

## Free Space Laser Communications Principles And Advances Optical And Fiber Communications Reports

The mid-infrared domain is a promising optical domain because it holds two transparency atmospheric windows, as well as the fingerprint of many chemical compounds. Quantum cascade lasers (QCLs) are one of the available sources in this domain and have already been proven useful for spectroscopic applications and free-space communications. This thesis demonstrates how to implement a private free-space communication relying on mid-infrared optical chaos and this requires an accurate cartography of non-linear phenomena in quantum cascade lasers. This private transmission is made possible by the chaos synchronization of two twin QCLs. Chaos in QCLs can be generated under optical injection or external optical feedback. Depending on the parameters of the optical feedback, QCLs can exhibit several non-linear phenomena in addition to chaos. Similarities exist between QCLs and laser diodes when the chaotic dropouts are synchronized with an external modulation, and this effect is known as the entrainment phenomenon. With a cross-polarization reinjection technique, QCLs can generate all-optical square-waves. Eventually, it is possible to trigger optical extreme events in QCLs with tilted optical feedback. All these experimental results allow a better understanding of the non-linear dynamics of QCLs and will extend the potential applications of this kind of semiconductor lasers.

Optical Wireless Communications for Broadband Global Internet Connectivity: Fundamental and Potential Applications provides a comprehensive overview for readers who require information about the fundamental science behind optical wireless communications, as well as up-to-date advanced knowledge of the state-of-the-art technologies available today. The book is a useful resource for scientists, researchers, engineers and students interested in understanding optical, wireless communication systems for global channels. Readers will find beneficial knowledge on how related technologies of optical wireless communications can be integrated into achieving worldwide Internet connectivity. Presents an in-depth coverage of information on optical wireless communication in a single source Combines the fundamentals with the most recent advanced technology of achieving global Internet access and connectivity Provides derivations of the mathematical equations Includes between chapter sections where information and learning from one chapter is connected to other chapters

This book collects one of the global premier scientific gatherings on telecommunications, signal processing, data networks, security, and optimization. It presents the proceedings of the International Telecommunications Conference 2017 (ITelCon 2017), held in Istanbul, Turkey from December 28 to 29, 2017. The proceedings include state-of-the-art studies that highlight major advances in the field of telecommunications and related branches. In addition, some of the

contributions form the basis for 5G and beyond studies and standardization processes. The ITelCon conference brings together industry and academia participants from around the globe and promotes research, development, and applications in the field of telecommunications. It includes a far-reaching program supported by a variety of technical tracks on research, development, technology, design, services, and applications. The primary audience of ITelCon includes academics, experts and professionals from industry, as well as researchers in the field of telecommunications and relevant subfields.

This text succeeds in giving a practical introduction to the fundamentals, problems and techniques of the design and utilisation of optical fiber systems. This edition retains all core features, while incorporating recent improvements and developments in the field.

This book comprises select peer-reviewed papers from the International Conference on Emerging Trends in Electromechanical Technologies & Management (TEMT) 2019. The focus is on current research in interdisciplinary areas of mechanical, electrical, electronics and information technologies, and their management from design to market. The book covers a wide range of topics such as computer integrated manufacturing, additive manufacturing, materials science and engineering, simulation and modelling, finite element analysis, operations and supply chain management, decision sciences, business analytics, project management, and sustainable freight transportation. The book will be of interest to researchers and practitioners of various disciplines, in particular mechanical and industrial engineering.

This title provides a comprehensive, unified tutorial covering the most recent advances in the emerging technology of free-space optics (FSO), a field in which interest and attention continue to grow along with the number of new challenges.

This book is intended as an all-inclusive source to serve the needs of those who require information about the fundamentals of FSO, as well as up-to-date advanced knowledge of the state-of-the-art in the technologies available today. This text is intended for graduate students, and will also be useful for research scientists and engineers with an interest in the field. FSO communication is a practical solution for creating a three dimensional global broadband communications grid, offering bandwidths far beyond what is possible in the Radio Frequency (RF) range. However, the attributes of atmospheric turbulence and scattering impose perennial limitations on availability and reliability of FSO links. From a systems point-of-view, this groundbreaking book provides a thorough understanding of channel behavior, which can be used to design and evaluate optimum transmission techniques that operate under realistic atmospheric conditions. Topics addressed include:

- FSO Physical and Statistical Models: Single/Multiple Inputs/Outputs
- Understanding FSO: Theory and Systems Analysis
- Modulation and Coding for Free-Space Optical Channels
- Atmospheric Mitigation and Compensation for FSO Links
- Non-line-of-sight (NLOS) Ultraviolet and Indoor FSO

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Communications • FSO Platforms: UAV and Mobile • Retromodulators for Free Space Data links • Hybrid Optical RF Communications • Free-space and Atmospheric Quantum Communications • Other related topics: Chaos-based and Terahertz (THz) FSO Communications

Since publication of the first edition of this text in 1998, there have been several new, important developments in the theory of beam wave propagation through a random medium, which have been incorporated into this second edition. Also new to this edition are models for the scintillation index under moderate-to-strong irradiance fluctuations; models for aperture averaging based on ABCD ray matrices; beam wander and its effects on scintillation; theory of partial coherence of the source; models of rough targets for ladar applications; phase fluctuations; analysis of other beam shapes; plus expanded analysis of free-space optical communication systems and imaging systems.

Free Space Optical (FSO) Communication uses light propagation in free space (air, outer space, and vacuum) to wirelessly transmit data for telecommunications and communication networking. FSO Communication is a key wireless and high-bandwidth technology for high speed large-capacity terrestrial and aerospace communications, which is often chosen as a complement or alternative to radio frequency communication. The propagating optical wave can be influenced negatively by random atmospheric changes such as wind speed, temperature, relative humidity, and pressure, thermal expansion, earthquakes, and high-rise buildings. This edited book covers the principles, challenges, methodologies, techniques, and applications of Free Space Optical Communication for an audience of engineers, researchers, scientists, designers, and advanced students.

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

Chapters will provide self-contained treatment of the topic as much as possible to allow the reader to go directly to the appropriate chapter to deal with a particular topic of concern. This sharp focus is necessary to maintain the emphasis, and to make this a practical reference. The knowledge and experience will integrate aspects of laser oscillators, laser amplifiers, laser systems, engineering of rugged laser cavities, design and engineering of laser-based instrumentation, and design of highly reliable laser systems for material processing applications. \* Provides a sharp focus practical aspects of reference material. \* Offers an approach that will be simple, direct, and focused only on lasers and optics \* Integrates aspects of laser oscillators, laser amplifiers, laser systems, engineering of rugged laser cavities, design and engineering of laser-based instrumentation, and design of highly reliable laser systems for material processing applications.

Discusses free-space optics and their use in high-bandwidth systems and high-speed networks, covering topics including the physics behind free-space optics technology and using free-space optics to extend existing networks.

This reference provides an overview of near-Earth laser communication theory developments including component and subsystem technologies, fundamental limitations, and approaches to reach those limits. It covers basic concepts and state-of-the-art technologies, emphasizing device technology, implementation techniques, and system trades. The authors discuss hardware technologies and their

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applications, and also explore ongoing research activities and those planned for the near future. This new edition includes major to minor revisions with technology updates on nearly all chapters.

Detailing a systems approach, *Optical Wireless Communications: System and Channel Modelling with MATLAB®*, is a self-contained volume that concisely and comprehensively covers the theory and technology of optical wireless communications systems (OWC) in a way that is suitable for undergraduate and graduate-level students, as well as researchers and professional engineers. Incorporating MATLAB® throughout, the authors highlight past and current research activities to illustrate optical sources, transmitters, detectors, receivers, and other devices used in optical wireless communications. They also discuss both indoor and outdoor environments, discussing how different factors—including various channel models—affect system performance and mitigation techniques. In addition, this book broadly covers crucial aspects of OWC systems: Fundamental principles of OWC Devices and systems Modulation techniques and schemes (including polarization shift keying) Channel models and system performance analysis Emerging visible light communications Terrestrial free space optics communication Use of infrared in indoor OWC One entire chapter explores the emerging field of visible light communications, and others describe techniques for using theoretical analysis and simulation to mitigate channel impact on system performance. Additional topics include wavelet denoising, artificial neural networks, and spatial diversity. Content also covers different challenges encountered in OWC, as well as outlining possible solutions and current research trends. A major attraction of the book is the presentation of MATLAB simulations and codes, which enable readers to execute extensive simulations and better understand OWC in general.

