperability problems
- FirstNet represents a most significant development for public safety

FirstNet (cont'd)

- Who will use FirstNet?
- FirstNet is dedicated for the public safety community's use:
  - Law Enforcement
  - Firefighters
  - Emergency Medical Personnel
- Secondary users
  - Utilities
  - Critical infrastructure

FirstNet (cont'd)

- **Who's part of the development**



Training and Exercises Lane

- Single agency to regional training and exercise of the Tactical Interoperable Communication Plans (TICPs)
- Following Homeland Security Exercise and Evaluation Program (HSEEP) guidance
- Discussion-based Table Top Exercises (TTX)
- Operationally focused:
  - Functional Exercises (FE)
  - Full-Scale Exercises (FSE)

Usage Lane

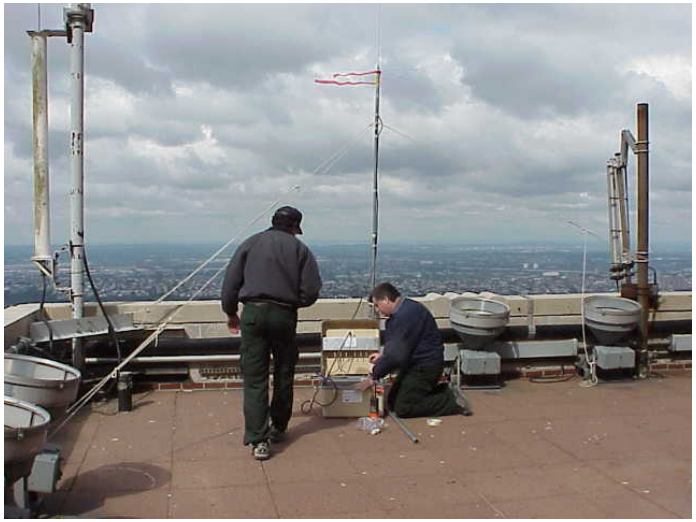
- Planned events/exercises
- Local emergencies
- Regional incident management
- Daily use

Exercise 4-1

Communication Asset Deployment Strategies

Exercise 4-1

Exercise 4-1



Exercise 4-1

Exercise 4-1

Exercise 4-1

Exercise 4-2

Interoperability Challenges

Objectives Review

1. *Define the concept of interoperability.*
2. *Identify and describe the five lanes of the SAFECOM interoperability continuum.*

Questions?