Satellite Communications Systems Engineering 2nd Edition

Discusses orbits, earth-satellite geometry, launch vehicles, radio-frequency link, transponders, stations, and interference

Since the first edition of this book was published seven years ago, the field of modeling and communication systems has grown and matured in many ways, and the use of simulation as a tool is now even more common practice. With the current interest in digital mobile communic primary area of application of modeling and simulation is now in wireless systems of a differe from the `traditional' ones. This second edition represents a substantial revision of the first, accommodate the new applications that have arisen. New chapters include material on model simulation of nonlinear systems, with a complementary section on related measurement tech channel modeling and three new case studies; a consolidated set of problems is provided at t the book.

This new edition introduces and examines the space technologies that benefit our everyday li chapter now includes exercises and problems, and the content covers new satellites and eme technologies. It explores the ever-improving quality of satellite systems and services, and also investigates ways to bring about higher resolution satellite imagery and lower satellite costs. is on man-made satellites, which are becoming smaller, smarter, cheaper, and easier to launch a longer life span, and are less susceptible to interference. Furthermore, the book considers a several key technologies that affect the satellite industry. Includes extensive study questions exercises after each chapter. Explains present commercial space technology and its future ou Explores the many applications of space technologies and their impact on our lives, including world examples. Presents a future outlook on robotics, communications and navigation, and h health and nanotechnology. Provides a clear understanding of space, space technologies, spac applications, space security, space regulations, a space roadmap, and their impact on the lives humans now and for generations to come.

The book covers all the fundamentals of satellites, ground control systems, and earth station considering the design and operation of each major segment. You gain a practical understandi basic construction and usage of commercial satellite networksOCohow parts of a satellite sy function, how various components interact, which role each component plays, and which fact most critical to success."

The revised and updated sixth edition of em style="mso-bidi-font-style: normal;"Satellite Communications Systems contains information on the most recent advances related to satell communications systems, technologies, network architectures and new requirements of servi applications. The authors – noted experts on the topic – cover the state-of-the-art satellite communication systems and technologies and examine the relevant topics concerning commu and network technologies, concepts, techniques and algorithms. New to this edition is inform internetworking with the broadband satellite systems, more intensive coverage of Ka band te GEO high throughput satellite (HTS), LEO constellations and the potential to support the curr broadband Internet services as well as future developments for global information infrastruct authors offer details on digital communication systems and broadband networks in order to p high-level researchers and professional engineers an authoritative reference. The companion v provides slides for instructors to teach and for students to learn. In addition, the book is des user-friendly format.

The challenge of communication in planetary exploration has been unusual. The guidance and of spacecraft depend on reliable communication. Scientific data returned to earth are irreplac replaceable only at the cost of another mission. In deep space, communications propagation is relative to terrestrial communications, and there is an opportunity to press toward the mathe

limit of microwave communication. Yet the limits must be approached warily, with reliability as channel capacity in mind. Further, the effects of small changes in the earth's atmosphere and interplanetary plasma have small but important effects on propagation time and hence on the measurement of distance. Advances are almost incredible. Communication capability measured bits per second at a given range rose by a factor of 10 in the 19 years from Explorer I of 195 Voyager of 1977. This improvement was attained through ingenious design based on the sort penetrating analysis set forth in this book by engineers who took part in a highly detailed and successful pro gram. Careful observation and analysis have told us much about limitations on accurate measurement of distance. It is not easy to get busy people to tell others clearly and how they have solved important problems. Joseph H. Yuen and the other contribu tors to this be commended for the time and care they have devoted to explicating one vital aspect of a gr adventure of mankind.