Learn the important things about free-space optical communications without having to deal with all the details. This should be the first book you read on the subject; but in fact, it may be the only book you need. It's perfect for engineers, physicists, and technical managers. You'll also find links to the author's Matcad code for doing link budget analysis. See the outline for more details.

A comprehensive, single-source reference on satellite technology and its applications, *Satellite Technology: Principles and Applications, Second Edition* includes the latest developments on the topic. Covering the features and facilities of satellites and satellite launch vehicles, with an emphasis on the fundamental principles and concepts, the authors provide readers with a complete understanding of the technology. This book explains the past, present and future satellite missions, as well as non-communication related applications. Coverage ranges from remote sensing and navigational uses to meteorological and military areas. This second edition contains an additional chapter on earth station design and gives extensive focus to space based weapon systems, satellite interference and future trends in satellite technology. Extra information has also been provided on all of the first edition's topics to enhance the existing coverage. Fully updated new edition with latest technological developments Covers the full range of important applications such remote sensing, weather forecasting, navigational, scientific and military applications Amply illustrated with figures and photographs, this book also contains problems with solutions, which is of benefit students at undergraduate and graduate levels An indispensable book for professionals and students in the field of satellite technology Companion website provides a complete and updated compendium on satellites and satellite launch vehicles Renewed interest in laser communication systems has sparked development of useful new analytic models. This book discusses optical scintillation and its impact on system performance in free-space optical communication and laser radar applications, with a

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detailed look at propagation phenomena and the role of scintillation on system behavior. Intended for practicing engineers, scientists, and students.

This book addresses 5G network capacity requirements with a new architecture for 5G Optical Backhaul Network. The author first describes the challenges for 5G backhaul network requirements and then the details of an Optical Backhaul Network for 5G. The author describes an architecture, in which small cells deploy as a cluster (i.e., 3-5 small cells in one cluster), where one small cell works as an aggregation point using an optical transceiver to backhaul the aggregated traffic to the nearest optical network unit, before it then goes to the core network. This book also illustrates the optical link budget analysis that can be used to determine the availability and the performances of the optical backhaul link in different deployment scenarios and different weather conditions. Provides a single-source reference to the basics of free space laser communication with ambient light compensation; Offers timely information, blending theory and practice; Written to be accessible to readers with varying backgrounds, including numerous illustrations; Provides hands-on experience through practical examples, which can be put to work to deploy and optimize cellular networks.

Gets you quickly up to speed with the theoretical and practical aspects of free space optical systems engineering design and analysis One of today's fastest growing system design and analysis disciplines is free space optical systems engineering for communications and remote sensing applications. It is concerned with creating a light signal with certain characteristics, how this signal is affected and changed by the medium it traverses, how these effects can be mitigated both pre- and post-detection, and if after detection, it can be differentiated from noise under a certain standard, e.g., receiver operating characteristic. Free space optical systems engineering is a complex process to design against and analyze. While there are several good introductory texts devoted to key aspects of optics—such as lens design, lasers, detectors, fiber and free space, optical communications, and remote sensing—until now, there were none offering comprehensive coverage of the basics needed for optical systems engineering. If you're an upper-division undergraduate, or first-year graduate student, looking to acquire a practical understanding of electro-optical engineering basics, this book is intended for you. Topics and tools are covered that will prepare you for graduate research and engineering in either an academic or commercial environment. If you are an engineer or scientist considering making the move into the opportunity rich field of optics, this all-in-one guide brings you up to speed with everything you need to know to hit the ground running, leveraging your experience and expertise acquired previously in alternate fields. Following an overview of the mathematical fundamentals, this book provides a concise, yet thorough coverage of, among other crucial topics: Maxwell Equations, Geometrical Optics, Fourier Optics, Partial Coherence theory Linear algebra, Basic probability theory, Statistics, Detection and Estimation theory, Replacement Model detection theory, LADAR/LIDAR detection theory, optical communications theory Critical aspects of atmospheric propagation in real environments, including commonly used models for characterizing beam, and spherical and plane wave propagation through free space, turbulent and particulate channels Lasers, blackbodies/graybodies sources and photodetectors (e.g., PIN, ADP, PMT) and their inherent internal noise sources The book

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provides clear, detailed discussions of the basics for free space optical systems design and analysis, along with a wealth of worked examples and practice problems—found throughout the book and on a companion website. Their intent is to help you test and hone your skill set and assess your comprehension of this important area. Free Space Optical Systems Engineering is an indispensable introduction for students and professionals alike.

