

Satellite Communications Network Design And Analysis

Modeling and Simulation Environment for Satellite and Terrestrial Communications Networks: Proceedings of the European COST Telecommunications Symposium will be of interest to network designers, developers, and operators. This book is a collection of papers given at the European Cost Telecommunications Symposium. The Symposium was broken down into four sessions: Modelling and Simulation, Teletraffic Modelling, Communications Networks Simulation, Problems in Simulation. Each session addressed a wide spectrum of subjects. The symposium covered nearly all of the important aspects of simulation modeling and tools for the design and performance evaluation of communication techniques and systems. Emerging techniques were emphasized. Modeling and Simulation Environment for Satellite and Terrestrial Communications Networks: Proceedings of the European COST Telecommunications Symposium is a useful reference work for practicing engineers and academic researchers.

Satellite Communications and Navigation Systems publishes the proceedings of the 2006 Tyrrhenian International Workshop on Digital Communications. The book focuses on the integration of communication and navigation systems in satellites. This thesis describes a possible integrated terrestrial-satellite network system for disaster recovery and response. The motivation of this thesis was based on the adjacent spectrum allocations between the Virginia Tech terrestrial Local Multiple Distribution Service (LMDS) system and a Ka-band satellite system, and potentially being able to provide as an additional Ka-band satellite network backbone to the Virginia Tech terrestrial LMDS system for better and faster communications deployments. The Spaceway satellite system's design parameters were adopted typically for a Ka-band satellite system. The LMDS system was assumed to use IEEE 802.16 standard protocols although it currently uses its own proprietary protocols. Four possible topologies integrating both terrestrial and satellite network were investigated. The study showed that the task was more problematic and complicated than anticipated due to incompatible network protocols, limitations of available hardware components, the high path loss at Ka-band, and the high cost of the equipment, although the adjacent frequency bands do suggest a possible integrated network. In this thesis, the final selected topology was proposed and designed. The technical characteristics of the earth station used for coupling both terrestrial and satellite networks were determined by a link budget analysis and a consideration of network implementations. The reflector antenna used by the earth station was designed. In addition, other system design concerns and engineering tradeoffs, including adjacent satellite interference, rain attenuation, antenna pointing error, noise temperature, and modulation and multiple access selection, were addressed.

Broadband Satellite Communications for Internet Access is a systems engineering methodology for satellite communication networks. It discusses the implementation of Internet applications that involve network design issues usually addressed in standard organizations. Various protocols for IP- and ATM-based networks are examined and a comparative performance evaluation of different alternatives is described. This methodology can be applied to similar evaluations over any other transport medium.

Modeling and Simulation Environment for Satellite and Terrestrial Communications Networks
Modeling and Implementation of a Packet Routing Switch for Satellite Communications

Satellite Communications and Navigation Systems
NASA Technical Translation

Distributed Satellite Communications System Design

This updated and expanded second edition reflects the state of earth station design and ground segment architecture. From international telephone network gateways to direct broadcast home receivers, today's broad range of ground systems and devices require satellite communication engineers and business managers to have a broad and sound understanding of the design and operating principles of earth stations and ground control facilities. This book explores the delivery end of the satellite link and its relationship to delivery of services. Authored by a leading authority in the field, the book provides engineers and managers with the knowledge they need to explore their own approach to implementing and managing earth stations and the overall ground segment. Readers find practical guidance in an array of critical areas, including: preparing preliminary analyses, reviewing hardware designs, managing the introduction of the overall ground segment, and more.

This exciting new book discusses the motivation for the evolution of a new breed of High Throughput Satellites (HTS) that have emerged from traditional communications satellites. It explores the commercial sectors and technical context that have shaped HTS. The historical underpinnings of HTS are provided to highlight the requirements that dimension these satellites. A survey of operational GEO HTS systems is also included. Readers will understand the technical, operational and commercial context of HTS systems, as well as the performance of the current HTS system. This initial breed of satellites was limited to geostationary satellites, but it is quickly projecting into low earth orbit (LEO) constellations, often referred to as mega-constellations. The industrial and operational facets of LEO constellations are challenging. The characteristics of GEO and LEO systems are presented to understand the differences between the two systems. The book also explores the evolution of the current HTS payload architectures, as well as theoretical methodology is presented for the capacity estimation for both the FORWARD link and RETURN link, which can be used for preliminary HTS dimensioning and can be adapted to practical scenarios.