"This book is a unique combination of practical payload systems engineering and communicatio theory and applications. Payload systems engineering itself is a complex endeavor that people learn on the job over many years' time, and this book hopes to ease their learning path. There detailed books on how to design the various kinds of units, e.g., antennas, of a payload but se books focusing on unit performance at a level appropriate for systems engineering.Potential sa owners, few of whom have worked in the satellite field, need help to understand how to get v want from the manufacturer.The satellite bus, particular satellites, and particular and general s communications systems have been written about in several books, but the payload has receiv typically a few pages in all these books"--

Phased arrays, while traditionally used in radar systems, are now being used or proposed for u internet of things (IoT) networks, high-speed back haul communication, terabit-per-second sat systems, 5G mobile networks, and mobile phones. This book considers systems engineering of arrays and addresses not only radar, but also these modern applications. It presents a system perspective and approach that is essential for the successful development of modern phased Using practical examples, this book helps solve problems often encountered by technical profe Thermal management challenges, antenna element design issues, and architectures solutions a explored as well as the benefits and challenges of digital beam forming. This book provides the information required to train engineers to design and develop phased arrays and contains ques the end of each chapter that professors will find useful for instruction.

Satellite Communications Systems EngineeringAtmospheric Effects, Satellite Link Design and System PerformanceJohn Wiley & Sons

In response to a request from the Defense Advanced Research Projects Agency, the committee studied a range of issues to help identify what strategies the Department of Defense might follow to meet its need for flexible, rapidly deployable communications systems. Taking into account the military's particular requirements for security, interoperability, and other capabilities as well as the extent to which

commercial technology development can be expected to support these and related needs, the book recommends systems and component research as well as organizational changes to help the DOD field state-of-the-art, cost-effective untethered communications systems. In addition to advising DARPA on where its investment in information technology for mobile wireless communications systems can have the greatest impact, the book explores the evolution of wireless technology, the often fruitful synergy between commercial and military research and development efforts, and the technical challenges still to be overcome in making the dream of "anytime, anywhere" communications a reality.

This textbook takes a unified view of the fundamentals of wireless communication and explains cutting-edge concepts in a simple and intuitive way. An abundant supply of exercises make it ideal for graduate courses in electrical and computer engineering and it will also be of great interest to practising engineers.

Updated and expanded, Physical Principles of Wireless Communications, Second Edition illustrates the relationship between scientific discoveries and their application to the invention and engineering of wireless communication systems. The second edition of this popular textbook starts with a review of the relevant physical laws, including Planck's Law of Blackbody Radiation, Maxwell's equations, and the laws of Special and General Relativity. It describes sources of electromagnetic noise, operation of antennas and antenna arrays, propagation losses, and satellite operation in sufficient detail to allow students to perform their own system designs and engineering calculations. Illustrating the operation of the physical layer of wireless communication systems—including cell phones, communication satellites, and wireless local area networks—the text covers the basic equations of electromagnetism, the principles of probability theory, and the operation of antennas. It explores the propagation of electromagnetic waves and describes the losses and interference effects that waves encounter as they propagate through cities, inside buildings, and to and from satellites orbiting the earth. Important natural phenomena are also described, including Cosmic Microwave Background Radiation, ionospheric reflection, and tropospheric refraction. New in the Second Edition: Descriptions of 3G and 4G cell phone systems Discussions on the relation between the basic laws of quantum and relativistic physics and the engineering of modern wireless communication systems A new section on Planck's Law of Blackbody Radiation Expanded discussions on general relativity and special relativity and their relevance to GPS system design An expanded chapter on antennas that includes wire loop antennas

Expanded discussion of shadowing correlations and their effect on cell phone system design The text covers the physics of Geostationary Earth Orbiting satellites, Medium Earth Orbiting satellites, and Low Earth Orbiting satellites enabling students to evaluate and make first order designs of SATCOM systems. It also reviews the principles of probability theory to help them accurately determine the margins that must be allowed to account for statistical variation in path loss. The included problem sets and sample solutions provide students with the understanding of contemporary wireless systems needed to participate in the development of future systems.

