# Digital Satellite Communications Systems And Technologies Military And Civil Applications

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## Wireless Communications - Jack M. Holtzman 2012-12-06
The past several years have been exciting for wireless communications. The public appetite for new services and equipment continues to grow. The Second Generation systems that have absorbed our attention during recent years will soon be commercial realities. In addition to these standard systems, we see an explosion of technical alternatives for meeting the demand for wireless communications. The debates about competing solutions to the same problem are a sign of the scientific and technical immaturity of our field. Here we have an application in search of technology rather than the reverse. This is a rare event in the information business. Happily, there is a growing awareness that we can act now to prevent the technology shortage from becoming more acute at the end of this decade. By then, market size and user expectations will surpass the capabilities of today's emerging systems. Third Generation Wireless Information Networks will place even greater burdens on technology than their ancestors. To discuss these issues, Rutgers University WINLAB plays host to a series of Workshops on Third Generation Wireless Information Networks. The first one, in 1989, had the flavor of a gathering of committed enthusiasts of an interesting niche of telephony. Presentations and discussions centered on the problems of existing cellular systems and technical alternatives to alleviating them. Although the more distant future was the announced theme of the Workshop, it drew only a fraction of our attention.

## Perspectives in Spread Spectrum - Amer A. Hassan 2012-12-06
Perspectives in Spread Spectrum brings together studies and recent work on six exciting topics from the spread spectrum arts. The book gives a wide, collective view of trends, ideas, and techniques in the spread spectrum discipline, due to the authors' extensive work on spread spectrum techniques and applications from different vantage points. The inexorable march of electronics towards ever faster, ever smaller, and ever more powerful electronic and optical circuitry has wrought, and will continue to enable, profound changes in the spread spectrum arts, by allowing increasingly complex signalling waveforms and statistical tests to be implemented as the theory beyond spread spectrum continues to evolve. Perspectives in Spread Spectrum is divided into six chapters. The first chapter deals with sequence spreading design. There is not a single metric for design of spreading sequences; rather, the design is ideally tailored to the specific scenario of usage. This chapter delves into recent and very promising synthesis work. The second chapter

deals with OFDM techniques. As channels become wider and trans-channel fading (or jamming) becomes frequency selective across the band, OFDM techniques may provide a powerful alternative design perspective. The third chapter is a generalization of the venerable Walsh functions. A new modulation scheme, Geometric Harmonic Modulation, GHM for short, is reviewed and characterized as a form of OFDM. From GHM, a further generalization of the Walsh functions is derived for non-binary signalling. The fourth chapter is concerned with some new and exciting results regarding the follower jammer paradigm. A counter-countermeasure technique is reviewed, notable for its counterintuitive characteristic which can be understood from a simple yet elegant game framework. The fifth chapter recounts some results pertaining to random coding for an optical spread spectrum link. The technique is based on laser speckle statistics and uses a coherent array of spatial light modulators at the transmitter but allows the receiver to be realized as a spatially distributed radiometric and therefore incoherent structure. The sixth and final chapter looks at an important and interesting application of spread spectrum to accurately locate a wideband, 'bent pipe', satellite transponder. It is, in a strong sense, an inverted GPS technique. Perspectives in Spread Spectrum serves as an excellent reference and source of ideas for further research, and may be used as a text for advanced courses on the topic.

**Discrete Stochastic Processes** - Robert G. Gallager 2012-12-06
Stochastic processes are found in probabilistic systems that evolve with time. Discrete stochastic processes change by only integer time steps (for some time scale), or are characterized by discrete occurrences at arbitrary times. Discrete Stochastic Processes helps the reader develop the understanding and intuition necessary to apply stochastic process theory in engineering, science and operations research. The book approaches the subject via many simple examples which build insight into the structure of stochastic processes and the general effect of these phenomena in real systems. The book presents mathematical ideas without recourse to measure theory, using only minimal mathematical analysis. In the proofs and explanations, clarity is favored over formal rigor, and simplicity over generality. Numerous examples are given to show how results fail to hold when all the conditions are not satisfied. Audience: An excellent textbook for a graduate level course in engineering and operations research. Also an invaluable reference for all those requiring a deeper understanding of the subject.

**Global Mobile Satellite Communications Theory** - Stojče Dimov Ilčev 2016-09-23
This book discusses current theory regarding global mobile satellite communications (GMSC) for maritime, land (road and rail), and aeronautical applications. It covers how these can enable connections between moving objects such as ships, road and rail vehicles and aircrafts on one hand, and on the other ground telecommunications subscribers through the medium of communications satellites, ground earth stations, Terrestrial Telecommunication Networks (TTN), Internet Service Providers (ISP) and other wireless and landline telecommunications providers. This new edition covers new developments and initiatives that have resulted in land and aeronautical applications and the introduction of new satellite constellations in non-geostationary orbits and projects of new hybrid satellite constellations. The book presents current GMSC trends, mobile system concepts and network architecture using a simple mode of style with understandable technical information, characteristics, graphics, illustrations and mathematics equations. The first edition of Global Mobile Satellite Communications (Springer, 2005) was split into two books for the second edition—one on applications and one on theory. This book presents global mobile satellite communications theory.

