Antenna Engineering Using Physical Optics Practical Cad Techniques And Software Artech House Antenna Library

This is the first textbook that contains a holistic treatment of antennas both for traditional antennas mounted on masts (Line-of-Sight antenna systems) and for small antennas used on modern wireless devices such as smart phones being subject to signal variations (fading) due to multipath propagation. The focus is on characterization, as well as describing classical antennas by modern complex vector theory - thereby linking together many disciplines such as electromagnetic theory, classical antenna theory, wave propagation, and antenna system performance. Overall, this book represents a rethinking of the way basic antenna theory is presented. The book contains many references to important old and new papers and books on the analysis and design of the most useful antenna types, for the most interested readers.

This consistent and systematic review of recent advances in optical antenna theory and practice brings together leading experts in the fields of electrical engineering, nano-optics and nano-photonics, physical chemistry and nanofabrication. Fundamental concepts and functionalities relevant to optical antennas are explained, together with key principles for optical antenna modelling, design and characterisation. Recognising the tremendous potential of this technology, practical applications are also outlined. Presenting a clear translation of the concepts of radio antenna design, near-field optics and field-enhanced spectroscopy into optical antennas, this interdisciplinary book is an indispensable resource for researchers and graduate students in engineering, optics and photonics, physics and chemistry.

One of the most damaging factors associated with any radio communication system is the effect of undesirable or interference signals. This innovative new book gives you the knowledge you need to ensure your adaptive array system is protecting your communication links to the fullest. It presents concepts and procedures that help you realize the maximum processing capabilities of a given system, choose the right system for a specific application, and identify precautionary steps to avoid adverse effects.

The accurate design of earth–space systems requires a comprehensive understanding of the various propagation media and phenomena that differ depending on frequencies and types of applications. The choice of the relevant channel models is crucial in the design process and constitutes a key step in performance evaluation and testing of earth–space systems. The subject of this book is built around the two characteristic cases of satellite systems: fixed satellites and mobile satellite systems. Radio Wave Propagation and Channel Modeling for Earth–Space Systems discusses the state of the art in channel modeling and characterization of next-generation fixed multiple-antennas and mobile satellite systems, as well as propagation phenomena and fade mitigation techniques. The frequencies of interest range from 100 MHz to 100 GHz (from VHF to W band), whereas the use of optical free-space communications is envisaged. Examining recent research advances in space-time tropospheric propagation fields and optical satellite communication channel models, the book covers land mobile multiple antennas satellite- issues and relative propagation campaigns and stratospheric channel models for various applications and frequencies. It also presents research and well-accepted satellite community results for land mobile satellite and tropospheric attenuation time-series single link and field synthesizers. The book examines aeronautical communications channel characteristics and modeling, relative radio wave propagation campaigns, and stratospheric channel model for various applications and frequencies. Propagation effects on satellite navigation systems and the corresponding models are also covered.

Problem Solving in Electromagnetics, Microwave Circuit, and Antenna Design for Communications Engineering
Radio Wave Propagation and Channel Modeling for Earth-Space Systems
Modern Electromagnetic Scattering Theory with Applications
Antenna Handbook
Effects of Random Surface Errors on the Performance of Paraboloidal Reflectors

The move toward worldwide wireless communications continues at a remarkable pace, and the antenna element of the technology is crucial to its success. With contributions from more than 30 international experts, the Handbook of Antennas in Wireless Communications brings together all of the latest research and results to provide engineering professionals and students with a one-stop reference on the theory, technologies, and applications for indoor, hand-held, mobile, and satellite systems. Beginning with an introduction to wireless communications systems, it offers an in-depth treatment of propagation prediction and fading channels. It then explores antenna technology with discussion of antenna design methods and the various antennas in current use or development for base stations, hand held devices, satellite communications, and shaping beams. The discussions then move to smart antennas and phased array technology, including details on array theory and beamforming techniques. Space diversity, direction-of-arrival estimation, source tracking, and blind source separation methods are addressed, as are the implementation of smart antennas and the results of field trials of systems using smart antennas implemented. Finally, the hot media topic of the safety of mobile phones receives due attention, including details of how the human body interacts with the electromagnetic fields of these devices. Its logical development and extensive range of diagrams, figures, and photographs make this handbook easy to follow and provide a clear understanding of design techniques and the performance of finished products. Its unique, comprehensive coverage written by top experts in their fields promises to make the Handbook of Antennas in Wireless Communications the standard reference for the field.