Since the publication of the best-selling first edition of The Satellite Communication Applications Handbook, the satellite communications industry has experienced explosive growth. Satellite radio, direct-to-home satellite television, satellite telephones, and satellite guidance for automobiles are now common and popular consumer products. Similarly, business, government, and defense organizations now rely on satellite communications for day-to-day operations. This second edition covers all the latest advances in satellite technology and applications including direct-to-home broadcasting, digital audio and video, and VSAT networks. Engineers get the latest technical insights into operations, architectures, and systems components.

Demand for Mobile Satellite Service (MSS) is on the increase, with a huge surge of interest in mobile communications in recent years and high-paced advancements in the supporting system architectures, devices and applications. This thoroughly revised and updated book provides a comprehensive guide to the MSS technologies and emerging trends. It takes a system level approach, giving in-depth treatment of technical and business related issues. The author, a leading professional in the area, draws on his extensive experience in industry and research, to provide the reader with a sound and informed understanding of the technology. Mobile Satellite Communications includes introductory material for the reader new to the field, in addition to exploring prevalent system concepts, architecture, practices and trends for the more experienced. An in-depth review of scientific principles merged with business models and regulatory considerations presents a balanced perspective of commercial mobile satellite systems. This book will be of interest to practicing engineers in mobile satellite communications and mobile broadcasting, research and development professionals working in these areas, mobile satellite service providers and operators. Academics and students studying satellite systems/technology, specialists in other classes of satellite systems, technical and marketing managers, strategists and planners of telecommunication

systems: individuals interested in mobile communications, satellite and telecommunications/broadcasting technology will also find this book insightful. Key Features: Comprehensive treatment of mobile satellite communications topics, including radio link aspects, satellite constellations, architectural and operational aspects, as well as business planning models, MSS radio interface standards, spectrum forecast methodologies and system examples. Addresses related themes such as mobile broadcasting, mobile VSATs, search and rescue, and navigation systems. Introduces emerging technologies such as mobile broadband, television broadcasting to handheld units, advanced capacity enhancement techniques, hybrid system architecture concepts, including a rich sample of research topics such as multiple input multiple output, satellite-based ad-hoc networks, and highlights initiatives in the use of Q/V frequency bands. Includes revision questions at the end of each chapter. An accompanying website for interaction (www.satellitesandyou.com).

With a Preface by noted satellite scientist Dr. Ahmad Ghais, theSecond Edition reflects the expanded user base for this technologyby updating information on historic, current, and plannedcommercial and military satellite systems and by expanding sectionsthat explain the technology for non-technical professionals. The book begins with an introduction to satellite communicationsand goes on to provide an overview of the technologies involved inmobile satellite communications, providing basic introductions toRF Issues, power Issues, link issues and system issues. Itdescribes early commercial mobile satellite communications systems,such as Marisat and Marecs and their military counterparts. The book then discusses the full range of Inmarsat and othercurrent and planned geostationary, low earth orbiting and hybridmobile satellite systems from over a dozen countries andcompanies. It is an essential guide for anyone seeking acomprehensive understanding of this industry and militarytool. • Revised edition will serve both technical andnon-technical professionals who rely every day on mobile satellitecommunications • Describes and explains historic, current, and plannedcivil, commercial, and military mobile satellite communicationsystems. • First Edition charts and tables updated and expandedwith current material for today's mobile satellite technology Thorough coverage of basic digital communication system principles ensures that readers are exposed to all basic relevant topics in digital communication system design. The use of CD player and JPEG image coding standard as examples of systems that employ modern communication principles allows readers to relate the theory to practical systems. Over 180 worked-out examples throughout the book aids readers in understanding basic concepts. Over 480 problems

involving applications to practical systems such as satellite communications systems, ionospheric channels, and mobile radio channels gives readers ample opportunity to practice the concepts they have just learned. With an emphasis on digital communications, Communication Systems Engineering, Second Edition introduces the basic principles underlying the analysis and design of communication systems. In addition, this book gives a solid introduction to analog communications and a review of important mathematical foundation topics. New material has been added on wireless communication systems -- GSM and CDMA/IS-94; turbo codes and iterative decoding; multicarrier (OFDM) systems; multiple antenna systems. Includes thorough coverage of basic digital communication system principles -- including source coding, channel coding, baseband and carrier modulation, channel distortion, channel equalization, synchronization, and wireless communications. Includes basic coverage of analog modulation such as amplitude modulation, phase modulation, and frequency modulation as well as demodulation methods.

