

Needs Assessment

This course was developed to provide a basic introduction to satellite communications. The Department of Defense and our nation's military are continually increasing their need and dependency for satellite for the transmission of voice, video and data.

Satellite communication provides the user with almost instantaneous access to hi-definition satellite imagery, video surveillance, and basic communications all while maintaining transmission security. In the event of natural or man-made disaster, when terrestrial communications is rendered nonexistent, satellite communications is a reliable alternative.

Course Description

In this program, you will develop knowledge of global satellite networks, applications and secure broadband internet protocol (IP) over satellite as well as broadband for geospatial intelligence (GEOINT) via satellite. The program begins with a review of the basic principles of broadband IP satellite and covers advanced technologies such as private vs. managed services, security considerations, Single Channel per Carrier (SCPC) and Time-Division Multiple Access (TDMA). The presenter will use a dialogue approach for this session to make it informative and interactive.

This session will discuss applications such as multi-level redundancy, IP mobility, seamless interoperability, warfighter communications, on-the-move communications, open standards and global network management considerations.

Learner Outcomes

This course introduces the basic concepts of satellite communications including applications and security. By the end of this course the learner will have a basic understanding of:

- The fundamentals of satellite communications (SATCOM)
- The challenges and benefits of SATCOM solutions for GEOINT
- How to seamlessly and securely integrate broadband satellite communications with other terrestrial links over IP
- How SATCOM is easily deployable and supports voice, video and data requirements with high network availability
- SATCOM applications for:
 - Continuity of Operations (COOP)
 - Communications-on-the-move (COTM)
 - Network Management
 - Airborne and Intelligence, Surveillance, and Reconnaissance (ISR) Applications
 - Warfighter Support

Course Outline

Secure Broadband Over IP

- 1. Satellite Fundamentals**
 - a. Satellite Orbits
 - b. Propagation Delay
 - c. Satellite Beams
 - d. Frequency Bands
 - e. Polarization
 - f. SCPC vs. TDMA
 - g. Modulation and Coding
- 2. Challenges**
 - a. Line-of-Site
 - b. Beyond Line-of-Site
- 3. Applications**
 - a. COOP
 - b. COTM
 - c. Network Management Systems (NMS)
 - d. Use Cases
 - i. Airborne
 - ii. Warfighter Support
- 4. Security**
 - a. Network Elements
 - b. Federal Information Processing Standards (FIPS)
 - c. Security Content Automation Protocol (SCAP)
 - d. Transmission security (TRANSEC)
- 5. Open Standards**
 - a. Open Antenna to Modem Interface Protocol (AMIP)
- 6. Additional Resources**

Learning Support & Materials

- **TRANSEC White Paper**
https://www.idirectgov.com/uploads/1000/673-igt_TRANSEC_White_Paper_5_15.pdf
- **Airborne White Paper**
https://www.idirectgov.com/uploads/1000/578-igt_airbornecommunicationsonthemovev5.pdf
- **SCAP Brief**
https://www.idirectgov.com/uploads/1000/593-scap_tech_brief_1214.pdf
- **OPEN AMIP**
https://www.idirectgov.com/uploads/1000/625-Open_AMIP_0215.pdf
- **COOP Application Brief**
https://www.idirectgov.com/uploads/1000/651-iDirectGov_COOPCaseStudy_4p0315.pdf
- **Logistician Case Study**
https://www.idirectgov.com/uploads/1000/680-iDi_CS_Logistician_2pg_FA_0515.pdf
- **Morale Welfare and Recreation (MWR) Case Study**
https://www.idirectgov.com/uploads/1000/621-iDiGT_CS_SPAWAR_MWRNet_0215.pdf
- **Training Brochure**
https://www.idirectgov.com/~idirect/uploads/igt_Training_0515.pdf

Attainment of Learner Outcomes

Secure Broadband Over IP - Quiz

Q1. We discussed three types of satellites today. Which of the following is NOT one of them?

1. GEO – Geosynchronous Earth Orbit (aka Geostationary Earth Orbit)
2. MEO – Medium Earth Orbit
3. LEO – Low Earth Orbit
4. EEO – Elliptical Earth Orbit

Answer: 4

Q2. If you are talking to someone over a geostationary earth orbit (GEO) satellite, how long would it take to get a response back?

1. 1/2 seconds or more
2. 1/3 seconds
3. 1/4 seconds
4. Immediate

Answer: 1

Q3. Which of the following describes Single Channel per Carrier (SCPC)? **Choose three.**

1. Dedicated link between the hub and remote
2. High-throughput link
3. Bandwidth is dedicated (always available)
4. Less efficient than Time Division Multiple Access (TDMA)

Answer: 1,2,3

Q4. Which of the following is NOT a frequency band normally used for satellite communication?

1. Ka band
2. X band
3. C band
4. FM radio band

Answer: 4

Q5. One of the benefits of satellite communications (SATCOM) is communications on-the-move (COTM). Why would you use SATCOM for COTM?

1. Because you can communicate beyond the line of sight.
2. Because you can communicate while inside a tunnel.
3. Because your satellite will follow you.
4. Because it is much cheaper to communicate via SATCOM than using a walkie-talkie.

Answer: 1

Q6. OpenAMIP standard is an open standard for the antenna and modem to interface properly. What is the benefit of using this open standard?

1. OpenAMIP certified equipment is cheaper than others.
2. OpenAMIP certified equipment provides better link budget or communication quality.
3. OpenAMIP protects certified equipment from non-certified.
4. You can select any combination of vendors for antenna and modem and expect them to work together gracefully as long as they are OpenAMIP certified.

Answer: 4

Q7. What is FIPS?

1. Family of Internet Protocol Standards
2. Facility of Inter-Planetary Standards
3. Federal Information Processing Standards
4. Facsimile, Internet, Photographs, and Satellite

Answer: 3

Q8. Which one of the following is not a characteristic of spot-beams?

1. Higher transmission using smaller antenna
2. More uniform beam contours
3. Wide area coverage
4. Spot-beam is strong enough to penetrate any obstacles

Answer: 4

Q9. What is TRANSEC for?

1. It allows the broadcast of movies to everyone without restrictions.
2. It enhances the quality of the high-definition movies.
3. It allows store-and-forward of messages.
4. It secures a communication network with strong encryption and authentication.

Answer: 4

Q10. Which of the following mobile platforms is not suitable for satellite communication?

1. Aircraft carrier
2. Cargo plane, jet fighter, or any airborne vehicles
3. Submerged submarine
4. Tank or armored personnel carrier

Answer: 3