

All-Hazards Communications Technician (COMT)

Training Course

Unit 3: Interoperable Communications



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Unit 3: Objectives

- Identify Interoperable communications
- Understand and define the various aspects of interoperable communications as defined in the SAFECOM Continuum
- Consider how the Continuum impacts the position of the COMT



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COMT UNIT 3 – INTEROPERABLE COMMUNICATIONS

Interoperability Defined

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.

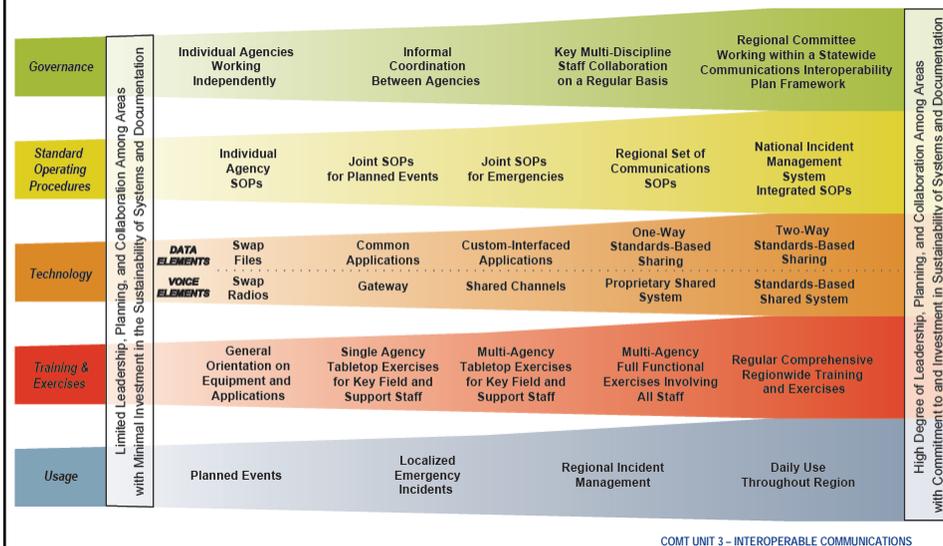


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COMT UNIT 3 – INTEROPERABLE COMMUNICATIONS