Fundamentals of Wireless Communication
Satellite Communication Engineering
Atmospheric Effects, Satellite Link Design and System Performance
The Evolution of Untethered Communications
Satellite Communications Payload and System
MITRE Systems Engineering Guide
Principles and Trends
Wireless Communications Systems
Introduction to Communication Systems

Thorough coverage of basic digital communication system principles ensures that readers are exposed to all basic relevant topics in digital communication system design. The use of CD player and JPEG image coding standard as examples of systems that employ modern communication principles allows readers to relate the theory to practical systems. Over 180 worked-out examples throughout the book aids readers in understanding basic concepts. Over 480 problems involving applications to practical systems such as satellite communications systems, ionospheric channels, and mobile radio channels gives readers ample opportunity to practice the concepts they have just learned. With an emphasis on digital communications, Communication Systems Engineering, Second Edition introduces the basic principles underlying the analysis and design of communication systems. In addition, this book gives a solid introduction to analog communications and a review of important mathematical foundation topics. New material has been added on wireless communication systems—GSM and CDMA/IS-94;

turbo codes and iterative decoding; multicarrier (OFDM) systems; multiple antenna systems. Includes thorough coverage of basic digital communication system principles—including source coding, channel coding, baseband and carrier modulation, channel distortion, channel equalization, synchronization, and wireless communications. Includes basic coverage of analog modulation such as amplitude modulation, phase modulation, and frequency modulation as well as demodulation methods. For use as a reference for electrical engineers for all basic relevant topics in digital communication system design.

A comprehensive introduction to the fundamentals of design and applications of wireless communications Wireless Communications Systems starts by explaining the fundamentals needed to understand, design, and deploy wireless communications systems. The author, a noted expert on the topic, explores the basic concepts of signals, modulation, antennas, and propagation with a MATLAB emphasis. The book emphasizes practical applications and concepts needed by wireless engineers. The author introduces applications of wireless communications and includes information on satellite communications, radio frequency identification, and offers an overview with practical insights into the topic of multiple input multiple output (MIMO). The book also explains the security and health effects of wireless systems concerns on users and designers. Designed as a practical resource, the text contains a range of examples and pictures that illustrate many different aspects of wireless technology. The book relies on MATLAB for most of the computations and graphics. This important text: Reviews the basic information needed to understand and design wireless communications systems Covers topics such as MIMO systems, adaptive antennas, direction finding, wireless security, internet of things (IoT), radio frequency identification (RFID), and software defined radio (SDR) Provides examples with a MATLAB emphasis to aid comprehension Includes an online solutions manual and video lectures on selected topics Written for students of engineering and physics and practicing engineers and scientists, Wireless Communications Systems covers the fundamentals of wireless engineering in a clear and concise manner and contains many illustrative examples.

Highlighting satellite and earth station design, links and communication systems, error detection and correction, and regulations Sand procedures for system modeling, integrations, testing, and evaluation, Satellite Communication Engineering provides a simple and concise overview of the fundamental principles common to information communications. It

For those seeking a thorough grounding in modern communication engineering principles delivered with unrivaled clarity using an

engineering-first approach Communication Engineering Principles: 2nd Edition provides readers with comprehensive background information and instruction in the rapidly expanding and growing field of communication engineering. This book is well-suited as a textbook in any of the following courses of study: Telecommunication Mobile Communication Satellite Communication Optical Communication Electronics Computer Systems Primarily designed as a textbook for undergraduate programs, Communication Engineering Principles: 2nd Edition can also be highly valuable in a variety of MSc programs. Communication Engineering Principles grounds its readers in the core concepts and theory required for an in-depth understanding of the subject. It also covers many of the modern, practical techniques used in the field. Along with an overview of communication systems, the book covers topics like time and frequency domains analysis of signals and systems, transmission media, noise in communication systems, analogue and digital modulation, pulse shaping and detection, and many others.