This is a self-contained book on the foundations and applications of optical and microwave technologies to telecommunication networks application, with an emphasis on access, local, road, cars, trains, vessels and airplanes, indoor and in-car data transmission as well as for long-distance fiber-systems and application in outer space and automation technology. The book provides a systematic discussion of physics/optics, electromagnetic wave theory, optical fibre technology, and the potential and limitations of optical and microwave transmission.

This textbook introduces the advanced topics of: (i) wireless communications, (ii) free-space optical (FSO) communications, (iii) indoor optical wireless (IR) communications, and (iv) fiber-optics communications and presents these different types of communication systems in a unified fashion for better practical use. Fundamental concepts, such as propagation principles, modulation formats, channel coding, diversity principles, MIMO signal processing, multicarrier modulation, equalization, adaptive modulation and coding, detection principles, and software defined transmission are first described and then followed up with a detailed look at each particular system. The book is self-contained and structured to provide straightforward guidance to readers looking to capture fundamentals and gain theoretical and practical knowledge about wireless communications, optical communications, and fiber-optics communications, all which can be readily applied in studies, research, and practical applications. The textbook is intended for an upper undergraduate or graduate level course in optical communication. It features problems, an appendix with all background material needed, and homework.

Optical Fiber Telecommunications VI (A&B) is the sixth in a series that has chronicled the progress in the R&D of lightwave communications since the early 1970s. Written by active authorities from academia and industry, this edition brings a fresh look to many essential topics, including devices, subsystems, systems and networks. A central theme is the enabling of high-bandwidth communications in a cost-effective manner for the development of customer applications. These volumes are an ideal reference for R&D engineers and managers, optical systems implementers, university researchers and students, network operators, and investors. Volume A is devoted to components and subsystems, including photonic integrated circuits, multicore and few-mode fibers, photonic crystals, silicon photonics, signal processing, and optical interconnections. Volume B is devoted to systems and networks, including advanced modulation formats, coherent detection, Tb/s channels, space-division multiplexing, reconfigurable networks, broadband access, undersea cable, satellite communications, and microwave photonics. All the latest technologies and techniques for developing future components and systems Edited by two winners of the highly prestigious OSA/IEEE John Tyndal award and a President of IEEE's Lasers & Electro-Optics Society (7,000 members) Written by leading experts in the field, it is the most authoritative and comprehensive reference on optical engineering on the market

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Wireless communications have a strong impact on improving the quality of life in this century. Smart phones industry is now considered one of the most attractive fields, so advanced research is conducted in order to improve the quality of service in wireless communication environments. Many design challenges such as power consumption, quality of service, low cost, high data rate and small size are being treated every day. This book aims to provide highlights of the current research in the field of wireless communications. The subjects discussed are very valuable to communication researchers as well as researchers in the wireless related areas. The book chapters cover a wide range of wireless communication topics that are considered key technologies for future applications.

This book provides an in-depth understanding of free space optical (FSO) communication with a particular emphasis on optical beam propagation through atmospheric turbulence. The book is structured in such a way that it provides a basic framework for the beginners and also gives a concise description from a designer's perspective. The book provides an exposure to FSO technology, fundamental limitations, design methodologies, system trade-offs, acquisition, tracking and pointing (ATP) techniques and link-feasibility analysis. The contents of this book will be of interest to professionals and researchers alike. The book may also be used as a textbook for engineering coursework and professional training.