**Discrete-Time Models for Communication Systems Including ATM** - Herwig Bruneel 2012-12-06
Most queuing analyses performed in the literature are based on characterization of queueing phenomena in continuous-time items. Recently in the telecommunication industries, BISDN (broadband integrated services digital network) has received considerable attention since it can provide a common interface for future communication needs including video,

data, and speech. Since information in BISDN is transported by means of dicsrete units of 53-octet ATM (asynchronous transfer mode) cells, interests in discrete-time systems have increased. Discrete-Time Models for Communication Systems Including ATM provides a general framework for queueing analyses of dicrete-time systems. After a brief look at past studies of discrete-time systems, a detailed description and analysis are presented for a generic discrete-time model with a single server, arbitrary service times and independent arrivals. The book then follows a less stringent approach and focuses more on the average statistics and on different queueing disciplines. Conventional first-in-out and last-in-first-out disciplines are discussed in terms of the average statistics. Systems with multiple classes of messages without class-dependent priorities are considered to establish a discrete-time conservation law. Multiple classes with priorities are also considered to derive performance measures of priority scheduling disciplines. Finally, a multi-queue system with cyclic service is analyzed in the context of round-robin service ordering. This is followed by analyses of discrete-time queueing systems with `more complicate' input and output processes. Specifically, single-server systems are investigated whereby either the arrivals or the server is subject to random interruptions. Results are mainly obtained in terms of generating functions and mean values of the principal performance measures. The influence of the nature of the arrival correlation and the server interruptions on the queueing behavior is discussed. Finally, the book explores queueing models directly associated with ATM switches and multiplexers. This book is a valuable reference and may be used as a text for and advanced course on the subject.

**Communication Satellite Systems Technology** - Richard B. Marsten 2014-12-03 Communication Satellite Systems Technology reviews the state of the art in communication satellite systems technology. Topics covered range from commercial point-to-point systems and military satellite communication systems to satellite support subsystems and components, along with high-power systems. Communication satellites are also discussed from a sociological

perspective. Comprised of 50 chapters, this book begins with a 1945 article by Arthur C. Clarke in which he proposed the construction of rocket space stations in orbit that would provide complete radio coverage of the globe as well as extraterrestrial relay services. The reader is then introduced to the Early Bird satellite and its hydrogen peroxide orbit control and orientation system. Details of the sequence of maneuvers required after transfer ellipse injection until final placement in a stationary orbit are given. The methods of calculation of maneuver parameters, as well as numerical examples of certain Early Bird orbit changes and maneuver parameters, are described. The effects of the principal long-term disturbing forces on the satellite are also considered. Subsequent chapters focus on military satellite communication systems; satellite support subsystems and components; high-power systems; and systems concepts. The organization and program of Intelsat are also evaluated. This monograph will be of value to practitioners in the fields of aeronautics, astronautics, and satellite communications.

**Communication Satellite Systems Technology** - Richard Barry Marsten 1966

*Wireless Information Networks* - Jack M. Holtzman 2012-12-06
In April 1995, WINLAB (the Wireless Infonnation Network Lab oratory at Rutgers University) hosted the Fifth WINLAB Workshop on Third Generation Wireless Infonnation Networks. This workshop brings together a select group of experts interested in the future of Personal Communications, Mobile Computing and other services supported by wireless communications. As a sequel to Kluwer books on previous WINLAB workshops,l this volume assembles written versions of presentations of the Fifth Workshop. The last few years have been exciting for the field of wireless communications. The second generation systems that have absorbed our attention during those years are becoming commercial realities. Everyone is looking forward to PCS, especially in light of the recent auctions. We see an explosion of technical alternatives for meeting the demand for wireless communications. We also have applications in search of the best technologies rather than the

reverse. The papers included provide new insights into many of the issues needing resolution for the successful introduction of the new services by the end of the decade. The authors represent views from both industry and universities from a number of nations. They are grouped into four main categories: Architecture, Radio Resource Management, Access, and Mobile Data, Mobile Networks.

**Satellite Communications Systems Engineering** - Louis J. Ippolito, Jr. 2017-02-28 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.