This special report focuses on the emerging legal regime for orbital debris mitigation. It contains an overview of the relevant laws, policies, and regulations on orbital debris mitigation and aims to serve as a useful reference for the space community.

Since the publication of the best-selling first edition of the Satellite Communication Applications Handbook, the satellite industry has experienced explosive growth thanks to a flood of innovations in consumer electronics, broadcasting, the Internet, transportation, and broadband telecommunications. This second edition covers all the latest advances in satellite technology and applications and features new chapters on mobile digital audio radio and VSAT networks. It updates and expands upon the engineering and management topics that made the first edition a must-have for every satellite communications professional as well as network architects. Engineers get the latest technical details into operations, architectures, and systems components. Managers are brought up to date with the latest business applications as well as regulatory and legal decisions affecting domestic and international markets. The treatment is also of value to technical, legal, regulatory, and operations professionals who must gain a clear understanding of the capabilities and issues associated with satellite space and ground facilities and services.

Introduction to Satellite Communication

Natural Hazards

MEO/LEO Constellations : U.S. Laws, Policies, and Regulations on Orbital Debris Mitigation

Satellite Communications Systems

This book targets major issues in terrestrial-satellite communication networks and presents the solutions. While the terrestrial networks can achieve high-speed data service at low cost, satellite based access is one way to complement terrestrial based networks to ensure ubiquitous, 100% geographic coverage. The coexistence and cooperation between terrestrial and satellite networks are of great potential in future communication networks, and satellite radio access networks has already been considered in the fifth-generation (5G) networks to be supported for phase 2. Therefore, it is important to study the architectures of terrestrial-satellite networks, as well as the possible techniques and challenges. The authors introduce the technique of beamforming in satellite communication systems, which is an efficient transmitting method for multiple access, and they discuss the main challenges as well as prospective applications. The authors introduce possible methods for interference cancelation reception in terrestrial-satellite communication networks when reusing the frequency band between the two networks. Due to the limitation of spectrum resources, spectrum sharing will become one of the important issues in terrestrial-satellite communication networks. The problems of spectrum coexistence between GEO and Terrestrial Systems and between GEO and NEG0 systems are also discussed. Finally, taking both the two system into consideration, the resource allocation problem will be more complex due to the coupling between resources and the interference. Based on this, the authors propose several resource allocation schemes in different scenarios of terrestrial-satellite communication networks, which can optimize the capacity performance of the system. The expected audience for this book includes (but not limited to) graduate students, professors, researchers, scientists, practitioners, engineers, industry managers, and government researchers working in the field of satellite communications and networks.

Satellite network & communication services cover practically many important sectors and any interference with them could have a serious effect. They are a strategic asset for every country and are considered as critical infrastructure, they are considerable as privileged targets for cyber attack. In this high professional Book with 200 references we discuss the Satellite Communications architecture operation design and technologies Vulnerabilities & Possible attacks. Satellites Network Needs More funding in Security It's important to increase the cost of satellite network security . The correct investing in satellite network security depends on the risk value . vulnerabilities can be exploited through Internet-connected computer networks by hackers or through electronic warfare methodologies which is more directly manipulate the radio waves of uplinks and downlinks. in addition to all that we provide recommendations and Best Policies in Practice to protect theSatellite Sky communications and network. You will find the most about: satellite communication security Network architecture security, applications, operation, frequencies, design and technologies satellite communication threats Satellite Communications Satellites Attack Scenarios Against Cobham BGAN Terminals Downlink Jamming attacking BGAN Terminals / GRE /Marine /Cobham AVIATOR, VAST and FB Terminals How to protect security issue in space network satellite Encryption harding, Vulnerable Software satellite DDos.