In recent decades, the number of satellites being built and launched into Earth's orbit has grown immensely, alongside the field of space engineering itself. This book offers an in-depth guide to engineers and professionals seeking to understand the technologies behind Low Earth Orbit satellites. With access to special spreadsheets that provide the key equations and relationships needed for mastering spacecraft design, this book gives the growing crop of space engineers and professionals the tools and resources they need to prepare their own LEO satellite designs, which is especially useful for designers of small satellites such as those launched by universities. Each chapter breaks down the various mathematics and principles underlying current spacecraft software and hardware designs.

The only work to present a unified treatment of all the basic aspects of satellite communications and to give practical examples from real systems. Whereas most texts in the field concentrate on a mathematical description of the communications link, Satellite Communications gives the reader a thorough knowledge of the subject by going on to cover orbits, propagation, and the equipment that comprises a working system. Pratt and Bostian go beyond the standard treatment of ideal channels (which ignores some very real practical limitations) to deal with the problems associated with transmitting digitally modulated signals through real satellites and earth stations. Included are chapters on orbital mechanics, spacecraft construction, satellite-path radio wave propagation, modulation techniques, multiple access, and a detailed analysis of the communications link. Contains worked examples and homework

problems based on current industrial practice.
This second edition of Satellite Communications is a revised, updated, and improved version of the first edition (Van Nostrand, 1984) and has been extended to include many newer topics that are rapidly becoming important in modem and next-generation satellite systems. The first half of the book again covers the basics of satellite links, but has been updated to include additional areas such as Global Positioning and deep space satellites, dual polarization, multiple beaming, advanced satellite electronics, frequency synthesizers, and digital frequency generators. The second half of the book is all new, covering frequency and beam hopping, on-board processing, EHF and optical cross links, and mobile satellites and VSAT systems. All of these latter topics figure to be important aspects of satellite systems and space platforms of the twenty-first century. As in the first edition, the objective of the new edition is to present a unified approach to satellite communications, helping the reader to become familiar with the terminology, models, analysis procedures, and evolving design directions for modem and future satellites. The presentation stresses overall system analysis and block diagram design, as opposed to complicated mathematical or physics descriptions. (Backup mathematics is relegated to the appendices where a reader can digest the detail at his own pace.) The discussion begins with the simplest satellite systems and builds to the more complex payloads presently being used.
This reference provides an overview of near-Earth laser communication theory developments including component and subsystem technologies, fundamental limitations, and approaches to reach those limits. It covers basic concepts and state-of-the-art technologies, emphasizing device technology, implementation techniques, and system trades. The authors discuss hardware technologies and their applications, and also explore ongoing research activities and those planned for the near future. This new edition includes major to minor revisions with technology updates on nearly all chapters.
Design Principles
The Satellite Communication Applications Handbook
Principles of Communication Systems Simulation with Wireless Applications
Physical Principles of Wireless Communications, Second Edition
Satellite Communication Systems Engineering
Satellite Communications Systems Engineering, 2/E
Principles and Applications
Low Earth Orbit Satellite Design
Communication Engineering Principles

Satellites are increasingly used for global communications, as well as for radio and television transmissions. With the growth of mobile communications, and of digital technology, the use of satellite systems is set to expand substantially and already all students of electronics or communications engineering must study the subject. This book steers a middle path between offering a basic understanding of the process of communication by satellite and the methodology used; and the extensive mathematical analysis normally adopted in similar texts. It presents the basic concepts, using as much mathematical content as is necessary to make the process understandable. The principles introduced are backed up by examples of actual applications showing how professional systems engineers have achieved the required system performance capabilities. The practical systems chosen are representative of modern day applications and comprise an international communications system, an international maritime system and a regional system.