**Satellite Communications** - Michael J. Miller 2012-12-06 Satellite Communications: Mobile and Fixed Services is based on the premise that designers of future satellite systems must take account of the strong competition that satellites face from optical fibers. In future years, satellites will continue to be commercially viable media for telecommunications only if systems designers take account of the unique features that satellites have to offer. Accordingly, Satellite Communications places more emphasis on satellite mobile services and broadcasting, and less emphasis on fixed, point-to-point, high-capacity services than traditional textbooks in the field. Also, an emphasis is given in the book to design issues. Numerous illustrative system

design examples and numerical problems are provided. The particular attention given to methods of design of satellite mobile communications systems should make it an indispensable resource for workers in this field. The book also contains some recent results of propagation modelling and system design studies which should be of particular value to researchers and designers of satellite systems for mobile communications services. Satellite Communications is suitable for use as a textbook for advanced courses on satellite communications, and is a valuable reference for all those working in the field.

**Information, Coding and Mathematics** - Robert J. McEliece 2002-05-31 Information, Coding and Mathematics is a classic reference for both professional and academic researchers working in error-correction coding and decoding, Shannon theory, cryptography, digital communications, information security, and electronic engineering. The work represents a collection of contributions from leading experts in turbo coding, cryptography and sequences, Shannon theory and coding bounds, and decoding theory and applications. All of the contributors have individually and collectively dedicated their work as a tribute to the outstanding work of Robert J. McEliece. Information, Coding and Mathematics covers the latest advances in the widely used and rapidly developing field of information and communication technology.

Satellite Communications Systems - Gerard Maral 2002-05-06 Satellite communications refers to the utilisation of geostationary orbiting satellites to relay the transmission received from one earth station to one or more earth stations. They are the outcome of research in the area of communications whose objective is to achieve ever-increasing ranges and capacities with the lowest possible costs. Since publication of the first edition, satellite communications systems have become increasingly sophisticated. This revised, updated and extended fourth edition covers the entire field of satellite communications engineering from the techniques of orbital mechanics and radio wave propagation to the design of communication links and earth stations. * Features an improved

presentation of satellite applications with regards to services * Discusses the most recent developments in this evolving field, including MPEG2, concatenated coding, digital TV and examples of transmission of digital telephony * Practical approach and extensive illustrations are highly valued by student audience * A single source, comprehensive and thorough reference covering the entire field of satellite communications engineering. New features include: * An updated section on the evolution of satellite communications and the deployment of services * Inclusion of MPEG2, concatenated coding and coded modulation * Discusses examples for the transmission of digital telephony, digital TV and date, introduction of DVB-s (Digital Video Broadcasting by satellite) standard * Complete re-organisation of Chapters 5 and 6 resulting in a unique new Chapter 5 entitled 'Service Oriented Satellite Networks' * Recent developments in deployable antennas * Lithium batteries * New launchers such as Atlas 3 and 4 A leading edge resource for advanced students, engineers and designers in the field of satellite and mobile radio communications and also communication engineers.
Wireless and Mobile Communications - Jack M. Holtzman 2012-12-06
In October 1993, the Rutgers University Wireless Infonnation Network Laboratory hosted the fourth WINLAB Workshop on Third Generation Wireless Infonnation Networks. These events bring together a select group of experts interested in the long tenn future of Personal Communications, Mobile Computing, and other services supported by wireless telecommunications technology. This is a fast moving field and we already see, in present practice, realizations of visions articulated in the earlier Workshops. In particular, the second generation systems that absorbed the attention of the first WINLAB Workshop, are now commercial products. It is an interesting reflection on the state of knowledge of wireless communications that the debates about the relative technical merits of these systems have not yet been resolved. Meanwhile, in the light of United States Government announcements in September 1993 the business and technical communities must confront this year a new generation of Personal Communications

Services. Here we have applications in search of the best technologies rather than the reverse. This is a rare situation in the infonnation business. Today's advanced planning and forward looking studies will prevent technology shortages and uncertainties at the end of this decade. By then, market size and public expectations will surpass the capabilities of the systems of the mid-1990's. Third Generation Wireless Infonnation Networks will place greater burdens on technology than their predecessors by offering a wider range of services and a higher degree of service integration.
Wireless Personal Communications - Martin J. Feuerstein 2012-12-06
In this book, the state-of-the-art and future vision of wireless communications is presented in the form of a number of new services. Wireless personal communications is clearly a different service than today's cellular radio or cordless telephone, but there is an evolutionary connection between the three services. This book addresses questions about what features of personal communication services (PCS) will be met by existing or enhanced digital cellular radio technology. The regulatory and standards aspects of wireless communications are currently in a crucial stage of their formulation. A section of the book is devoted to the opinions of representatives from regulatory agencies and standards organizations on the future of this critical area. One of the most intriguing questions about the future of wireless communications has to do with the choice of multiple access technique. The trade offs between time division multiple access (TDMA) and code division multiple access (CDMA) have been the topic of many a heated discussion amongst members of the wireless community. This book presents a thorough discussion of a number of the topics which are instrumental in making a fair comparison of TDMA and CDMA; these topics include: analytical performance evaluation techniques, capacity studies, equalization requirements, and shared spectrum comparisons. Many of the technologies associated with wireless personal communications are reaching the design stages. This book presents a number of alternatives for designs of both base stations and user terminals. Some of the key questions of equalization,

