All-Hazards Communications Technician (COMT)

Training Course

Unit 6: Gateway Technology Awareness

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Unit 6: Objectives

- Identify gateway support systems typically used for emergency communications
- Identify the appropriate applications of gateways
- Identify the potential hazards of gateways

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2

COMT UNIT 6 – GATEWAY TECHNOLOGY AWARENESS

Gateway Technology

- 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 ongoing technical support

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COMT UNIT 6 – GATEWAY TECHNOLOGY AWARENESS

Gateway Technology (Cont)

- Cross-connect audio from normally non-compatible radio frequency (RF) systems
  - Connects audio and push-to-talk (PTT) functions from system “A” to system “B” (and “C”, “D”, and so on) and vice versa
- May also connect telephone, cell phones, and Internet Protocol (IP) audio sources to conventional RF systems

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COMT UNIT 6 – GATEWAY TECHNOLOGY AWARENESS

Cross-Connect Deployment

Portable

Incident Area Network (IAN) – Small, temporary network created for a specific incident

Transportable

Incident Area Network (IAN) – Small, temporary network created for a specific incident

Fixed

Jurisdiction Area Network (JAN) - Main communications network for first responders; provides connectivity to the Extended Area Network (EAN)**.**
Extended Area Network (EAN) - Links city, county, regional, state, and national systems

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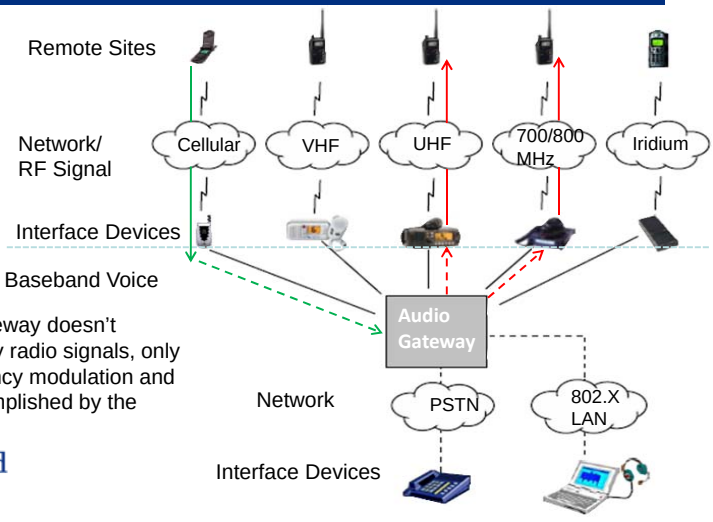
5

COMT UNIT 6 – GATEWAY TECHNOLOGY AWARENESS

Gateway Client Systems



Note:

The Audio Bridge/Gateway doesn't transmit or receive any radio signals, only clear voice. All frequency modulation and demodulation is accomplished by the interfaced devices.

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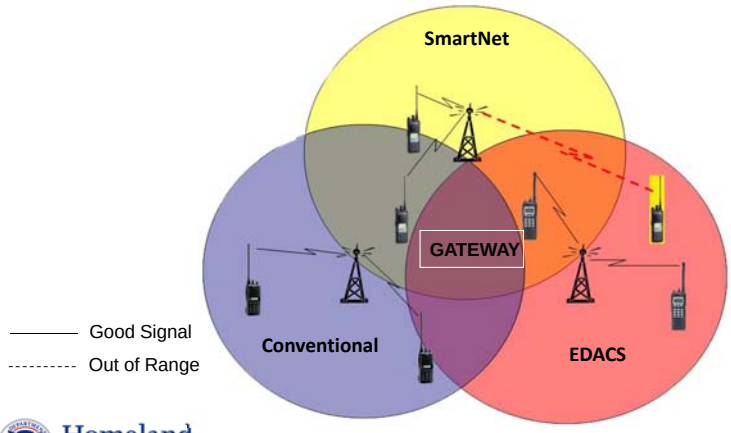
6

COMT UNIT 6 – GATEWAY TECHNOLOGY AWARENESS

Deployment Considerations: Gateway Placement



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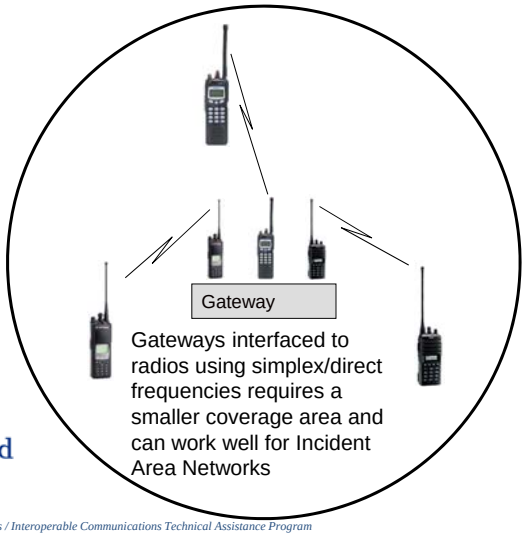
7

COMT UNIT 6 – GATEWAY TECHNOLOGY AWARENESS

Deployment Considerations: Extending Coverage Area



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COMT UNIT 6 – GATEWAY TECHNOLOGY AWARENESS

Gateway Form Factors

Brand "A"

Brand "B"

Brand "C"

Brand "F"

Brand "E"

Brand "D"