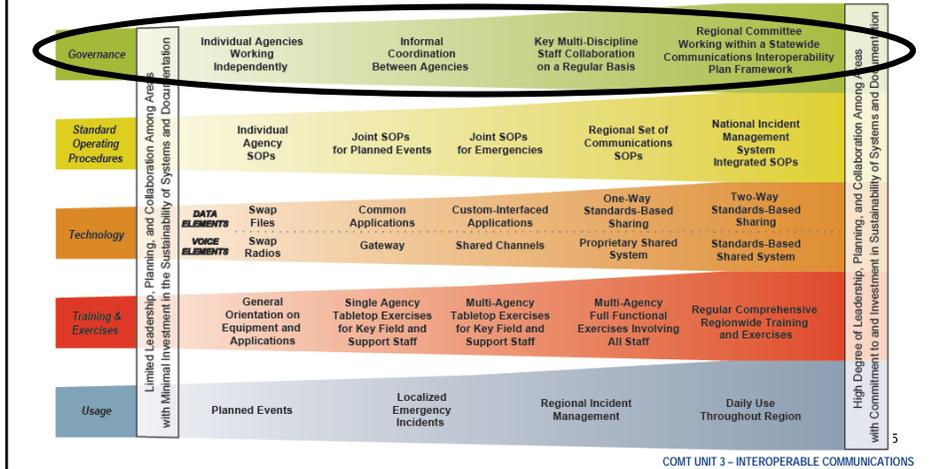
SAFECOM Interoperability Continuum



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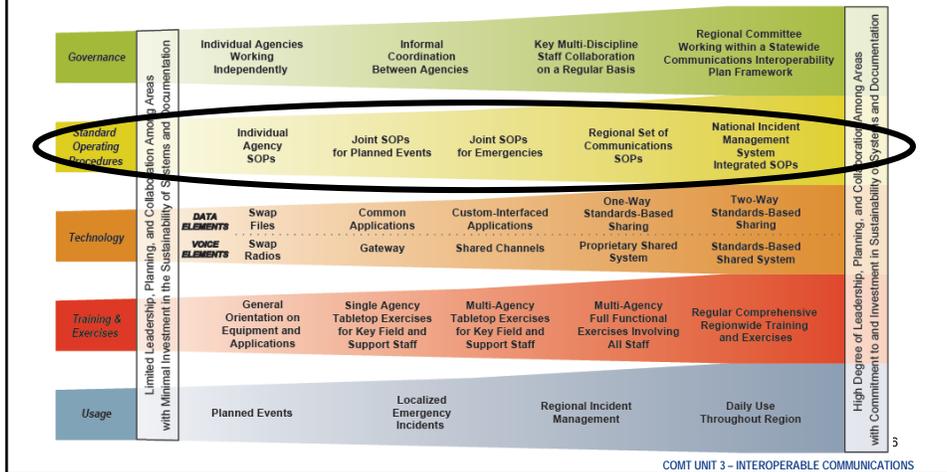
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- Governance



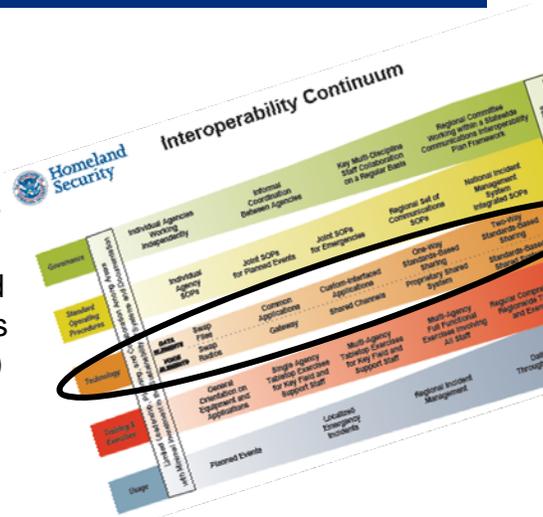
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- Standard Operating Procedures (SOPs) Lane



SAFECOM Interoperability Continuum

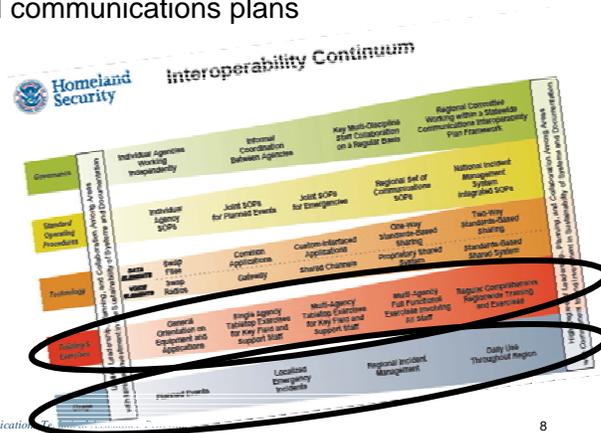
- Technology Lane
 - Swap radios (Cache Radios)
 - Gateways
 - Shared channels
 - Shared systems
 - Standards-based systems (such as Project 25 (P25))