This highly illustrated and accessible text will be an ideal introduction to the application of electromagnetics (EM) following an initial course in basic EM theory. The book covers the well established structure of elementary EM courses, beginning with Maxwell's equations in integral form and developing the wave equation to show the essential properties of waves. In addition to providing a grounding in this traditional curriculum, the principal concern throughout is to make difficult concepts of electromagnetism more accessible. The adoption of time domain methods for this purpose is the book's most important breakthrough, allowing the fundamentals of applied electromagnetics

to be introduced with a clarity and simplicity not available through the conventional route. Another new aspect of this book is the integration of computational modelling methods with the standard theory of electromagnetic waves. The author presents a set of example programs written in the MATLAB language to support the ideas outlined in the text. The book is organized in a logical progression of ideas, starting with the general idea of wave motion and showing how the equations of electricity and magnetism lead to the existence of electromagnetic waves through the Maxwell's equations. These ideas are then applied to simple accelerating charge models used in the engineering design of wire antennas. The concepts of resonance and antenna impedance are then treated from a time domain point of view. To reinforce the concepts of wave propagation, a chapter on computer modelling shows the rigorous procedures required to generate accurate numerical models of wave dynamics. The author extends these ideas to consider the properties of aperture antennas, showing how their important properties can be incorporated with the basic themes introduced earlier in the book. Finally, the important topic of wave scattering is introduced, once again from the point of view of time domain concepts.

This book is based on and describes the operation of the MATLAB Antenna Toolbox modeling tool, which is accessible to virtually every engineering student in the U.S. and abroad. It begins with the simple yet common dipole antenna as a means of illustrating the need to impedance match and to reduce parasitic losses. The book also reviews Maxwell's equations and ties them to antenna analysis via the vector potential. Later chapters introduce the simple loop antenna and its duality to the dipole, as well as a number of practical embodiments using stubs and feed point location. The book concludes with a chapter on antennas that utilize travelling waves along a line. These include long-line antennas, helical antennas, and spiral antennas.

Presenting a wide range of real-world electromagnetics problems, this one-of-a-kind resource offers professionals and students complete, step-by-step solutions to the most critical challenges relating to antenna and microwave circuit design. The book serves as a practical standalone reference or as a perfect complement to the text Electromagnetics, Microwave Circuit, and Antenna Design for Communications Engineering, Second Edition by Peter Russer (Artech House, 2006). Readers find in-depth coverage of the concepts, methods and theorems they need to understand to effectively tackle critical problems in the field. Including numerous graphical illustrations and simplifying mathematical computations, the book offers a deep and intuitive understanding of the subject.

Handbook of Reflector Antennas and Feed Systems Volume I: Theory and Design of Reflectors

Handbook of Antennas in Wireless Communications

Electromagnetics and Antenna Technology

Applied Frequency-Domain Electromagnetics

Modern Antenna Design

This book provides engineers with a comprehensive review of the state-of-the-art in reflectarray antenna research and development. The authors describe, in detail, design procedures for a wide range of applications, including broadband, multi-band, multi-beam, contour-beam, beam-scanning, and conformal reflectarray antennas. They provide sufficient coverage of basic reflectarray theory to fully understand reflectarray antenna design and analysis such that the readers can pursue reflectarray research on their own. Throughout the book numerous illustrative design examples including numerical and experimental results are provided. Featuring in-depth theoretical analysis along with practical design examples, em style="mso-bidi-font-style: normal;"Reflectarray Antennas is an excellent text/reference for engineering graduate students, researchers, and engineers in the field of antennas. It belongs on the bookshelves of university libraries, research institutes, and industrial labs and research facilities.

This comprehensive treatment of ultrawideband (UWB) antennas and time-domain microwave engineering serves as an invaluable practical reference for anyone involved in antenna and RF design work. This authoritative volume enables readers to select the proper UWB antennas for their applications, design and analyze UWB antennas, and integrate these antennas in an RF system. By applying time-domain thinking to problems of practical interest, the reader will not only learn how to build and analyze antennas, but also understand them at the most fundamental level. This second edition is updated and expanded throughout, providing readers with a history of antennas, numerous new problem sets and worked examples, along with new information on plotting time-domain field lines, time-domain reflectometry, matching techniques, and more. This book also addresses system issues like spectral control and antenna efficiency.

