

Courses in Satellite Communications



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General Information

Welcome to Optimal Satcom's Satellite Communications training program. In this brochure, you will find information about our courses, fees, schedule, and location. If you need further information, please do not hesitate to contact us.

Learn From The Experts

Optimal Satcom is the world-expert in the areas of satellite capacity planning, resource optimization, link analysis, SATCOM network design, and trade-off analysis. We have been involved in the development of several of the largest satellite planning and capacity management systems – both for commercial satellite operators and government programs. You may have already heard of our software tools which are known for their technical sophistication and ability to handle design and optimization of large systems, and accuracy of our analytical models. We also provide technical consulting to SATCOM companies and satellite operators to help them solve challenging problems.

Courses Designed To Help You Learn

We bring a unique combination of technical expertise and hands-on experience to our courses focusing in our area of expertise. The content of each course is carefully selected to be both comprehensive in the coverage of essential topics, and flexible to address real-world problems and issues which may be of importance to you. Each course is divided into a number of sections; each section includes a lecture/presentation which covers a specific topic in depth, and allows attendees to understand the theoretical concept. The theory is then followed by hands-on exercises, which apply the theory to solving realistic problems. Guided discussions help the group bring its own unique perspective to the topic and relate the theory to its experiences and problems. You start applying your knowledge immediately right there in the class – and carry it back with you to your every-day work.

We know that you come to us with wide ranging experience and background – from experienced SATCOM professionals to individuals new to the field, perhaps switching careers. We keep class sizes small so we can help each individual get the most out of the course. Each person who successfully completes the course receives a certificate of accomplishment.

GUIDED DISCUSSIONS HELP THE GROUP BRING ITS OWN UNIQUE PERSPECTIVE TO THE TOPIC AND RELATE THE THEORY TO ITS EXPERIENCES AND PROBLEMS...

Your Satisfaction, Our Guarantee!

Everyone who has taken one of our courses has been extremely satisfied and we guarantee your satisfaction – if we do not meet or exceed your expectations, we will happily refund 100%

of the course fees, or apply it to a future course. This guarantee applies to any of the standard courses listed here, offered at our site. (Due to their nature, customized courses and courses offered at customer sites are excluded from this guarantee.)

If you are a group of three or more people interested in attending a course at our site;

**“VISIT US ON THE WEB AT
WWW.OPTIMALSATCOM.COM
FOR THE LATEST INFORMATION
ON OUR COURSES.”**

either one of our standard courses, or one customized to your requirements, we will be glad to provide a course dedicated to your group. Please note that our schedule fills up many weeks in advance, so please be sure to contact us early.

Courses At Optimal Satcom

We are conveniently located in Herndon in Northern Virginia, in the heart of the Washington Dulles technology corridor; and close to beautiful Washington, DC. Whether it's nature, history, culture, business, or politics, Washington has something for everyone. Why not combine a course with a business trip or a family vacation. Several major satellite operators, defence contractors, and most governmental agencies involved in satellite communications are located in the Washington, DC area. The Northern Virginia area also has one of the highest concentrations of high-tech and telecommunications companies – nearly 75% of the world's total Internet traffic is routed through Northern Virginia.

We have a well-equipped training facility in Herndon, complete with AV equipment, computers, and comfortable relaxed surroundings. Continental breakfast, afternoon tea, and all-day beverage services are offered with our compliments.

If you are traveling from out of town, Marriot, Hampton Inn, and Hyatt are located close by. You may also choose to stay in nearby Tyson's Corner, home to the area's finest dining and shopping, and a large number of hotels in all price ranges.

Courses At Your Site

In addition to our regularly scheduled and custom courses held at our site, we also offer training at your site. Select from one of our standard courses, or customize the course to your requirements. If you have a medium or large-sized group, this may be a cost-effective option for you – you will save on travel, meal, and hotel costs. This may also be a better option if you can-

not afford to have several people away from work for the entire duration of the course. However, please be aware that the courses are very intense – it will be impossible for you to attend the class in parallel with your regular job, therefore please plan accordingly. We do request that managers and training directors be considerate to their employees and allow them to focus on the course rather than juggling it in parallel with their day-to-day job functions.



