

Satellite Communication Applications Handbook

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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 marketing, legal, regulatory, and financial and operations professionals who must gain a clear understanding of the capabilities and issues associated with satellite space and ground facilities and services.

You get real-world, first-hand insight into: defining a satellite network architecture to meet your organization's business or operational requirements; engineering criteria and design principles for TV and radio broadcasting, mobile and fixed telephony, and VSAT data communications; and addressing business and regulatory issues to ensure a successful satellite application. Whether you are new to the satellite industry and need a quick and thorough understanding of how satellite communications operate or are a veteran professional needing a refresher on issues not encountered day to day, The Satellite Communication Applications Handbook, Second Edition is an indispensable resource to be referred to again and again.

Contents:

Part 1 - Systems Considerations.

Evolution of Satellite Technology and Applications - Satellite Network Fundamentals.
Satellite Application Types: Broadcast and Multicast, DAB and DARS, Voice, Data Communications and the Internet, Mobile and Personal communications.

Satellite Links and Access Methods - Design of the Satellite Link. Multiple Access Systems, Frequency Band Tradeoffs and Selection: UHF, L, S, C, X, Ku, Ka, Q/V and Laser communications..

Issues in Satellite System Management - Satellite Selection and System Implementation.
Communications Payload Configurations: Bent Pipe, Shaped and Spot Beam Antennas,

Digital Onboard Processing Repeater (Channel Routing and Demod-Remod with Packet Switching) Spacecraft Bus Requirements: Stability and Control, Power Constraints; Contingency Planning for the Space Segment.

Part 2 - Broadcast and Multicast Links to Multiple Users.

Television Applications and Standards - Entertainment Programming: Network Broadcast, Cable TV, DBS and Content Distribution networks. Educational Television and Distance Learning. Business Television. Standard Definition Television Standards: NTSC, PAL and SECAM..

Digital Video and Audio Compression Standards - Compression Technology: Digital Compression (Temporal and Motion). Motion Picture Experts Group (MPEG 1, 2, 4 and 7), Assessing MPEG 2 Video Quality Digital Video Broadcasting (DVB) Standard. Audio Compression; Data Broadcasting and Internet Protocol Encapsulation; Digital Video Interface Standards (SDI and ASI); Terrestrial Backhaul Standards (SONET, ATM and Gigabit Ethernet)

Direct-to-Home (DTH) Satellite Television Broadcasting - Relative Cost of Satellite DTH versus Cable. DTH Architecture (baseband equipment and suppliers). Satellite Architecture Orbital Interference Limitations. Differences Among DTH Systems (medium power FSS and high power BSS). Survey of DTH Systems (US, Europe, Asia, Latin America. .

Satellite Digital Audio Radio Service (S-DARS) - Satellite Radio Broadcast Service (Spectrum Allocations, Propagation). WorldSpace, Sirius, XM Satellite Radio, S-DARS in Other Regions. Issues and Opportunities Relative to S-DARS

Part 3 - Bidirectional and Interactive Networks for Voice and Data.

VSAT Networks for Interactive Applications - Interactive Data Networks. VSAT Star Networks (Applications, Network Architecture - Hub and Remote VSAT, LANs and Business TV)

Technical Aspects of VSAT Networks Extending Capacity Planning and Sizing (Collecting and Evaluating Requirements, Estimating Delay and Response Time, VSAT Access Protocols - TDMA, ALOHA, CDMA, FDMA, ATM). Outbound/Forward Link, Inbound/Return Link. Hub Implementations (Dedicated versus Shared). Suppliers of VSAT Networks. VSAT Networks at Ka Band and Above.

Fixed Telephony Satellite Networks - Role of Satellites in Telephone Services. Demand Assignment SCPC Networks. Preassigned Point-to-Point Links. Application in Rural Telephony.

Mobile Satellite Service (GEO and Non-GEO) - Foundation of Mobile Satellite Service (Radio Spectrum, Link Design, Orbit Selection). GEO MSS Systems (Inmarsat, MSAT).

Non-GEO MSS Systems (Iridium and Globalstar). Intelligent MSS Services (voice and data). Multiple Access Techniques in MSS. Digital Speech Compression and its evaluation (Waveform Encoding, Vocoder, Hybrid Systems). Ground Segment Architecture (Network Control, Security, Subscriber Management).

Part 4 - Regulatory and Business Affairs.

Frequency Coordination And Regulation of Services - Regulatory Background. Sharing of Radio Frequencies. Structure of the ITU. The ITU Radio Regulations (Objectives, Pertinent Content, Table of Frequency Allocations, Coordination Process, Rules for Satellite Operation - Flux Density Limits). International Frequency Coordination (Advance Publication, Frequency and Orbit Coordination, Terrestrial Coordination of Earth Stations). World Radiocommunication Conference. Additional Regulatory Approvals in the Countries of Service (Licensing and Uplinking of Earth Stations, Type Acceptance and Blanket Licensing, Other Approvals, Competitive Entry and Export Regulations). Regulatory Environments in Different Countries (North America, Europe, Japan and Asia, Latin America, Middle East, Africa)

The Business of Satellite Communications - The Satellite Marketing Challenge (Selling Hardware and Services). Selling the Space Segment (FSS Transponder Segmentation, Space Segment Procision - Transponder Guarantees and Ownership, Occasional Video, Partial Transponder/SCPC services). Value Added Service Offerings (End-to-Business Opportunities and Issues, Value Added Services, the Service Contract and Service Level Agreement). The Marketing Organization and Evaluating Venture Viability. Financing a Satellite System. Trends in the Satellite Communications Business (Broadband Applications in Mobile and Fixed, Focus on Valuable Segments, Satellites and the Digital Divide).

***Bruce Elbert** is president of Application Technology Strategy, Inc., and was formerly Senior Vice President of Applications Systems Development at Hughes Space and Communications. He holds an M.S.E.E. in communications engineering and computer science from the University of Maryland, an M.B.A. from Pepperdine University and a BEE from the City College of New York. His company provides system design services, advice on technical and business matters, and training in all fields relating to satellite communications. Editor for Artech House's series on satellite communications, as well as its series on management and professional development, he is the author of several books including The Satellite Communication Ground Segment and Earth Station Handbook and Introduction to Satellite Communication, Second Edition (Artech House, 2000, 1999).*