control channel requirements, multi-path diversity and channel allocation strategies have been addressed. Invariably, system designs and performance are tied to the characteristics of the radio channel. This book introduces several novel techniques for predicting propagation and system performance in a variety of indoor and outdoor environments. These techniques include analytical as well as computer simulation algorithms for predicting signal strenghts and other channel parameters based on the local topographical features. This book serves as an excellent reference source and may be used as a text for advanced courses on wireless communications, cellular radio, or digital mobile radio.

**Broadband Communications and Home Networking** - Scott R. Bullock 2001-06-30 Annotation High-speed digital communications build on the principles of Bell's 1876 invention. The vice president of engineering for a satellite communications company lucidly explains telephony fundamentals before turning to the specifics of broadband communications and home/small office networking: high-speed modems; digital modulation techniques; orthogonal signals; power line, telephone line, radio frequency, and satellite communications; and the "last mile" connection from competitive local distributors of the signal to the end user. Includes some consideration of standards and costs, and supporting diagrams and equations. Annotation c. Book News, Inc., Portland, OR (booknews.com).

**Introduction to Convolutional Codes with Applications** - Ajay Dholakia 2012-12-06 Introduction to Convolutional Codes with Applications is an introduction to the basic concepts of convolutional codes, their structure and classification, various error correction and decoding techniques for convolutionally encoded data, and some of the most common applications. The definition and representations, distance properties, and important classes of convolutional codes are also discussed in detail. The book provides the first comprehensive description of table-driven correction and decoding of convolutionally encoded data. Complete examples of Viterbi, sequential, and majority-logic decoding technique are also included, allowing a quick comparison among the different decoding approaches. Introduction to Convolutional Codes with Applications summarizes the research of the last two decades on applications of convolutional codes in hybrid ARQ protocols. A new classification allows a natural way of studying the underlying concepts of hybrid schemes and accommodates all of the new research. A novel application of fast decodable invertible convolutional codes for lost packet recovery in high speed networks is described. This opens the door for using convolutional coding for error recovery in high speed networks. Practicing communications, electronics, and networking engineers who want to get a better grasp of the underlying concepts of convolutional coding and its applications will greatly benefit by the simple and concise style of explanation. An up-to-date bibliography of over 300 papers is included. Also suitable for use as a textbook or a reference text in an advanced course on coding theory with emphasis on convolutional codes.

Speech and Audio Coding for Wireless and Network Applications - Bishnu S. Atal 2012-12-06 Speech and Audio Coding for Wireless and Network Applications contains 34 chapters, loosely grouped into six topical areas. The chapters in this volume reflect the progress and present the state of the art in low-bit-rate speech coding, primarily at bit rates from 2.4 kbit/s to 16 kbit/s. Together they represent important contributions from leading researchers in the speech coding community. Speech and Audio Coding for Wireless and Network Applications contains contributions describing technologies that are under consideration as standards for such applications as digital cellular communications (the half-rate American and European coding standards). A brief Introduction is followed by a section dedicated to low-delay speech coding, a research direction which emerged as a result of the CCITT requirement for a universal low-delay 16 kbit/s speech coding technology and now continues with the objective of achieving toll quality with moderate delay at a rate of 8 kbit/s. A section on the important topic of speech quality evaluation is then presented. This is followed by a section on speech coding for wireless transmission, and a section on audio coding which covers not only

7 kHz bandwidth speech, but also wideband coding applicable to high fidelity music. The book concludes with a section on speech coding for noisy transmission channels, followed by a section addressing future research directions. Speech and Audio Coding for Wireless and Network Applications presents a cross-section of the key contributions in speech and audio coding which have emerged recently. For this reason, the book is a valuable reference for all researchers and graduate students in the speech coding community.