The first book on optical OFDM by the leading pioneers in the field The only book to cover error correction codes for optical OFDM Gives applications of OFDM to free-space communications, optical access networks, and metro and log haul transports show optical OFDM can be implemented Contains introductions to signal processing for optical engineers and optical communication fundamentals for wireless engineers This book gives a coherent and comprehensive introduction to the fundamentals of OFDM signal processing, with a distinctive focus on its broad range of applications. It evaluates the architecture, design and performance of a number of OFDM variations, discusses coded OFDM, and gives a detailed study of error correction codes for access networks, 100 Gb/s Ethernet and future optical networks. The emerging applications of optical OFDM, including single-mode fiber transmission, multimode fiber transmission, free space optical systems, and optical access networks are examined, with particular attention paid to passive optical networks, radio-over-fiber, WiMAX and UWB communications. Written by two of the leading contributors to the field, this book will be a unique reference for optical communications engineers and scientists. Students, technical managers and telecom executives seeking to understand this new technology for future-generation optical networks will find the book invaluable. William Shieh is an associate professor and reader in the electrical and electronic engineering department, The University of Melbourne, Australia. He received his M.S. degree in electrical engineering and Ph.D. degree in physics both from University of Southern California. Ivan Djordjevic is an Assistant Professor of Electrical and Computer Engineering at the University of Arizona, Tucson, where he directs the Optical Communications Systems Laboratory

(OCSL). His current research interests include optical networks, error control coding, constrained coding, coded modulation, turbo equalization, OFDM applications, and quantum error correction. "This wonderful book is the first one to address the rapidly emerging optical OFDM field. Written by two leading researchers in the field, the book is structured to comprehensively cover any optical OFDM aspect one could possibly think of, from the most fundamental to the most specialized. The book adopts a coherent line of presentation, while striking a thoughtful balance between the various topics, gradually developing the optical-physics and communication-theoretic concepts required for deep comprehension of the topic, eventually treating the multiple optical OFDM methods, variations and applications. In my view this book will remain relevant for many years to come, and will be increasingly accessed by graduate students, accomplished researchers as well as telecommunication engineers and managers keen to attain a perspective on the emerging role of OFDM in the evolution of photonic networks." -- Prof. Moshe Nazarathy, EE Dept., Technion, Israel Institute of Technology

- \* The first book on optical OFDM by the leading pioneers in the field
- \* The only book to cover error correction codes for optical OFDM
- \* Applications of OFDM to free-space communications, optical access networks, and metro and log haul transports show optical OFDM can be implemented
- \* An introduction to signal processing for optical communications
- \* An introduction to optical communication fundamentals for the wireless engineer

Free-Space Laser Communications Principles and Advances Springer Science & Business Media

The development and launch of the first artificial satellite Sputnik more than five decades ago propelled both the scientific and engineering communities to new heights as they worked together to develop novel solutions to the challenges of spacecraft system design. This symbiotic relationship has brought significant technological advances that have enabled the design of systems that can withstand the rigors of space while providing valuable space-based services. With its 26 chapters divided into three sections, this book brings together critical contributions from renowned international researchers to provide an outstanding survey of recent advances in spacecraft technologies. The first section includes nine chapters that focus on innovative hardware technologies while the next section is comprised of seven chapters that center on cutting-edge state estimation techniques. The final section contains eleven chapters that present a series of novel control methods for spacecraft orbit and attitude control.

The advantages of optical communications are many: ultra-high speed, highly reliable information transmission, and cost-effective modulation and transmission links to name but a few. It is no surprise that optical fiber communications systems are now in extensive use all over the world. Along with software and microelectronics, optical communication represents a key technology of modern telecommunication systems. Optical Communications: Components and Systems provides the basic material required for advanced study in theory and applications of optical fiber and space communication

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systems. After a review of some fundamental background material, component-based chapters discuss all relevant passive and active optical and optoelectronic components used in point-to-point links and in networks. Systems chapters address the analysis and optimization of both incoherent and coherent systems, introduce fiber optic link design, and discuss physical limits. The authors also provide an overview of applications such as optical networks and optical free-space communications. The advanced interactive multimedia communications of today and the future rely on optical fiber and space communication techniques. *Optical Communications: Components and Systems* offers engineers and physicists a working reference for the selection and design of optical communication systems and provides engineering students with a valuable text that prepares them for work in this essential and rapidly growing field.

Learn how to build efficient, simple, high performance indoor optical wireless communication systems based on visible and infrared light.

This is a comprehensive tutorial on the emerging technology of free-space laser communications (FSLC). The book offers an all-inclusive source of information on the basics of FSLC, and a review of state-of-the-art technologies.

Coverage includes atmospheric effects for laser propagation and FSLC systems performance and design. *Free-Space Laser Communications* is a valuable resource for engineers, scientists and students interested in laser communication systems designed for the atmospheric optical channel.