Jacking, jamming and eavesdropping attacks security issues in space network . techniques and algorithms. New to this edition is information on interworking with the broadband satellite systems, more intensive coverage of Ka band technologies, GEO high throughput satellite (HTS), LEO constellations and the . The simulation development associated with the network models of both the Interim Service Integrated Services Digital Network (ISDN) Satellite (ISIS) and the Full Service ISDN Satellite (FSIS) architectures is documented. The ISIS Network Model design represents satellite systems like the Advanced Communications Technology Satellite (ACTS) orbiting switch. The FSIS architecture, the ultimate aim of this element of the Satellite Communications Applications Research (SCAR) Program, moves all control and switching functions on-board the next generation ISDN communications satellite. The technical and operational parameters for the advanced ISDN communications satellite design will be obtained from the simulation of ISIS and FSIS engineering software models for their major subsystems. Discrete event simulation experiments will be performed with these models using various traffic scenarios, design parameters, and operational procedures. The data from these simulations will be used to determine the engineering parameters for the advanced ISDN communications satellite. Pepin, Gerard R. Unspecified Center ACTS; COMMUNICATION NETWORKS; COMPUTER NETWORKS; DATA TRANSMISSION; ISIS SATELLITES; SATELLITE COMMUNICATION; SATELLITE DESIGN; SATELLITE NETWORKS; SIMULATORS; COMPUTERIZED SIMULATION; DESIGN ANALYSIS; MATHEMATICAL MODELS; SWITCHING...

The revised and updated sixth edition of em style="font-size: 10pt; font-family: serif;">normal: Satellite Communications Systems contains information on the most recent advances related to satellite communications systems, technologies, network architectures and new requirements of services and applications. The authors – noted experts on the topic – cover the state-of-the-art satellite communications systems and examine the relevant topics concerning communication and network technologies, concepts, techniques and algorithms. New to this edition is information on interworking with the broadband satellite systems, more intensive coverage of Ka band technologies, GEO high throughput satellite (HTS), LEO constellations and the potential to support the current new broadband Internet services as well as future developments for global information infrastructure. The authors offer details on digital communication systems and broadband networks in order to provide high-level researchers and professional engineers an authoritative reference. The companion website provides slides for instructors to teach and for students to learn. In addition, the book is designed in a user-friendly format.

Service Efficient Network Interconnection Via Satellite

Trademarks

Space Microelectronics Volume 1: Modern Spacecraft Classification, Failure, and Electrical Component Requirements

Integrating in Satellite Communications and Satellite Technology

Satellite Communication Systems 2ed

This document describes the design concept of the Network Design Tool. The Network Design Tool (NDT) is a collection of analytical techniques, algorithms and simulation methods that may be used to characterize the performance of a computer communication network. Much work has been done over the past several years in network performance analysis and many techniques have been developed or proposed. Each of these methods applies to a particular aspect of the network design and is based on a particular modeling point of view. We define the computer communication network and then describe the different ways the network may be modeled. Each network model is related to the particular design problem being addressed. The various analytical approaches are briefly described and their relationship to the network models discussed. Chapter 2 is a survey of the major approaches to specific network design problems while Chapters 3 and 4 discuss two fairly well defined areas of network analysis: topological design/optimization and protocol validation. Chapter 5 is a survey of network design tools presently available locally or on the Advanced Research Projects Agency Network (ARPANET). Finally, Chapter 6 presents an outline of the NDT specification. (Cont.) Traditionally, the first step toward designing satellite communication systems - as well as terrestrial, sensor web, and ad hoc networks - has been to specify the system topology (e.g., the orbits of the satellites and the locations of the ground stations) based on the desired market and then to design the network protocols to make the most of the available resources. Such a sequential process assumes that the design of the network architecture (e.g., protocols, packet structure, etc) does not drive the design of the system architecture (e.g., constellation topology, spacecraft design, etc). This thesis will show that in the case of Ka-band distributed satellite communication systems this fundamental assumption is not valid, and can have a significant impact on the success (cost, capacity, customer satisfaction) of the resulting satellite communication system. Furthermore, this thesis will show that how a designer values performance during the design and decision process can have a substantial impact on the quality of the design path taken through the trade space of possible joint architectures.

