Course ID	Course Title
SATCOM	**Satellite Communications Principles and Design: A-to-Z of Modern Commercial and Military Satellite Systems**
Course Duration	
2 day	

Related Courses

- Satellite Network Design Workshop: VSAT Design, Installation, and Program Management (SATSHOP, 1 day)

Aimed At

The standard presentation of this course assumes a bachelor of science in Electrical Engineering, Mathematics, Physics, or a related subject along with an appropriate background in communications.

Group Size

5-25

Prerequisites

None

Course in a Nutshell

Satellites are a key component of the world's communications infrastructure, including technically advanced and developing countries alike. It's the only telephony and broadband wide-area network technology that's available everywhere, from the concrete jungles to the rain forests. For anyone involved with telecommunication and information technology, understanding this technology is a fundamental requirement.

In this course you will learn both the technology and applications of satellites ranging from the early Sputnik to today's advanced nano-satellites with optical laser links. We will review the satellite system components as well as the satellite deployment process from the launch to the in-orbit operation. Finally, we will study how to design a satellite network and select the proper components. In short, you will learn everything from A to Z for a comprehensive review of this important technology.

Customize It!

- *Are you involved with commercial satellites or military?* This course is available in two versions, COMSATCOM and MILSATCOM, for commercial and military audiences, respectively.
- *Are you a wireless or satellite engineer* who would like to "fill in the holes" and catch up with the state-of-the-art of satellites? Let us know so we can focus on the areas that interest you the most.
- *Are you a satellite installer* who would like to learn the concepts and theory that underlie your craft? We can focus on the tools and techniques that will help you become more "tech savvy".
- *Are you a manager, executive, or sales person* whose work involves satellite communication systems? If so, we can emphasize those parts of the course that deal with the markets and applications pertinent to your project or product.
- *Add a workshop day (SATSHOP) at the end of the course, for a total of 3 days:* Get some hands-on practice on the design, procurement, and installation of a satellite network. We can help you get ready! Please ask

us about the "combo discount".

Learn How To

- Learn the current markets and applications for satellite communications
- Understand the key components of a satellite system and how they fit together
- Learn the conceptual and theoretical underpinnings of your field
- Learn how to design a satellite system

Course Outline

- Introduction
  - Limitations of terrestrial communications
  - Advantages and disadvantages of satellites
- History
- Commercial Markets and Applications
  - Analog and digital transmission
  - Business applications
  - Radio
  - Television
- Military Markets and Applications
  - GPS
  - Remote sensing
  - DOD tactical & strategic
- Systems
  - Geo, Meo, Leo
  - Mobile satellite systems
- Satellite Systems Architecture
  - Network configuration: Mesh vs. star
  - Remotes
  - Satellite subsystems
  - Ground station
  - Network management
- Satellite Deployment
  - Orbital dynamics
  - Propulsion
  - Launch vehicles
  - Sun outages/eclipses
- Communications Theory
  - OSI layers
  - Modems
  - LNA
  - HPA
  - Antennas
- System Planning
  - Design
  - Link budget
  - Satellite coverage
  - Frequency bands
  - Eb/No

- o Modulation
- o Interference
- Propagation
  - o Frequency
  - o Rain
  - o Repeaters
  - o Tall buildings
- Protocols/Air Interface
- Security
- Wrap-up: System View
  - o Putting it all together
  - o End-to-end performance
  - o Future of satellite communications

How You Will Learn

- A seasoned instructor will present this course in interactive lecture format
- Along with lecture, we use exercises, puzzles, case studies, and interesting group activities to enrich the instruction and drive home the essential points.
- If you already know something about the technology, we will build on that. We'll compare and contrast what's familiar with what's new, making new ideas easier to learn as well as more relevant.
- If your background is less technical, we will use meaningful and ingenious examples and analogies to simplify the complex subject matter.
- You will receive a printed Participant Handbook which will help you remember and retain what you learned in class and apply it on your job.

Revised   *Oct. 13, 2005*