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COMT UNIT 6 – GATEWAY TECHNOLOGY AWARENESS

Gateways – Pros

- Provide a connection between unlike audio sources or radio systems
- 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, talk permit tones, and so on, into consideration
- Fixed gateways can be engineered, tested, and exercised

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COMT UNIT 6 – GATEWAY TECHNOLOGY AWARENESS

Gateways – Cons

- Incorrectly managed, joined audio sources can create major operational problems
- Mobile gateways are not "plug and play"
  - Potential to cause connected communications networks to fail
- Failure to adjust audio levels correctly will result in difficult-to-understand audio from different sources

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Gateways – Cons (Cont)

- Does not add capacity; potentially reduces active operational channels to support interoperable communications
- Does not change the footprint of a channel
- 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

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Gateways – Cons (Cont)

- 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

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COMT UNIT 6 – GATEWAY TECHNOLOGY AWARENESS

Gateway Limitations: Overview

- Gateways retransmit across multiple frequency bands and/or systems providing an interim interoperability solution as agencies move toward shared systems. However, gateways have the following limitations:
  - No Encryption
  - Inefficiencies
  - Geographic Area
  - Portable Battery Life
  - Set-up Time
  - Frequency conflicts/interference

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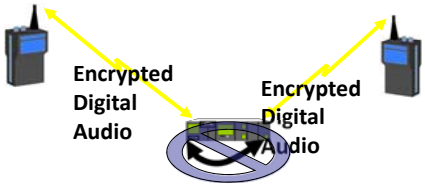
COMT UNIT 6 – GATEWAY TECHNOLOGY AWARENESS

Gateway Limitation: No Encryption

- The Gateways don't transmit or receive any RF signals
- Gateways pass baseband audio (audible voice)
- All modulation/demodulation and Encryption/Decryption is accomplished by the interface devices



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COMT UNIT 6 – GATEWAY TECHNOLOGY AWARENESS

Gateway Limitation: Inefficiency

Additional Assets

- To provide interoperability on the scene of an incident each agency needs to provide a mobile radio in advance or a portable on the scene of the incident
- This ties up one additional radio asset for each system/channel, the more channels you tie together in a patch the more radio spectrum (frequencies) being utilized for a single talk path

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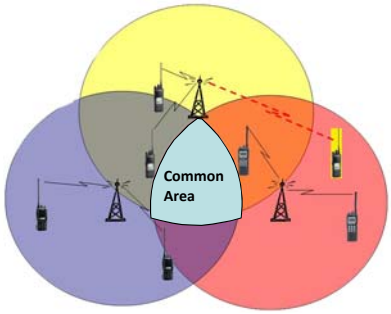
COMT UNIT 6 – GATEWAY TECHNOLOGY AWARENESS

Gateway Limitation: Coverage Area

Gateway's effective geographic coverage area is limited to the area that is common to all systems participating in that link.



Note: In this usage the Gateway does not increase your coverage range. Your radio must be able to hit your normal network to communicate

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Gateway Limitation: Set-Up

- Some gateways require significant time to configure, others are a matter of simply hooking up radios and turning the system on.
- It doesn't matter the type of gateway you use, it is imperative the gateway be configured in its standard operating configuration prior to deployment

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COMT UNIT 6 – GATEWAY TECHNOLOGY AWARENESS

Gateway Limitation: Battery Life

- Portable Radios have a Limited Use Time due to Battery Life
- Mobile gateways are designed to enable interoperable communications for short duration events
- To extend mobile gateway operating time, consider: additional power sources, radio chargers, extra batteries, and maybe even a spare portable radio

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Gateway Limitation: Frequency Conflicts/Interference

- Antennas must be properly positioned to prevent radio interference or desensitizing the other radio's receivers
- In regions where multiple mobile gateway devices are accessible, it is critical to coordinate the use of these devices to ensure that multiple gateways do not "step-on" each other

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COMT UNIT 6 – GATEWAY TECHNOLOGY AWARENESS

Best Practices

No Encryption

- Treat all conversations as if they are in the clear

Inefficiencies

- To prevent excess chatter, only patch those systems that really need to talk to each other for the time they need to talk. Remember, just because you can patch someone doesn't mean you should

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COMT UNIT 6 – GATEWAY TECHNOLOGY AWARENESS

Best Practices (Cont)

Inefficiencies (Cont)

- When using an audio gateway with a trunked system, it's best to have a high priority talkgroup on the system dedicated for gateway use

Geographic Area

- Use simplex/direct frequencies for localized incidents

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COMT UNIT 6 – GATEWAY TECHNOLOGY AWARENESS

Best Practices (Cont)

Portable Battery Life

- Use mobile radios whenever possible

Set-up Time

- Interface radios should be tested and adjusted with the audio gateway prior to initial deployment. Some mobile radios require special programming, others may require hardware modification

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Best Practices (Cont)

Setup Time (Cont)

- All gateways require special interface cables to connect to the various types of radios. If a radio must be added ad hoc, the requesting organization should provide a portable radio, additional batteries, charger, and the interface cable

Frequency conflicts/interference

- Coordination is the key - always go through the Communications Leader prior to creating a patch and know what is being patch

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COMT UNIT 6 – GATEWAY TECHNOLOGY AWARENESS

Gateway Video

- Instructor – Show Gateway Video

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COMT UNIT 6 – GATEWAY TECHNOLOGY AWARENESS

Unit 6 Questions

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