Doppler Applications in LEO Satellite Communication Systems develops and presents an important class of techniques useful in the construction of little Low Earth Orbit (LEO) satellite communication systems. It centers on the very significant Doppler shift that attends communications through a LEO satellite and shows how this phenomenon can be exploited for an unexpected benefit. The techniques taught in the book are expected to be particularly attractive to system engineers because ground-based transceivers must generally compensate for the large Doppler component and therefore the necessary receiver processing loops are often already in place and expensed. This volume starts with a recounting of the characteristics of a LEO satellite and its orbit. The 2nd chapter addresses the LEO orbital geometry and reviews the Doppler effect attending LEO communications. Chapter three is focused on the important task of estimating the Doppler at a ground terminal. Appropriate signal processing algorithms are reviewed. Chapter four is concerned with predicting LEO satellite visibility. Chapters five and six are, respectively, devoted to the use of the significant LEO Doppler as an aid in a new traffic flow control protocol and as an aid for effecting communications power control. The last chapter describes MATLAB® based analysis. Doppler Applications in LEO Satellite Communication Systems provides a thorough review of the LEO Doppler phenomenon.

This volume presents an overview of computer-based simulation models and methodologies for communication systems. Topics covered include probability, random, process, and estimation theory and roles in the design of computer-based simulations.

The first edition of Satellite Communications Systems Engineering (Wiley 2008) was written for those concerned with the design and performance of satellite communications systems employed in fixed point to point, broadcasting, mobile, radio navigation, data relay, computer communications, and related satellite based applications. This welcome Second Edition continues the basic premise and enhances the publication with the latest updated information and new technologies developed since the publication of the first edition. The book is based on graduate level satellite communications course material and has served as the primary text for electrical engineering Masters and Doctoral level courses in satellite communications and related areas. Introductory to advanced engineering level students in electrical, communications and wireless network courses, and electrical engineers, communications engineers, systems engineers, and wireless network engineers looking for a refresher will find this essential text invaluable.

Antennas and propagation are of fundamental importance to the coverage, capacity and quality of all wireless communication systems. This book provides a solid grounding in antennas and propagation, covering terrestrial and satellite radio systems in both mobile and fixed contexts. Building on the highly successful first edition, this fully updated text features significant new material and brand new exercises and supplementary materials to

support course tutors. A vital source of information for practising and aspiring wireless communication engineers as well as for students at postgraduate and senior undergraduate levels, this book provides a fundamental grounding in the principles of antennas and propagation without excessive recourse to mathematics. It also equips the reader with practical prediction techniques for the design and analysis of a very wide range of common wireless communication systems. Including: Overview of the fundamental electromagnetic principles underlying propagation and antennas. Basic concepts of antennas and their application to specific wireless systems. Propagation measurement, modelling and prediction for fixed links, macrocells, microcells, picocells and megacells Narrowband and wideband channel modelling and the effect of the channel on communication system performance. Methods that overcome and transform channel impairments to enhance performance using diversity, adaptive antennas and equalisers. Key second edition updates: New chapters on Antennas for Mobile Systems and Channel Measurements for Mobile Radio Systems. Coverage of new technologies, including MIMO antenna systems, Ultra Wideband (UWB) and the OFDM technology used in Wi-Fi and WiMax systems. Many new propagation models for macrocells, microcells and picocells. Fully revised and expanded end-of-chapter exercises. The Solutions Manual can be requested from http://www.wiley.com/go/saunders_antennas_2e