Writing a comprehensive book on satellite communications requires the com mand of many technical disciplines and the availability of up-to-date information on international recommendations, system architectures, and equipment stand ards. It is therefore necessary to involve many authors, each possessing a good level of knowledge in a particular discipline. The problem of using a coherent and unambiguous set of definitions and basic terms has been solved by including in the book all the background information needed for understanding satellite communication systems, without any major reference to other textbooks specializing in particular disciplines. The obvious consequence of this approach has been the large size of the book, with the advantages, however, of practically complete independence from other books, more systematic discussion of the subject matter, and better readability. After the required background information, emphasis has been placed on the discussion of techniques and system design criteria rather than on specific equipment implementation or description of particular systems. The book may be divided in five parts as follows: • The first five chapters provide most of the required background information. • Chapter 6 is an introductory outline of satellite communication systems. • Chapters 7 to 13 deal with the various aspects of technical system design. • Chapter 14 discusses system economics. • Chapter 15 provides a brief insight into some foreseeable future develop ments of satellite communications.

This book provides significant knowledge on innovative radio resource management schemes for satellite communication systems that exploit lower layer adaptivity and the knowledge of layer 3 IP QoS support and transport layer behavior. The book integrates competencies considering all the parts of system design: propagation aspects, radio resource management, access protocols, network protocols, transport layer protocols, and more, to cover both broadband and mobile satellite systems.

High Throughput Satellites

Satellites Communications Network Design and Costing Model

Principles and Protocols

Satellite Communications Systems Engineering

Broadband Satellite Communications for Internet Access

The ultimate guide to next-generation systems and network design With the explosive growth in RF and wireless technologies, there is a critical shortage of skilled engineers to design and operate today's vast communications networks. Advanced RF Engineering for Wireless Systems and Networks provides a multidimensional primer for professionals involved in the design of next-generation wireless and satellite communications systems and networks. This essential work offers systematic, hands-on guidance to wireless system design, clearly demonstrating how to design second- and third-generation systems from the ground up. Written in an easy-to-understand, tutorial style, the book: • Covers the latest in the design of filters, amplifiers, RF switches, and oscillators for 2G and 3G technologies • Includes a detailed RF treatment of the WLAN aspects • Introduces the completely new topic of services over GPRS areas • Clarifies the difference between 1G, 2G, and 3G systems • Outlines strategies for migrating from 2G to 3G technologies • Bridges between engineering and networking concepts • Provides useful theoretical and design problems at the end of chapters

A Local Area Network (LAN) is a network usually within a single office or building that links desktop computers with each other and with peripherals such as servers and printers. The interconnect is the electrical and functional association of two different services, often provided by different suppliers, and it is from LAN inter-connection that telecoms operators seek to profit. The application of LAN interconnection via satellite can be used to complement and extend existing terrestrial public access networks through interconnection of clusters of broadband islands (such as LANs and MANs) in remote regions, where terrestrial lines are expensive to install and operate. Examples include: • Hospitals/clinics in remote and rural areas can be connected to the central hospitals in a tele-medicine environment • Remote offices can be connected to the central office to facilitate tele-working • University/colleges can be inter-connected to provide tele-education facilities Similarly, the possibility to provide access to such facilities in developing regions of the world is also viable and particularly attractive in the short to mid-term. Private LAN connection facilities could also be made available to the corporate user, offering the possibility to establish broadband internet access within a closed user group. Such a scenario may be used to change with the imminent launch of satellite personal communication services (SPCS), through the use of non-geostationary satellites. This new generation of satellites will be placed in low earth orbit or medium earth orbit, hence, introducing new satellite design concepts. One of the first texts to cover this rapidly evolving field, this text provides the reader with an overview of mobile satellite systems, from their initial introduction (Inmarsat), current satellite-PCS (referring to such systems as Globalstar), through to Satellite-UMTS and an understanding of the following: • The design concepts associated with non-geostationary satellite systems (constellation, link budgets, Doppler) • The concepts of UMTS (network architecture, aims, in the context of IMT-2000) and the role foreseen for the satellite component (complementary to terrestrial network, network extension, global availability) • Inter-working between satellite and terrestrial networks (network architecture, ATM Adaptation Layer) • Radio interface technologies (WB-CDMA, TDMA, transmission environment) • Regulatory issues • Future services and applications • Potential satellite markets (prediction techniques, effect of tariffing policies on potential market) With leading edge information, this valuable resource will be indispensable to researchers, engineers, operators and market evaluators in satellite service industries and research institutions, as well as postgraduates and research students in the field.