**Wireless Personal Communications** - Brian D. Woerner 2013-06-29
The area of personal and wireless communications is a burgeoning field. Technology advances and new frequency allocations for personal communication services (PCS) are creating numerous business and technical opportunities. It is becoming clear that an essential requirement for exploiting opportunities is the ability to track the dramatic changes in wireless technology, which is a principal aim of this book. Wireless Personal Communications: Research Developments places particular emphasis on the areas of signal processing, propagation and spread-spectrum, and emerging communication systems. This book contains new results on adaptive antennas for capacity improvements in wireless communication systems, as well as state-of-the-art information on the latest technical developments. Also included are several chapters which discuss the impact of defense conversion on the wireless industry, and related competitive issues. The six parts of the book each focus on a distinct issue in wireless communications. Part I contains several tutorial chapters on key areas in wireless communications. The first chapter is on radio wave propagation for emerging wireless personal communication systems. Chapter two contains a comprehensive study of emerging DSP-based interference rejection techniques for single channel (antenna) systems. Chapter three deals with spread spectrum wireless communications, explaining the concept of spread spectrum, modeling techniques for spread spectrum, and current applications and research issues for spread spectrum systems. Part II focuses on digital signal processing and

spread spectrum, two means of creating interference and multipath robust communications. Part III concerns propagation aspects of wireless communications. Part IV discusses the performance of emerging wireless systems. Part V describes the opportunities and pitfalls of defense conversion from the perspective of several U.S. defense firms that have successfully made the transition to commercial wireless. The final section discusses a number of competitive issues regarding personal communication services.

Satellite Communications - Dennis Roddy 2001 THE DEFINITIVE REFERENCE ON SATELLITE COMMUNICATIONS Satellite Communications, Third Edition is the latest update of the reference widely regarded as the most complete and accessible intro to this dynamic area of engineering. This edition has been revised to include the hottest applications in a rapidly growing field with expanded coverage of CDMA...new Internet via satellite and digital TV broadcasting chapters...an expanded section on geostationary orbits...error correction coding...and a preview of coming applications and growth. Author Dennis Roddy's authoritative and readable treatment provides you with: Full descriptions of hardware, including satellite structures, antennas, earth stations, and onboard systems Cutting-edge applications such as wireless Internet, telephony, Global Positioning Systems (GPS), and worldwide broadcasts of digital TV New information on ATM, TCP/IP, and LEO networking over satellites, mobile systems, and onboard switching Details on methods, orbits, links, access, signals, modulation, and interference All examples and problems worked in MathCad, with mathematical complexities pared to a minimum

**Satellite Communication Engineering** - Michael Olorunfunmi Kolawole 2002-05-24 Highlighting satellite and earth station design, links and communication systems, error detection and correction, and regulations and 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

**Internet TV Systems** - Lawrence Harte

2016-10-07
This book describes the necessary equipment, platforms, and service options for setting up and running Internet TV systems. It covers the technologies, business, and content aspects along with operation and business parts. This 2nd edition has been updated information that covers how to use Internet TV Distribution services to setup channels on Internet TV marketplaces including Roku, Amazon Prime, Google TV, and others. Also includes new sections covering second screen, video advertising networks, and more.

*Navy's Needs in Space for Providing Future Capabilities* - National Research Council 2005-07-18
The United States must operate successfully in space to help assure its security and economic well being. The Department of the Navy is a major user of space capabilities, although those capabilities are now primarily provided by DOD, the Air Force, and NOAA. Following a DOD assessment of national space security management in 2001, the Navy commissioned a Panel to Review Space to assess Navy space policy and strategy. As an extension of that review, the NRC was requested by the Navy to examine its needs in space for providing future operational and technical capabilities. This report presents a discussion of the strategic framework of future space needs, the roles and responsibilities for meeting those needs, an assessment of Navy support to space mission areas, and a proposed vision for fulfilling Naval forces space needs.

*Planning and Architectural Design of Integrated Services Digital Networks* - A. Nejat Ince 2012-12-06
Planning and Architectural Design of Integrated Services Digital Networks: Civil and Military Applications provides a comprehensive treatment of ISDNs: how to plan and design them architecturally and how to implement them so that they meet certain given user requirements ranging from a variety of service demands to transmission performance, security, reliability/availability, capability for growth, interoperability with other ISDN and non-ISDN networks and, of course, cost. The book concentrates on the application of ISDN concepts and standards to the planning and design of real costed networks to meet certain specified user requirements. Where there are multiple options, considerations and rationale on the choice of network aspects and standards are discussed. The unique feature of the book, compared with other books on ISDN, is that it expounds an original methodology which starts from an assumed or given set of complete user requirements and proceeds to designing a complete network taking into account the technology and standards of ISDN, as well as some constraints including cost which may be imposed. Planning and Architectural Design of Integrated Services Digital Networks describes computer-aided design tools employed for dimensioning the network for various traffic loads and for assessing its traffic carrying performance for assessing different precedence categories and network configurations, transmission conditions and routing algorithms which may be static-deterministic or dynamic-adaptive. Aspects such as surveillance and control, security, survivability and EMP protection are also addressed. Planning and Architectural Design of Integrated Services Digital Networks: Civil and Military Applications is an excellent reference source and may be used as a text for advanced courses on the subject.