Nearby Hotels

Courtyard Marriott Herndon -Reston 533 Herndon Pkwy, Herndon, VA 20170 www.marriott.com	0.3 Mile 6 min walk
Hampton Inn & Suites Herndon -Reston 435 Herndon Pkwy, Herndon, VA 20170 www.hamptoninn3.hilton.com	1.5 Mile 5 min
Hyatt House Herndon -Reston 467 Herndon Pkwy, Herndon, VA 20170 www.hyatt.com	0.6 Miles 11 min walk



Nearby Places of Interest

Washington, DC Mall, White House & US Capitol	24 Miles
Washington Dulles Airport (IAD)	6 Miles
Ronald Reagan Washington National Airport (DCA)	26 Miles
Baltimore Washington International Airport (BWI)	55 Miles
Reston Town Center	2 Miles
Tysons Corner (I & II) Shopping Centers	13 Miles
Reston National Golf Course	3 Mile

Course Outlines

For more information about the courses and schedule visit www.optimalsatcom.com

SC-201. Basic Satellite Communications (1 Day)

This course is intended for professionals who are new to the field of satellite communications, and who need to acquire essential satellite communications knowledge quickly. It is an ideal first course in satellite communications for people with some technical background. After you take this course, you will have a clear understanding of basic satellite communications, and become familiar with common terminology. You will learn the history of satellite communication; basic satellite flight dynamics, and common satellite orbits. You will be introduced to different types of signals typically used for satellite communications and obtain an overview of how different satellite systems work – point-to-point, SCPC, VSAT networks, satellite broadcasts, satellite TV, DVB, etc.

SC-301. Introduction to Satellite Communications (2 Days)

This course is offered as a 2-day course where the first day is shared with SC-201. The second day of the course builds on the first day with more in-depth topics. After you take this course, you will have a clear understanding of basic satellite communications, and proficiently use SATCOM terminology. You will understand the working of a typical satellite link, and its elements – the transmit terminal, the satellite, the carrier, the interference parameters and the receive terminal; and will be able to perform elementary link budget analyses.

SC-401. Introduction to SATCOM Engineering and Link Budget Analysis (3 Days)

This course is intended for technical professionals who are familiar with basic satellite communications and link budget analysis, and who are involved in the analysis and design of satellite links. It is an ideal course for SATCOM engineers who want to build a firm SATCOM engineering foundation to help them design well-engineered satellite links. After you take this course, you will master the process of link budget analysis and link design. You will be able to easily understand and analyze link budgets. You will understand the key parameters which influence each design decision, and learn how to engineer links that deliver the required quality of service without being overly conservative. You will also learn to recognize and avoid common errors in link design.

SC-501. Advanced Satellite Communications (5 Days)

This course is intended for SATCOM engineers and managers who are very familiar with satellite communications and link-budget analysis, but who want to enhance their depth and breadth of knowledge of satellite communications. It is an ideal course for senior engineers and technical managers who frequently face challenging link design and SATCOM engineering problems.

After you take this course, you will have a deep understanding of satellite communications. You will become familiar with a typical communications satellite payload architecture, and the layout of transmit and receive earth stations. You will understand the sources of the major link impairments – thermal noise, interference, and intermodulation. You will learn about the various propagation effects (rain, scintillation, gaseous absorption, etc.) which need to be considered in link design, and the popular rain models used to model them. You will learn about the satellite non-linear amplifier, and optimization of satellite capacity. You will understand the considerations involved in digital link design and selection of modem options – modulation types, FEC, Reed-Solomon, and Turbo Codes, etc. You will also become familiar with relevant ITU regulations.

SC-502. Satellite Transmission Planning For Capacity Users (5 Days)

This course is intended for experienced SATCOM engineers, network planners and capacity managers who are involved in the design and operation of satellite-based networks, or who manage sizeable transponder capacity. After you take this course, you will learn a systematic approach to designing satellite networks – an approach that progresses from an initial design towards an optimal design through a process of recognizing, analyzing, and correcting problems and bottlenecks; and performing necessary trade-offs. You will learn to consider alternatives, make modifications that yield the greatest improvement, and reject approaches which are unlikely to make much difference, or which are operationally undesirable. You will understand how to recognize the dominant impairments which may be wasting transponder power, and how to reduce their impact. You will learn about the classic trade-offs – bandwidth vs. power; uplink vs. downlink; satellite vs. ground, etc. – that need to be made in designing a satellite network.

SC-503. Satellite Transmission Planning For Satellite Operators (5 Days)

This course is intended for experienced SATCOM engineers, network planners and capacity managers who are involved in the management of satellite transponder capacity. It is an ideal course for satellite operators who manage substantial capacity – a partial or whole satellite, or even an entire satellite fleet – and need to simultaneously manage, and coordinate between several independent satellite networks. After you take this course, you will learn a systematic approach to managing satellite capacity. You will learn how to quickly analyze your satellite, assign capacity to your customers, and compute power-equivalent bandwidth. You will understand how to recognize and avoid potential problems such as interference and intermodulation, and optimize use of your satellite capacity. You will learn how to develop good frequency plans and perform grooming. You will learn to define transponder

operating conditions and assign optimum gain (SFD) settings. You will learn to operate under operational constraints and ensure adherence to ITU regulations, and deal with issues related to inter-system and inter-network coordination.