Satellite Communications

Terrestrial-Satellite Communication Networks

Systems, Techniques and Technology

First-order Interactions Between System and Network Architectures

The Industry Implications of DVB-S2X, High Throughput Satellites, Ultra HD, M2M, and IP

This cutting-edge resource provides a comprehensive treatment of applying delay-tolerant networking (DTN) principles to satellite-based network communications. Detailed models and analytical tools are used to evaluate performance and provide guidance in the field. This book presents the state-of-the-art in existing on-board and ground technologies that support satellite applications, such as communications protocols, algorithms, and security procedures. Readers gain key insight into the fundamental concepts of DTN applied to satellite networks (DTSNs) and case studies are provided. This book presents an authoritative introduction to the methods for computing metrics for satellite network modeling. Satellite communications are examined, including satellite links, communication protocols, and distributed multiple access schemes, such as time division, code division, and frequency division. This book focuses on ways in which DTN might make terrestrial communication and observation via earth orbiting satellites less expensive and more robust. The fundamental concepts and analysis of the Ring Road Architecture are explored. Unique analyses on the motivating factors of using Inter-Satellite Links (ISL) to form networks in disruptive environments in space are discussed. This book explores the limits of larger and complex DTSNs as the number of satellites increase and different orbital formations become possible. As satellite networks become larger in upcoming years this book provides a guide for readers to stay informed about standard

This book provides up to date coverage of the basics of ATM and internet protocols, and characteristics of satellite networks and internetworking between satellite and terrestrial networks Satellite Network Design: Principles and Protocols, Second Edition provides up to date information of the original topics in satellite networking and protocols focusing on Internet Protocols (IP) over satellites, broadband over satellites, next generation IP (IPv6) over satellites, new generation of DVB-S/2 and DVB-RCS next generations and new services and applications. It also includes some analytical techniques for evaluation of end to end IP performance and QoS over satellite, reflecting the recent convergences of telecommunication, Internet, broadcasting and mobile networks. Topics new to this edition: Internetworking with MANET, DVB-S/2 and DVB-RCS/2 (including TCP/IP over DVB-S/RCS), recent developments in broadband satellite systems, convergence of services and network technologies (including Internet, telecom, mobile, TV, etc), radio resource management, PEP, I-PEP, SCPS, traffic modelling and engineering with analysis and examples, and future developments of satellite networking. Provides up to date coverage of the basics of ATM and internet protocols, and characteristics of satellite networks and internetworking between satellite and terrestrial networks (e.g. mobile ad hoc networks), including coverage of new services and applications (e.g. Internet, telecom, mobile and TV) Discusses the real-time protocols including RTP, RTCP and SIP for real-time applications such as VoIP and MMC, and explains TCP/IP over satellite and evolution of IPv6 over satellite and beyond