Digital Satellite Communications Systems and Technologies - A. Nejat Ince 2012-12-06
Among the space activities of the last three decades satellite communications (SATCOM) has found the widest application in meeting both civil and military communications requirements. Several international, regional and national SATCOM systems of increasing capacity, capability and complexity have been and are being implemented over the years. The latest versions are utilizing such concepts as spot beams, processing transponders in SS-TDMA and operations in different frequency bands including the EHF band. On the military side, the United States of America, the United Kingdom, France and NATO (the North Atlantic Treaty Organisation) have been the only owners and operators of military SATCOM systems in the West. The systems in being and under development use satellites and ground terminals with characteristics which differ from the civilian ones with respect to frequency bands

utilised and survivability and interoperability. The SATCOM has given the military users the potential of having much-needed mobility, flexibility and survivability in strategic and tactical communications for land, sea and air operations. It must, however, be said particularly for the military SATCOM systems that they have been evolved in big jumps, both in time and capability, each jump involving the deployment of two or three often specially designed large satellites, large expenses and rather traumatic transition between jumps. Despite these undesirable features these systems did not have the required degree of suevivability and flexibility.

*Resilient Space Systems Design* - Ron Burch 2019-09-11
Presenting a fundamental definition of resilience, the book examines the concept of resilience as it relates to space system design. The book establishes the required definitions, relates its place to existing state-of-the-art systems engineering practices, and explains the process and mathematical tools used to achieve a resilient design. It discusses a variety of potential threats and their impact upon a space system. By providing multiple, real-world examples to illustrate the application of the design methodology, the book covers the necessary techniques and tools, while guiding the reader through the entirety of the process. The book begins with space systems basics to ensure the reader is versed in the functions and components of the system prior to diving into the details of resilience. However, the text does not assume that the reader has an extensive background in the subject matter of resilience. This book is aimed at engineers and architects in the areas of aerospace, space systems, and space communications.

**Dynamics of Meteor Outbursts and Satellite Mitigation Strategies** - Glenn E. Peterson 1999
The potential threat posed by Leonid meteroids to orbiting spacecraft over the next several years calls for new dynamic mitigation strategies to assist the satellite community in reducing the danger to its vehicles. This book offers deliberate dynamic mitigation strategies to complement the traditional shielding strategies, providing mission operators additional ways to decrease the danger. Five different attitude control and orbit maneuvering options are examined in detail. The information is presented in algorithmic form to allow technically competent, but meteoroid inexperienced, operators to easily understand the phenomena, assess the danger, and implement procedures. Although general in scope, the book emphasizes the Leonid meteor events of the 1998-2002 timeframe.

**Codes, Graphs, and Systems** - Richard E. Blahut 2012-12-06
Foreword by James L. Massey. Codes, Graphs, and Systems is an excellent reference for both academic researchers and professional engineers working in the fields of communications and signal processing. A collection of contributions from world-renowned experts in coding theory, information theory, and signal processing, the book provides a broad perspective on contemporary research in these areas. Survey articles are also included. Specific topics covered include convolutional codes and turbo codes; detection and equalization; modems; physics and information theory; lattices and geometry; and behaviors and codes on graphs. Codes, Graphs, and Systems is a tribute to the leadership and profound influence of G. David Forney, Jr. The 35 contributors to the volume have assembled their work in his honor.

**Satellite Communications Systems and Technology** - Burton L. Edelson 1995-01-15
Satellite Communications Systems & Technology

**Coded-Modulation Techniques for Fading Channels** - Seyed Hamidreza Jamali 2012-12-06
Coded-Modulation Techniques for Fading Channels provides the reader with a sound background for the application of bandwidth-efficient coded-modulation techniques in fading channels. The book systematically presents recent developments in the field, which has grown rapidly in recent years, and provides a solid frame of reference for further research in this area. During the past decade there has been a proliferation of research in the area of bandwidth-efficient coded-modulation techniques. The primary advantage of these schemes over modulation schemes employing traditional error correcting codes is their ability to improve the performance of the communication system without bandwidth expansion. This property makes them a suitable

choice for channels which are limited in both power and bandwidth. A typical example of such channels is a mobile satellite channel, where it is desired to accommodate a large number of users in a given bandwidth with a power which is constrained by the physical size of the satellite and by the vehicle's antenna. Coded-Modulation Techniques for Fading Channels is an excellent reference for researchers and practicing engineers, and may be used as a text for advanced courses on the subject.