This groundbreaking resource is the first book to offer you a thorough, practical treatment of laser space communications. The book focuses on the feasibility of laser space communication links between satellites, satellites and airborne platforms, and satellites and ground based stations to achieve worldwide connectivity. You get expert guidance on weather avoidance approaches and adaptive antenna subsystems that help mitigate the effects of turbulence. The book presents simplified, yet highly accurate, engineering expressions of complex mathematics of turbulence that provide you with numerical values in the links' signal power budget. Moreover, you find an entire chapter devoted to noise photons and their effect on the bit error rate. This comprehensive volume covers a wide range of critical topics you need to understand for your work in the field, from a discussion on laser vs. RF communications in space, basic design features of a laser transceiver, and configuration of inter-satellite communication links, to selection of ground station locations, 5th Generation Internet (5-GENIN), and signal modulation schemes. The book is supported with over 70 illustrations and more than 100 equations.

Optical communications systems are very important for all types of telecommunications and networks. They consists of a transmitter that encodes a message into an optical signal, a channel that carries the signal to its destination, and a receiver that reproduces the message from the received optical signal. This book presents up to date results on

communication systems, along with the explanations of their relevance, from leading researchers in this field. Its chapters cover general concepts of optical and wireless optical communication systems, optical amplifiers and networks, optical multiplexing and demultiplexing for optical communication systems, and network traffic engineering. Recently, wavelength conversion and other enhanced signal processing functions are also considered in depth for optical communications systems. The researcher has also concentrated on wavelength conversion, switching, demultiplexing in the time domain and other enhanced functions for optical communications systems. This book is targeted at research, development and design engineers from the teams in manufacturing industry; academia and telecommunications service operators/ providers.

Using fundamentals of communication theory, thermodynamics, information theory and propagation theory, this book explains the universal principles underlying a diverse range of electro-optical systems. From fiber optics and infra-red imaging to free space communications and laser remote sensing, the authors relate key concepts in science and device engineering to practical systems issues. A broad spectrum of coherent and incoherent imaging and communications systems is considered, accompanied by many real-world examples. The authors also present new insights into LIDAR and free space communications and imaging, providing practical guidance on identifying the fundamental limitations of transmission and imaging through deleterious channels. Accompanied by online examples of processed images and videos, this uniquely tailored guide to the fundamental principles underlying modern electro-optical systems is an essential reference for all practising engineers and academic researchers in optical engineering.

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

and communications, including satellite-to-under sea communication, satellite cell-phones, and global Xpress system of INMARSAT The cross-disciplinary coverage makes the book an essential reference book for professionals, R&D scientists and students at post graduate level Companion website provides a complete compendium on satellites and satellite launch vehicles An ideal introduction for Professionals and R&D scientists in the field. Engineering Students. Cross disciplinary information for engineers and technical managers.

Optical links are now to be found in short-haul industrial routes, as well as in long-haul telecommunications routes. In order to design and maintain these links, it is important to understand the operation of the individual system components, and this book provides the relevant information.

Recent progress in ICT has exceeded our expectations for meeting the requirement of multimedia society in the 21st century. The FSOC is considered to be one of the key technologies for realizing very high speed multi Gbps large-capacity terrestrial and aerospace communications. In FSOC, the optical beam propagation in the turbulent atmosphere is severely affected by various factors suspended in the channel. Wavefront aberration correcting with continuous beam alignment are the key requirements for a successful installation of an FSOC system which are the main contributions in our book. Establishment of FSOC setups, development of accurate weather station, measurement of atmospheric attenuation (Att) and turbulence strength (Cn2), development of new models to predict the Att and Cn2, design of Response Surface Model and Artificial Neural Network based on controller, implementation of neural-controller in FPGA and attaining the BER of  $6.4 \times 10^{-9}$  during different outdoor environments. All the original contributions, newness, findings and experimental results etc., are reported in the book. Subject of work; Wireless Optical Communication. The content of the book can be referred by various application designers and/or academicians for working on FSOC transceiver design, laser cutting, laser metrology, laser surgery, beam focusing & pointing, beacon positioning and coupling etc. Further, all necessary MATLAB and VHDL codes are also given on appropriate pages for the readers' quick/ clear understanding.

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