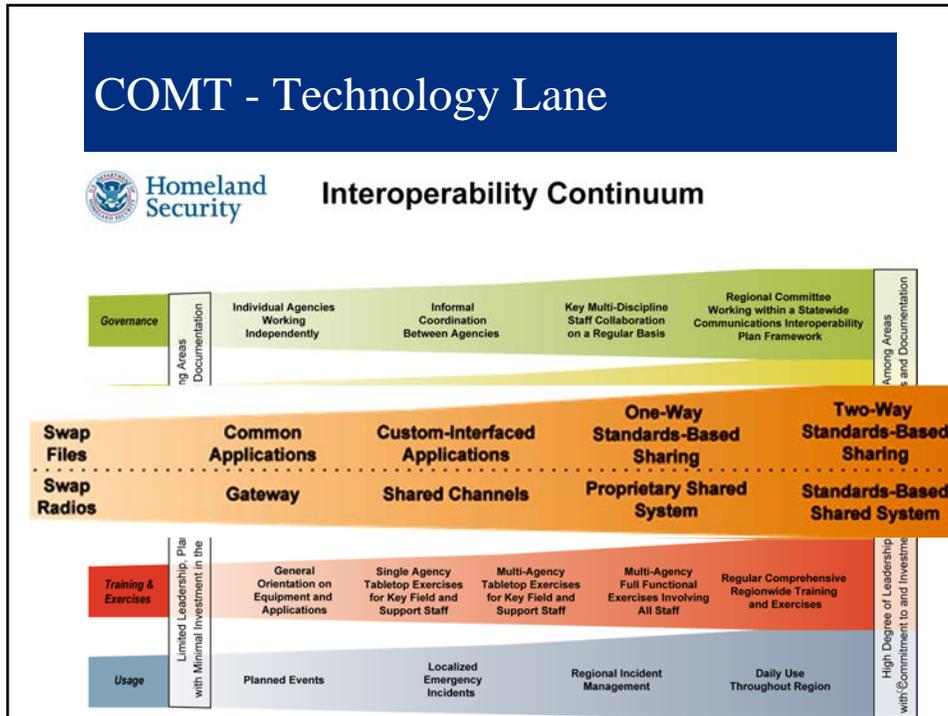
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SAFECOM Interoperability Continuum

- Training and Exercises Lane
- Usage Lane
 - Local/regional communications plans



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Swap Radios – Cache Assets

- Caches are different from swapping radios, as it is a one way issue of equipment
- Caches may be small (5-10), or large (2-3 thousand)
- Small caches have great utility as they are agile and quickly deployable
- Cache management has many issues: maintenance, battery support, refurbish and repair, and accountability
- Training may be required for cache issued radios
- Programming and cloning may be required



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5-5-90

- 5-5-90
 - The battery cycle for a typical NiCad rechargeable radio battery
 - Means the battery is designed for 5% Transmit, 5% Receive, and 90% standby over 8-10 hours



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5-5-90 (Cont)

- Several factors can reduce the effectiveness of this design:
 - Heavy radio traffic, both transmit (TX) and receive (RX)
 - Age and condition of battery
 - Temperature – too hot or too cold
 - Most digital radios consume more power than analog
 - Extended shift requirements



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Gateways – General

- 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

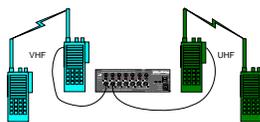


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Gateways

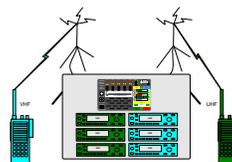
Portable Cross-connect



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

Transportable Cross-connect

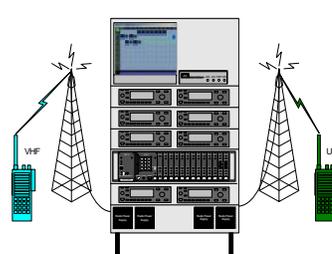
Used on a temporary basis to link two more radio nets (turn-key solution)



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Fixed Cross-connect



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

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Gateways

Coordination is the key:

- 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



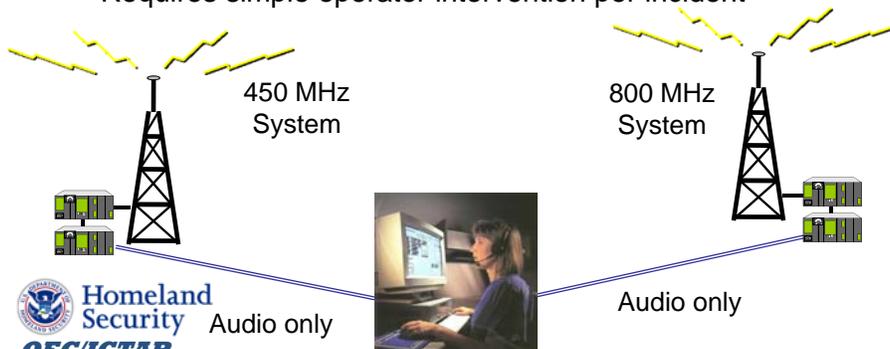
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Gateway – Console Patch