*Elliptic Curve Public Key Cryptosystems* - Alfred J. Menezes 1993-07-31
Elliptic curves have been intensively studied in algebraic geometry and number theory. In recent years they have been used in devising efficient algorithms for factoring integers and primality proving, and in the construction of public key cryptosystems. Elliptic Curve Public Key Cryptosystems provides an up-to-date and self-contained treatment of elliptic curve-based public key cryptology. Elliptic curve cryptosystems potentially provide equivalent security to the existing public key schemes, but with shorter key lengths. Having short key lengths means smaller bandwidth and memory requirements and can be a crucial factor in some applications, for example the design of smart card systems. The book examines various issues which arise in the secure and efficient implementation of elliptic curve systems. Elliptic Curve Public Key Cryptosystems is a valuable reference resource for researchers in academia, government and industry who are concerned with issues of data security. Because of the comprehensive treatment, the book is also suitable for use as a text for advanced courses on the subject.

*Communications and Cryptography* - Richard E. Blahut 2012-12-06
Information theory is an exceptional field in many ways. Technically, it is one of the rare fields in which mathematical results and insights have led directly to significant engineering payoffs. Professionally, it is a field that has sustained a remarkable degree of community, collegiality and high standards. James L. Massey, whose work in the field is honored here, embodies the highest standards of the profession in his own career. The book covers the latest work on: block coding, convolutional coding, cryptography, and information theory. The 44 contributions represent a cross-section of the world's leading scholars, scientists and researchers in information theory and communication. The book is rounded off with an index and a bibliography of publications by James Massey.

**Digital Satellite Communications Systems and Technologies** - A. Nejat Ince 2012-10-12
Among the space activities of the last three decades satellite communications (SATCOM) has found the widest application in meeting both civil and military communications requirements. Several international, regional and national SATCOM systems of increasing capacity, capability and complexity have been and are being implemented over the years. The latest versions are utilizing such concepts as spot beams, processing transponders in SS-TDMA and operations in different frequency bands including the EHF band. On the military side, the United States of America, the United Kingdom, France and NATO (the North Atlantic Treaty Organisation) have been the only owners and operators of military SATCOM systems in the West. The systems in being and under development use satellites and ground terminals with characteristics which differ from the civilian ones with respect to frequency bands utilised and survivability and interoperability. The SATCOM has given the military users the potential of having much-needed mobility, flexibility and survivability in strategic and tactical communications for land, sea and air operations. It must, however, be said particularly for the military SATCOM systems that they have been evolved in big jumps, both in time and capability, each jump involving the deployment of two or three often specially designed large satellites, large expenses and rather traumatic transition between jumps. Despite these undesirable features these systems did not have the required degree of suevivability and flexibility.

**Wireless Personal Communications** - Theodore S. Rappaport 2012-12-06
"Well informed people know it is impossible to transmit the voice over wires, and that were it possible to do so, the thing would be ofno practical value. " from an editorial in the Boston Post -1865 Fortunately for the

telecommunications industry, the unknown author of the above statement turned out to be very mistaken indeed. Even as he spoke, Alexander Graham Bell was achieving the impossible, with a host of competing inventors close behind. The communications revolution which ensued has changed the way in which we live and work, and the way in which we view the world around us. Wired telephone lines now encircle the globe, allowing instantaneous transmission of voice and data. Events from Times Square to Red Square are now as accessible as events on the local courthouse lawn. The advent of wireless communications has extended Bell's revolution to another domain. Personal communications promises voice, data and images which are accessible everywhere. Although predictions are dangerous, a look back over the last decade reveals spectacular growth. In the United States alone, there are now over 50 million cordless phones in use throughout the country -at least one cordless phone for every 3 households - and nearly 20 million pocket pagers. U. S. Cellular telephone service, launched commercially in 1984, has experienced 30-40% annual growth rates despite a sluggish economy.

## Applications of Finite Fields - Alfred J. Menezes 2013-04-17

The theory of finite fields, whose origins can be traced back to the works of Gauss and Galois, has played a part in various branches in mathematics. Inrecent years we have witnessed a resurgence of interest in finite fields, and this is partly due to important applications in coding theory and cryptography. The purpose of this book is to introduce the reader to some of these recent developments. It should be of interest to a wide range of students, researchers and practitioners in the disciplines of computer science, engineering and mathematics. We shall focus our attention on some specific recent developments in the theory and applications of finite fields. While the topics selected are treated in some depth, we have not attempted to be encyclopedic. Among the topics studied are different methods of representing the elements of a finite field (including normal bases and optimal normal bases), algorithms for factoring polynomials over finite fields, methods for constructing irreducible polynomials, the

discrete logarithm problem and its implications to cryptography, the use of elliptic curves in constructing public key cryptosystems, and the uses of algebraic geometry in constructing good error-correcting codes. To limit the size of the volume we have been forced to omit some important applications of finite fields. Some of these missing applications are briefly mentioned in the Appendix along with some key references.