SC-504. Introduction to ITU Frequency Coordination (5 Days)

This course is intended for engineers and technical professionals working in the SATCOM industry, as well as network planners and managers who are involved in the design of satellite-based networks and who want to become familiar with the ITU regulations and processes for inter-system coordination. After you take this course, you will understand the issues involved in coordination between two systems – either two satellite systems, or between a satellite system and a terrestrial system – with regard to inter-system interference. You will become familiar with the ITU regulations and recommendations which are applicable to inter-system interference, and the procedures and guidelines for coordination. You will learn how to compute adjacent satellite interference (ASI), and determine compliance with ITU regulations. You will also learn about the databases, resources, and software that the ITU provides for purposes of facilitating coordination.

SC-505 Operating and Managing Software-Defined Satellite (SDS) Services for Satellite Operators (5 Days)

This course is intended for experienced SATCOM engineers, network planners, capacity managers, and product managers at satellite operators who are preparing to operate and commercialize software-defined satellites (SDS), as well as those involved in procuring SDS satellites who need to write requirements and to understand and evaluate vendor proposals. After you take this course, you will have a clear understanding of software-defined satellite architectures and how they differ from conventional and high-throughput satellites. You will become familiar with the key building blocks of an SDS payload – onboard digital transparent processors, digital channelizers, and active phased-array antennas with digital beam-forming – and you will understand the beam-forming objective functions used to maximize gain, suppress interference (including ASI), meet coordination limits, null jammers, and achieve polarization isolation. You will learn how to model end-to-end performance through the satellite signal path and identify the measurement data required for payload characterization. You will master a systematic approach to sizing SDS gateways and designing SDS connectivity – configuring channelization bandwidth, beam G/Ts, EIRPs, SFD, HPA size, and AUPC dynamic range – while accounting for user terminal types, target spectral efficiency and throughput, coverage areas, and regulatory and coordination constraints.

Course Outlines

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You will learn how to develop customer engineering processes and technical marketing materials for unmanaged and partially-managed SDS services, including connectivity lifecycle management, channelization and coverage synthesis policies, transponder and coverage naming conventions, customer link budget tools, and capacity pricing metrics. You will also learn how to structure managed network services over SDS, evaluate their performance against actual user terminal distributions and SLAs (MIR/CIR), and adjust capacity and beam coverage based on real utilization.

CPL-1/CPL-2. Introduction to Complan (1 or 2 Days)

These courses are intended for new users of Complan®, and are offered in a 1-day or 2-day format; the second day of the course builds on the first day with more in-depth discussion on selected topics. After you take these courses, you will be able to use the Complan® at a basic level (1-day course) or intermediate level (2-day course). These are excellent courses for employees of companies that have deployed Complan®, and who need to use the software to perform their job functions. Please contact Optimal Satcom for more in-depth courses in the use of Complan®.

ECM-1/ECM-2. Introduction to the Enterprise Capacity Manager (1 or 2 Days)

These courses are intended for new users of the Enterprise Capacity Manager® (ECM™), and are offered in a 1-day or 2-day format; the second day of the course builds on the first day with more in-depth discussion on selected topics. After you take these courses, you will be able to use the ECM™ at a basic level (1-day course) or intermediate level (2-day course). These are excellent courses for employees of companies that have deployed ECM™, and who need to use the software to perform their job functions. Please contact Optimal Satcom for more in-depth courses in the use of ECM™ or other Optimal Satcom products.

CANCELLATION POLICY

Unless specified otherwise in a quotation or purchase order, the following cancellation policy applies to courses conducted by Optimal Satcom.

All cancellations must be made in writing. A 100% refund is provided for cancellations more than three (3) weeks prior to the start of training. Cancellations less than three (3) weeks and more than two (2) weeks prior to start of training incur a 20% cancellation penalty. Cancellations less than two (2) weeks and more than one (1) week prior to start of training incur a 50% cancellation penalty. Cancellations thereafter incur a 100% cancellation penalty. Full payment must be received by Optimal Satcom at least one week in advance of the training, or your registration may be cancelled by Optimal Satcom, in which case a 50% cancellation fee will apply. For cancellations made more than one week prior to start of training, the cancellation penalty may be applied as credit towards a future course at Optimal Satcom within one year. Credits not used within one year are forfeited. Optimal Satcom shall make an effort, but shall have no obligation to provide such a course as scheduling and availability of courses is determined based on demand and schedule.