Based on the popular Artech House classic, Digital Communication Systems Engineering with Software-Defined Radio, this book provides a practical approach to quickly learning the software-defined radio (SDR) concepts needed for work in the field. This up-to-date volume guides readers on how to quickly prototype wireless designs using SDR for real-world testing and experimentation. This book explores advanced wireless communication techniques such as OFDM, LTE, WLA, and hardware targeting. Readers will gain an understanding of the core concepts behind wireless hardware, such as the radio frequency front-end, analog-to-digital and digital-to-analog converters, as well as various processing technologies. Moreover, this volume includes chapters on timing estimation, matched filtering, frame synchronization message decoding, and source coding. The orthogonal frequency division multiplexing is explained and details about HDL code generation and deployment are provided. The book concludes with coverage of the WLAN toolbox with OFDM beacon reception and the LTE toolbox with downlink reception. Multiple case studies are provided throughout the book. Both MATLAB and Simulink source code are included to assist readers with their projects in the field.

For one- or two-semester, senior-level undergraduate courses in Communication Systems for Electrical and Computer Engineering majors. This text introduces the basic techniques used in modern communication systems and provides fundamental tools and methodologies used in the analysis and design of these systems. The authors emphasize digital communication systems, including new generations of wireless communication systems, satellite communications, and data transmission networks. A background in calculus, linear algebra, basic electronic circuits, linear system theory, and probability and random variables is assumed.

Revisions to 5th Edition by: Zhili Sun, University of Surrey, UK New and updated edition of this authoritative and comprehensive reference to the field of satellite communications engineering Building on the success of previous editions, Satellite Communications Systems, Fifth Edition covers the entire field of satellite communications engineering from orbital mechanics to satellite design and launch, configuration and installation of earth stations, including the implementation of communications links and the set-up of the satellite network. This book provides a comprehensive treatment of satellite communications systems engineering and discusses the technological applications. It demonstrates how system components interact and details the relationship between the

system and its environment. The authors discuss the systems aspects such as techniques enabling equipment and system dimensioning and state of the art technology for satellite platforms, payloads and earth stations. New features and updates for the fifth edition include: More information on techniques allowing service provision of multimedia content Extra material on techniques for broadcasting, including recent standards DVB-RCS and DVB-S2 (Digital Video Broadcasting -Return Channel Satellite and -Satellite Version 2) Updates on onboard processing By offering a detailed and practical overview, Satellite Communications Systems continues to be an authoritative text for advanced students, engineers and designers throughout the field of satellite communications and engineering.
Commercial Space Technologies and Applications: Communication, Remote Sensing, GPS, and Meteorological Satellites, Second Edition
Satellite Communication Engineering, 2nd Edition
An Introduction
Systems, Techniques and Technology
Mobile Satellite Communications

Satellite Communications Systems
Fundamentals of Communication Systems
Software-Defined Radio for Engineers
An undeniably rich and thorough guide to satellite communication engineering, Satellite Communication Engineering, Second Edition presents the fundamentals of information communications systems in a simple and succinct way. This book considers both the engineering aspects of satellite systems as well as the practical issues in the broad field of information transmission. Implementing concepts developed on an intuitive, physical basis and utilizing a combination of applications and performance curves, this book starts off with a progressive foundation in satellite technology, and then moves on to more complex concepts with ease. What's New in the Second Edition: The second edition covers satellite and Earth station design; global positioning systems; antenna tracking; links and communications systems; error detection and correction; data security; regulations and procedures for system modeling; integration; testing; and reliability and performance evaluation. Provides readers with the systems building blocks of satellite transponders and Earth stations, as well as the systems engineering design procedure Includes the tools needed to calculate basic orbit characteristics such as period, dwell time, coverage area, propagation losses; antenna system features such as size, beamwidth, aperture-frequency product, gain, tracking control; and system requirements such as power, availability, reliability, and performance Presents problem sets and starred sections containing basic mathematical development Details recent developments enabling digital information transmission and delivery via satellite Satellite Communication Engineering, Second Edition serves as a textbook for students and a resource for space agencies and relevant industries.
This is the first book primarily about the satellite payload of satellite communications systems. It represents a unique combination of practical systems engineering and communications theory. It tells about the satellites in geostationary and low-earth orbits today, both