- Hardware system-level component located in dispatch facility
- Audio-only links
- Requires simple operator intervention per incident



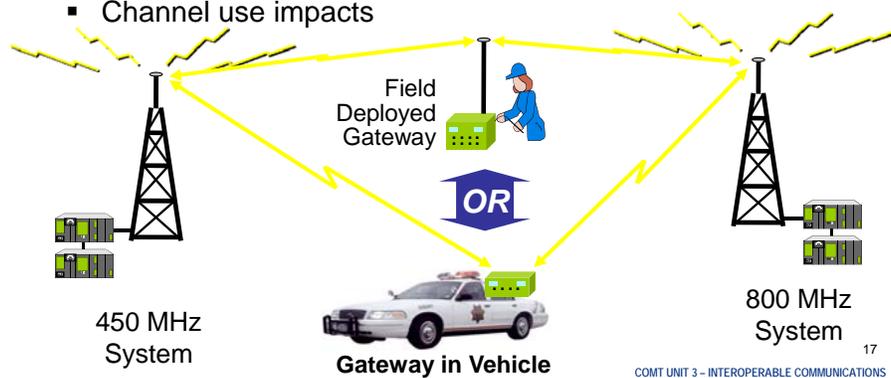
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Gateways – Mobile Devices

- Mobile/portable apparatus linking two networks via RF links
- Variety of technologies and approaches
- Requires operator intervention
- Channel use impacts



Shared Channels

- Advantages:
 - Established local emergency communications plans
 - Cost efficient – often a design component of construction
 - Simple solution not requiring separate infrastructure
 - Simplex and repeated channels can be used
 - Multiband radios will increase the utility



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Shared Channels (Cont)

- Disadvantages:
 - Pre-existing or on-scene radio programming required
 - Band-specific without multiband radios
 - Trunked operations require system coordination
- Best use:
 - Regions with coordinated channel planning
 - Unplanned events (Operational pre-plan required in advance)



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Shared Channels – Mutual Aid Channels

- Advantages:
 - Multiple radios talk directly to each other using common channels in conventional mode
 - Low cost to setup
 - National and/or regional standard frequency use
 - National channels increase potential for agencies located out of normal support area
- Disadvantages:
 - Requires common frequency band
 - Effective use requires dedicated planning/training by regional agencies



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Shared Channels – Mutual Aid Channels (Cont)

- Best use:
 - All agencies capable of a common frequency band
 - When advanced features are not required
 - Advanced features on required
 - Ad-Hoc implementation
 - Talkgroups may have dedicated mutual aid groups designated at the system level instead of discrete channels (trunked systems)
 - May not be compatible with external roamers



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Standards-Based Shared Systems

- Advantages:
 - Accepted Public Safety Standard (P25)
 - Conventional or Trunked
 - No setup time
 - Full system primary features set available
 - Wide event scale capability
 - No, or limited, additional subscriber training required
 - Subscribers may retain contact with home system



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Standards-Based Shared Systems (Cont)

- Disadvantages:
 - Initial system's cost
 - Not all built to a consistent standard
 - Significant operational governance required
 - Standard is not complete. Allows for proprietary loopholes
 - True "shared" systems between manufacturers are elusive



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Standards-Based Shared Systems (Cont)

- Best use:
 - Any scale of event
 - Regional area of coverage
 - Cross frequency band (requires concurrent coverage)



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Standards-Based Shared Systems (Cont)

- Works via:
 - All radios built to a standard can talk to each other via infrastructure or talkaround (P25)
- Advantage:
 - Interoperability via turn of a dial
 - Links different vendor systems and frequency ranges
 - “Out of the box” interoperability; simple to set up infrastructure
 - Next generation equipment is backward-compatible
 - No console intervention required
 - All advanced features are available to users



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Standards-Based Shared Systems (Cont)

- Disadvantage:
 - Requires equipment to be built to same standard, usually via new/upgraded system purchase
 - Not all vendors building to standard; interoperability holes are still possible