Cooperative and Cognitive Satellite Systems provides a solid overview of the current research in the field of cooperative and cognitive satellite systems, helping users understand how to incorporate state-of-the-art communication techniques in innovative satellite network architectures to enable the next generation of satellite systems. The book is edited and written by top researchers and practitioners in the field, providing a comprehensive explanation of current research that allows users to discover future technologies and their applications, integrate satellite and terrestrial systems and services to create innovative network architectures, understand the requirements and possibilities for future satellite communications standards and protocols, and evaluate the feasibility and practical constraints involved in the deployment process. Provides a solid overview of the current research in the field of co-operative and cognitive satellite systems Presents concepts in multibeam and multicarrier joint processing and high performance random access schemes Explains hybrid and dual satellite systems, cognitive broadband satellite systems, spectrum exploitation, and

Resource allocation: This section covers all the fundamentals of satellites, ground control systems, and earth stations, considering the design and operation of each major segment. You gain a practical understanding of the basic construction and usage of commercial satellite networksOchcow parts of a satellite system function, how various components interact, which role each component plays, and which factors are the most critical to success."

Satellite Communication Systems Design

Filter Design for Satellite Communications: Helical Resonator Technology

Satellite Communications Network Design and Analysis

Resource Management in Satellite Networks

The Satellite Communication Ground Segment and Earth Station Handbook, Second Edition

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 This authoritative book provides a thorough understanding of the fundamental concepts of satellite communications (SATCOM) network design and performance assessments. You find discussions on a wide class of SATCOM networks using satellites as core components, as well as coverage key applications in the field. This in-depth resource presents a broad range of critical topics, from geosynchronous Earth orbiting (GEO) satellites and direct broadcast satellite systems, to low Earth orbiting (LEO) satellites, radio standards and protocols. This invaluable reference explains the many specific uses of satellite networks, including small-terminal wireless and mobile communications systems. Moreover, this book presents advanced topics such as satellite RF link analyses, optimum transponder loading, on-board processing, antenna characteristics, protected systems, information assurance, and spread spectrum systems. You are introduced to current and future SATCOM systems and find details on their performance capabilities. This cutting-edge book also presents trends in multimedia satellite applications and IP services over satellites. 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. Surveys key advances in commercial satellite communications and what might be the implications and/or opportunities for end-users and service providers in utilizing the latest fast-evolving innovations in this field This book explores the evolving technical options and opportunities of satellite networks. Designed to be a self-contained reference, the book includes background technical material in an introductory chapter that will serve as a primer to satellite communications. The text discusses advances in modulation techniques, such as DBV-S2 extensions (DVS-S2X), spotbeam-based geosynchronous and medium earth orbit High Throughput Satellite (HTS) technologies and Internet applications; enhanced mobility services with aeronautical and maritime applications; Machine to Machine (M2M) satellite applications; emerging ultra HD technologies; and electric propulsion. The author surveys the latest innovations and service strategies and the resulting implications, which involves: Discussing advances in modulation techniques and HTS spotbeam technologies Surveying emerging high speed aeronautical mobility services and maritime and other terrestrial mobility services Assessing M2M (machine-to-machine) applications, emerging Ultra HD video technologies and new space technology Satellite communication is an integral part of the larger fields of commercial, television/media, government, and military communications, because of its multicast/broadcast capabilities, mobility, reliability, and global reach. High Throughput Satellites) are expected to revolutionize the field during this decade, providing very high speed, yet cost-effective, Internet access and connectivity anywhere in the world, in rural areas, in the air, and at sea. M2M connectivity, enabled by satellite communications, connects trucks on transcontinental trips, aircraft in real-time-telemetry aggregation, and mercantile ships. A comprehensive analysis of the new advances in satellite communications, Innovations in Satellite Communications Technology is a reference for telecommunications and satellite providers and end-users, technology investors, logistic professionals, and more.