## The Evolution of Untethered Communications - National Research Council 1998-01-01

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.

## Sequence Detection for High-Density Storage Channels - Jaekyun Moon 2012-12-06

Magnetic data storage can be viewed as a data communication system. This is not a sUlprising view, considering that data storage is essentially the transfer of data between different times. The past decade has indeed seen rapidly growing interest in applying improved coding and detection techniques to magnetic data storage, a traditional approach to enhance performance of communication channels. Since its inception in the 1930's, the magnetic recording industry has achieved impressive progress in data capacity. This has been made possible mainly by

innovations and advances in heads and media design. However, as the demand for higher storage capacity continues in the modem information era, a need arises to explore other possibilities to help meet the ever-growing demand. Advanced coding and detection are one such possibility, providing an efficient, cost-effective means to increase data capacity. In fact, with the advent of modem Ie technology which has enabled real-time implementation of increasingly complex signal processing algorithms, advanced coding and detection are rapidly becoming a major issue in the development of improved data storage products. While there have been remarkable advances in recent years in the areas of both coding and detection for data storage, this book focuses only on data detection, or the processing of readback waveforms to reproduce stored data, in conjunction with the traditional modulation coding method called run length-limited or (d,k) coding.

*Global Mobile Satellite Communications Applications* - Stojce Dimov Ilcev 2017-11-11 This book discusses global mobile satellite communications (GMSC) for maritime, land (road and rail), and aeronautical applications. It covers how these enable connections between moving objects such as ships, road and rail vehicles and aircrafts on one hand, and ground telecommunications subscribers through the medium of communications satellites, ground earth stations, Terrestrial Telecommunication Networks (TTN), Internet Service Providers (ISP) and other wireless and landline telecommunications providers. The new edition covers new developments and initiatives that have resulted in land and aeronautical applications and the introduction of new satellite constellations in non-geostationary orbits and projects of new hybrid satellite constellations. The book presents current GMSC trends, mobile system concepts and network architecture using a simple mode of style with understandable technical information, characteristics, graphics, illustrations and mathematics equations. It represents telecommunications technique and technology, which can be useful for all technical staff on vessels at sea and rivers, on all types of land vehicles, on planes, on off shore constructions and for everyone possessing

satellite communications handset phones. The first edition of Global Mobile Satellite Communications (Springer, 2005) was split into two books for the second edition – one on applications and one on theory. This book presents global mobile satellite communications applications.

Digital Image Compression - Weidong Kou 2013-03-14 Digital image business applications are expanding rapidly, driven by recent advances in the technology and breakthroughs in the price and performance of hardware and firmware. This ever increasing need for the storage and transmission of images has in turn driven the technology of image compression: image data rate reduction to save storage space and reduce transmission rate requirements. Digital image compression offers a solution to a variety of imaging applications that require a vast amount of data to represent the images, such as document imaging management systems, facsimile transmission, image archiving, remote sensing, medical imaging, entertainment, HDTV, broadcasting, education and video teleconferencing. Digital Image Compression: Algorithms and Standards introduces the reader to compression algorithms, including the CCITT facsimile standards T.4 and T.6, JBIG, CCITT H.261 and MPEG standards. The book provides comprehensive explanations of the principles and concepts of the algorithms, helping the readers' understanding and allowing them to use the standards in business, product development and R&D. Audience: A valuable reference for the graduate student, researcher and engineer. May also be used as a text for a course on the subject.

Wireless Infrared Communications - John R. Barry 2012-12-06 The demand for wireless access to network services is growing in virtually all communications and computing applications. Once accustomed to unteathered opera tion, users resent being tied to a desk or a fixed location, but will endure it when there is some substantial benefit, such as higher resolution or bandwidth. Recent technolog ical advances, however, such as the scaling of VLSI, the development of low-power circuit design techniques and architectures, increasing battery

energy capacity, and advanced displays, are rapidly improving the capabilities of wireless devices. Many of the technological advances contributing to this revolution pertain to the wireless medium itself. There are two viable media: radio and optical. In radio, spread-spectrum techniques allow different users and services to coexist in the same bandwidth, and new microwave frequencies with plentiful bandwidth become viable as the speed of the supporting low-cost electronics increases. Radio has the advantage of being available ubiquitously indoors and outdoors, with the possibility of a seam less system infrastructure that allows users to move between the two. There are unan swered (but likely to be benign) biological effects of microwave radiation at higher power densities. Optical communications is enhanced by advances in photonic devices, such as semiconductor lasers and detectors. Optical is primarily an indoor technology - where it need not compete with sunlight - and offers advantages such as the immediate availability of a broad bandwidth without the need for regulatory approval.

ITS Architecture - 1996