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Multi-band Interoperability

- VHF (high), UHF (450), 700/800 band radios
 - 700 and 800 are a seamless operation seen as a continuous block of spectrum
 - Legacy 800 systems may not be capable of 700 MHz
 - The Federal Communications Commission (FCC) structured 700/800 bands similarly
 - Dual band or tri-band product is available now from multiple vendors



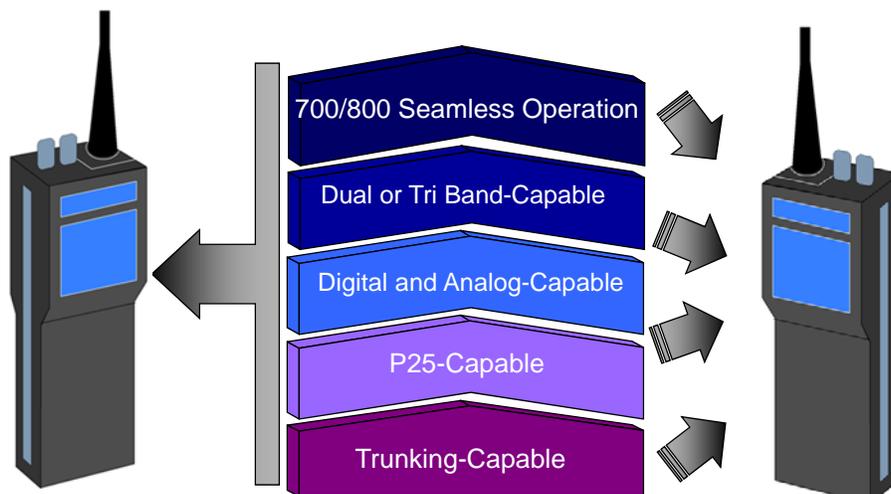
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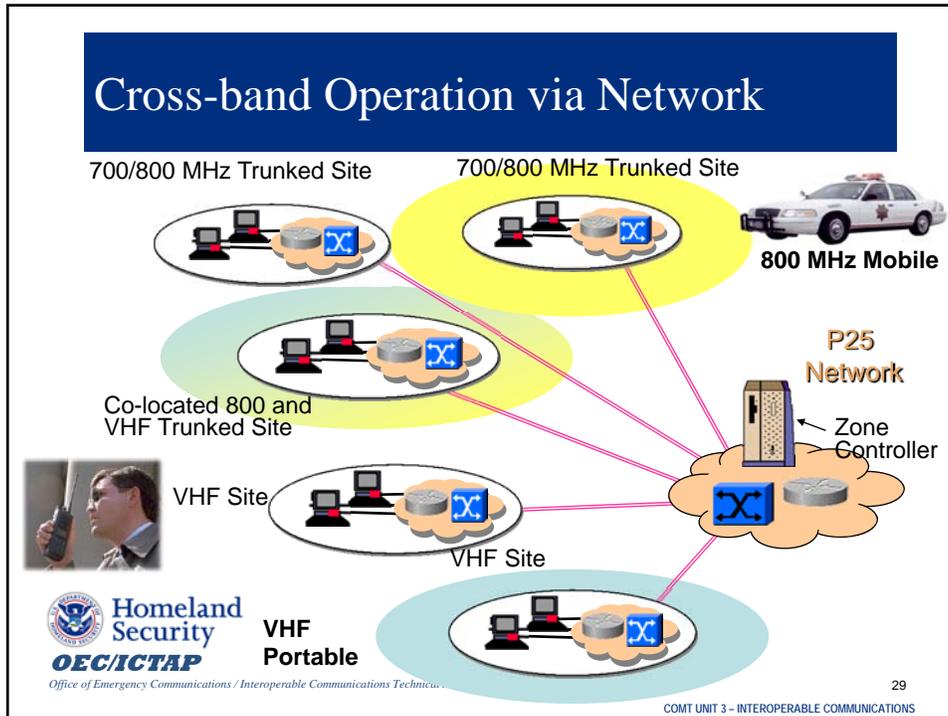
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New Portable Products Multi-band and Feature Rich



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Unit 3 Questions


QUIZ



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