All-Hazards Communications Technician (COMT)

Training Course

Unit 9: Satellite Technology Awareness

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Unit 9: Objectives

- Explain the operational capabilities of the various types of satellite systems the COMT may encounter

- Understand the appropriate applications of the various technology resources

- Understand the basic technical and physical principles behind the appropriate technologies

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COMT UNIT 9 – SATELLITE TECHNOLOGY AWARENESS

Satellite as a Resource

- An information exchange platform
  - Bypasses local terrestrial-based platform such as land line or radio
  - Voice (including VoIP)
  - Data (including video)

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COMT UNIT 9 – SATELLITE TECHNOLOGY AWARENESS

Satellite as a Resource (Cont)

- Useful
  - Where local terrestrial-based infrastructure has failed
  - Remote locations with no access to terrestrial systems
  - Command-level voice to remote management
  - Voice for extended area incidents
  - Local Area Network (LAN) can provide incident command network access to other regional LANs and Wide Area Networks (WANs) including the Internet

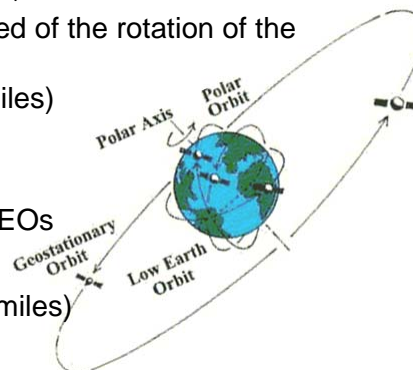**Homeland Security**
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COMT UNIT 9 – SATELLITE TECHNOLOGY AWARENESS

Satellite as a Resource (Cont)

- Format
  - Fixed (typically with a large dish)
  - Mobile (Transportable or handheld)
- Requires clear access to the sky, typically southern exposure
  - Not usable in buildings, dense forest, tunnels, under bridges, and so on
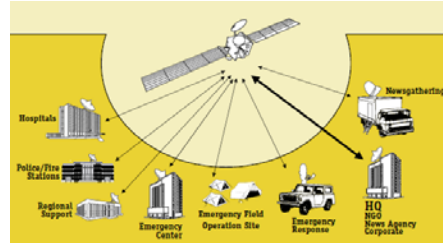
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COMT UNIT 9 – SATELLITE TECHNOLOGY AWARENESS

Satellite Orbits

- Geostationary Earth Orbit (GEO)
  - Orbit matches identical speed of the rotation of the earth
  - Over the equator (22,000 miles)
- Medium Earth Orbit (MEO)
  - Typical orbit (6,000 miles)
  - Not as common as GEOs/LEOs
- Low Earth Orbit (LEO)
  - Orbit is not equatorial (300 miles)
  - 48 to 66 global satellite constellation
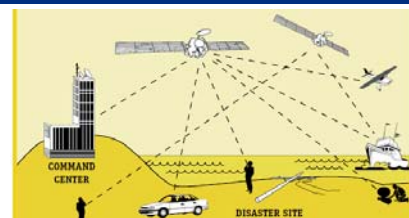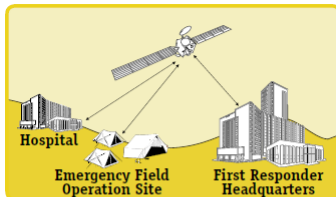
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COMT UNIT 9 – SATELLITE TECHNOLOGY AWARENESS

Fixed Satellite Service (FSS)

- Fixed Satellite Service

  - FSS traditionally referred to as a satellite service that uses fixed satellite infrastructure

  - New technologies allow FSS to communicate with mobile platforms

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• Cellular Restoration	• Voice-over-IP
• Wi-Fi Restoral	• Broadband Internet Access
• Emergency Phone Banks	• Live Video
• Communications on the Move	• Telemedicine
• PSTN Backhaul	• Videoconferencing

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COMT UNIT 9 – SATELLITE TECHNOLOGY AWARENESS

Mobile Satellite Service (MSS) Applications

- Mobile Satellite Service

  - MSS terminals

  - Portable satellite phones and terminals

  - Mounted on a ship, an airplane, truck, or an automobile

  - Handheld terminals carried by an individual

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• Mobile Telephony	• On-the-Move Asset Tracking
• Push-to-Talk Radio	• Data Transfer
• Emergency Response Coordination Communications	• Lone Worker Protection
• Dispatch Coordination Communications	• Environmental Monitoring
	• Event Reporting
	• Messaging