the so-called bent-pipe payloads and the processing payloads. The on-orbit environment, mitigated by the spacecraft bus, is described. The payload units (e.g. antennas and amplifiers), as well as payload-integration elements (e.g. waveguide and switches) are discussed in regard to how they work, what they do to the signal, their technology, environment sensitivity, and specifications. At a higher level are discussions on the payload as an entity: architecture including redundancy; specifications--what they mean, how they relate to unit specifications, and how to verify; and specification-compliance analysis ("budgets") with uncertainty. Aspects of probability theory handy for calculating and using uncertainty and variation are presented. The highest-level discussions, on the end-to-end communications system, start with a practical introduction to physical-layer communications theory. Atmospheric effects and interference on the communications link are described. A chapter gives an example of optimizing a multibeam payload via probabilistic analysis. Finally, practical tips on system simulation and emulation are provided. The carrier frequencies treated are 1 GHz and above. Familiarity with Fourier analysis will enhance understanding of some topics. References are provided throughout the book for readers who want to dig deeper. Payload systems engineers, payload proposal writers, satellite-communications systems designers and analysts, and satellite customers will find that the book cuts their learning time. Spacecraft-bus systems engineers, payload unit engineers, and spacecraft operators will gain insight into the overall system. Students in systems engineering, microwave engineering, communications theory, probability theory, and communications simulation and modelling will find examples to supplement theoretical texts.

Sections on important areas such as spread spectrum, cellular communications, and orthogonal frequency-division multiplexing are provided. * Computational examples are included, illustrating how to use the computer as a simulation tool, thereby allowing waveforms, spectra, and performance curves to be generated. * Overviews of the necessary background in signal, system, probability, and random process theory required for the analog and digital communications topics covered in the book.

Fully updated edition of the comprehensive, single-source reference on satellite technology and its applications Covering both the technology and its applications, Satellite Technology is a concise reference on satellites for commercial, scientific and military purposes. The book explains satellite technology fully, beginning by offering an introduction to the fundamentals, before covering orbits and trajectories, launch and in-orbit operations, hardware, communication techniques, multiple access techniques, and link design fundamentals. This new edition also includes comprehensive chapters on Satellite Networks and Satellite Technology – Emerging Trends. Providing a complete survey of applications, from remote sensing and military uses, to navigational and scientific applications, the authors also present an inclusive compendium on satellites and satellite launch vehicles. Filled with diagrams and illustrations, this book serves as

an ideal introduction for those new to the topic, as well as a reference point for professionals. Fully updated edition of the comprehensive, single-source reference on satellite technology and its applications - remote sensing, weather, navigation, scientific, and military - including new chapters on Satellite Networks and Satellite Technology – Emerging Trends Covers the full range of satellite applications in remote sensing, meteorology, the military, navigation and science, and communications, including satellite-to-under sea communication, satellite cell-phones, and global Xpress system of INMARSAT The cross-disciplinary coverage makes the book an essential reference book for professionals, R&D scientists and students at post graduate level Companion website provides a complete compendium on satellites and satellite launch vehicles An ideal introduction for Professionals and R&D scientists in the field. Engineering Students. Cross disciplinary information for engineers and technical managers.

This state-of-the art guide offers an in-depth treatment of the elements and components that comprise satellite communication systems. The book takes the reader step-by-step through the principles and methods of system design - all in easy-to-understand language avoiding long mathematical derivations.

An accessible undergraduate textbook introducing key fundamental principles behind modern communication systems, supported by exercises, software problems and lab exercises.

Communication Systems Engineering
Systems Engineering of Phased Arrays
Mobile Satellite Communications Handbook
Satellite Communication Systems
Deep Space Telecommunications Systems Engineering
2nd Edition
Introduction to Satellite Communication
Systems, Modulation, and Noise