Satellite Network Threats Hacking & Security Analysis

Advanced ISDN Satellite Designs and Experiments

EU Cost Action 253

Mobile Satellite Communication Networks

The Satellite Communication Applications Handbook, Second Edition

The research performed by GTE Government Systems and the University of Colorado in support of the NASA Satellite Communications Applications Research (SCAR) Program is summarized. Two levels of research were undertaken. The first dealt with providing interim services Integrated Services Digital Network (ISDN) satellite (ISIS) capabilities that accented basic rate ISDN with a ground control similar to that of the Advanced Communications Technology Satellite (ACTS). The ISIS Network Model development represents satellite systems like the ACTS orbiting switch. The ultimate aim is to move these ACTS ground control functions on-board the next generation of ISDN communications satellite to provide full-service ISDN satellite (FSIS) capabilities. The technical and operational parameters for the advanced ISDN communications satellite design are obtainable from the simulation of ISIS and FSIS engineering software models of the major subsystems of the ISDN communications satellite architecture. Discrete event simulation experiments would generate data for analysis against NASA SCAR performance measure and the data obtained from the ISDN satellite terminal adapter hardware (ISTA) experiments, also developed in the program. The Basic and Option 1 phases of the program are also described and include the following: literature search, traffic mode, network model, scenario specifications, performance measures definitions, hardware experiment design, hardware experiment development, simulator design, and simulator development. Pepin, Gerard R. ACTS; COMMUNICATION NETWORKS; COMMUNICATION SATELLITES; DIGITAL SYSTEMS; ISIS SATELLITES; SATELLITE COMMUNICATION; SATELLITE DESIGN; SATELLITE NETWORKS; COMPUTERIZED SIMULATION; GROUND BASED CONTROL; SIMULATORS...

The principal component needed to model a satellite communications network node is a high-speed packet routing switch. The design and testing of routing switches utilizing Transputer networks has been examined extensively in the literature. One such implementation by Khan and Ward made use of cooperating processes scheduled by the Transtech Genesys operating system. The performance of this system was unacceptable with problems attributed to packet duplication and process contention. In this report, we examine an alternate approach using cooperating occam processes without the overhead associated with an operating system. The routing switch permits dynamic updates to its routing tables from a host computer. Library functions are provided to host processes to offer this service. However, accommodating these updates influences the design of the underlying Transputer network. Allowances must be made not only for expedient routing of messages within the Transputer network but also for rapid and efficient routing table updates within the Transputer network. Results discussed in this report reflect the design and performance of the routing switch. Throughout efficiency under a variety of test conditions is also provided.

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.

This authoritative first volume provides a solid understanding of modern spacecraft classification, failure, and electrical component requirements. This book focuses on the study of modern spacecraft, including their classification, packaging and protection, design versions, launch failure and accident analysis, and the main requirements of electronic components used. Readers find comprehensive coverage of the design and development of individual components as well as systems, their packaging, and how to make them last in space. This is a useful resource for military and civil applications. Specific topics include: The manufacturing of electronics for space: The main physical mechanisms of the impact of destabilizing factors of outer space, including various kinds of radiation, high-energy galactic ions, and particles of cosmic dust; The design of advanced space-grade microelectronic products such as memory microcircuits, microprocessors, interface and logic of microcircuits and power control microcircuits; Facts and features about the "space race" that have not been available until now.

Advanced RF Engineering for Wireless Systems and Networks

Delay Tolerant Satellite Networks

System Design of an Integrated Terrestrial-satellite Communications Network for Disaster Recovery

Atmospheric Effects, Satellite Link Design and System Performance

Optimization and Cross-Layer Design

Natural Hazards – Risk, Exposure, Response, and Resilience demonstrates advanced techniques to measure risks, exposures, responses, and solutions to hazards in an array of communities. Eleven original research reports by international scholars on hazard assessment and management are organized into four sections: studies assessing risk using in-depth modeling and technological detection to provide insight into problems associated with earthquakes, torrential rains, and nuclear power plant safety; studies revealing the spatial distributions of exposure and impacts from an assortment of hazards; studies examining human response to increased awareness of the pattern of hazard; and a study demonstrating assessment of resilience of sociotechnological systems to natural hazards. This volume contributes new conceptual and practical commentaries to assess, mitigate, and plan for disasters.

Proceedings of the European COST Telecommunications Symposium

Scientific and Technical Aerospace Reports

Cooperative and Cognitive Satellite Systems

Network Design Tool for EHF Satellite Communications Networks

Satellite Networking