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COMT UNIT 9 – SATELLITE TECHNOLOGY AWARENESS

Satellite Mobile/Fixed

FIXED-TO-FIXED

Hospital
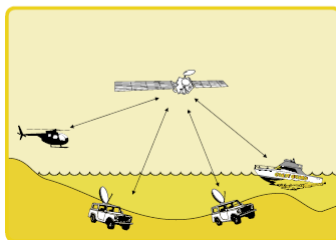Emergency Field Operation Site
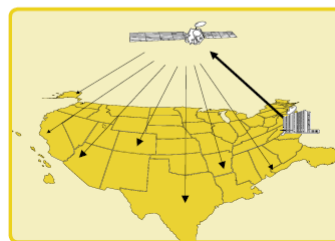First Responder Headquarters

FIXED-TO-MOBILE

MOBILE-TO-MOBILE

POINT-TO-MULTIPOINT

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COMT UNIT 9 – SATELLITE TECHNOLOGY AWARENESS

Satellite Issues

- May be costly to use
- Latency may cause issues with some applications
- May have maximum data transfer limits, causing loss of service
- Can be adversely affected by heavy clouds, rain, and fog
- Multiple terminals in the area
- Congestion at the terrestrial hub
- More of an art than a science in the non-fixed environment

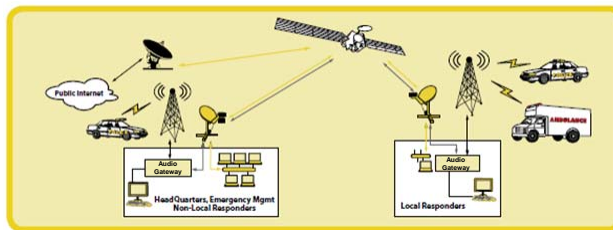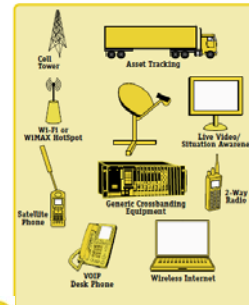**Homeland Security**
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COMT UNIT 9 – SATELLITE TECHNOLOGY AWARENESS

Interoperability by Satellite

- Interconnect with other communications solutions
  - Land Mobile Radio (LMR)
  - Cellular
  - Wi-Fi
  - Via generic cross-banding equipment

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COMT UNIT 9 – SATELLITE TECHNOLOGY AWARENESS

Broadband Connectivity

- Very Small Aperture Terminal (VSAT)
  - Fixed or mobile / transportable
  - Mobile / transportable dish size .74 to 2.4 meter
  - Rapidly deployable
  - Capable of 10+ Mbps down and 4+ Mbps up data speed
  - Internet access
  - VoIP telephone
  - VPN access
  - Video conferencing

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COMT UNIT 9 – SATELLITE TECHNOLOGY AWARENESS

Broadband Connectivity (Cont)

- Laptop Sized Portable Broadband

  - Simple setup for rapid deployment

  - Built in rechargeable battery for portable operations

  - Up to 500 Kbps data speed

  - Telephone access while simultaneously using internet

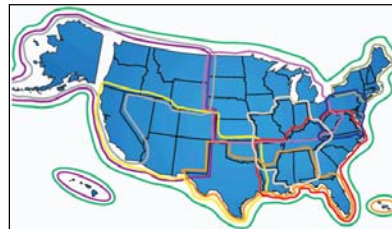 - Live video streaming capable

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Satellite Service Vendors

- Some commonly encountered vendors
  - Inmarsat http://www.inmarsat.com/
  - LightSquared (MSAT)
    - Satellite Mutual Aid Radio Talkgroups (SMART)
    - http://www.lightsquared.com/what-we-do/smart-solutions/

SMART Region Talkgroups

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Satellite Service Vendors (Cont)

- Iridium http://www.iridium.com/
- InteLsat http://www.intelsat.com/
- Hughes
- Globalstar
- Stratos
- TerreStar

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COMT UNIT 9 – SATELLITE TECHNOLOGY AWARENESS

Satellite Information Resource

- Resource guide
  - http://sia.org/guide.pdf

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COMT UNIT 9 – SATELLITE TECHNOLOGY AWARENESS

Unit 9 Questions

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