Based on Bahl and Bhartia's popular 1980 classic, Microstrip Antennas, this all new book provides the detail antenna engineers and designers need to design any type of microstrip antenna. After addressing essential microchip antenna theory, the authors highlight current design and engineering practices, emphasizing the most pressing issues in this area, including broadbanding, circular polarization, and active microstrip antennas in particular. Special design challenges, ranging from dual polarization, high bandwidth, and surface wave mitigation, to choosing the proper substrate, and shaping an antenna to achieve desired results are all covered.

This self-contained book gives fundamental knowledge about scattering and diffraction of electromagnetic waves and fills the gap between general electromagnetic theory courses and collections of engineering formulas. The book is a tutorial for advanced students learning the mathematics and physics of electromagnetic scattering and curious to know how engineering concepts and techniques relate to the foundations of electromagnetics

Reflectarray Antennas

Optical Antennas

Microstrip Antenna Design Handbook

Advanced Computational Electromagnetic Methods

The Irish Astronomical Journal

In the field of astrophysics, modern developments of practice are emerging in order to further understand the spectral information derived from cosmic sources. Radio telescopes are a current mode of practice used to observe these occurrences. Despite the various accommodations that this technology offers, physicists around the globe need a better understanding of the underlying physics and operational components of radio telescopes as well as an explanation of the cosmic objects that are being detected. Analyzing the Physics of Radio Telescopes and Radio Astronomy is an essential reference source that discusses the principles of the astronomical instruments involved in the construction of radio telescopes and the analysis of cosmic sources and celestial objects detected by this

machinery. Featuring research on topics such as electromagnetic theory, antenna design, and geometrical optics, this book is ideally designed for astrophysicists, engineers, researchers, astronomers, students, and educators seeking coverage on the operational methods of radio telescopes and understanding the physical processes of radio astronomy.

Optical and microwave waveguides have attracted much research interest in both science and industry. The number of potential applications for their use is growing rapidly. This book examines recent advances in the broad field of waveguide technology. It covers current progress and latest breakthroughs in emergent applications in photonics and microwave engineering. The book includes ten contributions on recent developments in waveguide technologies including theory, simulation, and fabrication of novel waveguide concepts as well as reviews on recent advances.

This is an extensively revised and updated new edition of the best-selling Mobile Antenna Systems Handbook. Comprehensive, authoritative and practical, it provides the information you need to understand the relationship between the elements involved in antenna systems design for mobile communications. You get sound advice in choosing the appropriate antenna for any given requirement - including antennas for ITS, access to the latest modeling formulas for macro, micro and pico cell propagation, and guidance on the latest RF safety standards and measurement techniques.

Spend less time setting up complex antenna design problems and improve the accuracy of your results with this practical new book and software package. It shows you how to combine physical optics modeling techniques with the free space dyadic Green's function to quickly and easily calculate antenna patterns and diffraction from nearby objects, letting your PC do the specialized math for you.

Antenna Theory and Design

The Art and Science of Ultrawideband Antennas, Second Edition

Analysis of a Generalized Dual Reflector Antenna System Using Physical Optics

Modern Antenna Handbook

Engineering Applications of the Modulated Scatterer Technique

This updated edition of an Artech House classic contains steering, focusing, and spreading of antenna beams using the physics of refraction of electromagnetic waves through a plasma. Pulsing circuitry for ionizing plasma antennas with low power requirements are covered. New and improved smart plasma antenna and applications to wi-fi and the applications of plasma antennas are discussed. Experimental work on plasma antenna noise and new progress on ruggedization and custom-made plasma tubes are also presented. This unique resource provides readers with a solid understanding of the efficient design and prototype development of plasma antennas to meet the challenge of reducing the power required to ionize the gas at various plasma densities. Thorough coverage of the technical underpinnings of plasma antennas, as well as important discussions on current markets and applications are discussed. Additionally, the book presents experimental work in this cutting-edge area and reveals the latest developments in the field.

Techniques based on the method of modal expansions, the Rayleigh-Stevenson expansion in inverse powers of the wavelength, and also the method of moments solution of integral equations are essentially restricted to the analysis of electromagnetic radiating structures which are small in terms of the wavelength. It therefore becomes necessary to employ approximations based on "high-frequency techniques" for performing an efficient analysis of electromagnetic radiating systems that are large in terms of the wavelength. One of the most versatile and useful high-frequency techniques is the geometrical theory of diffraction (GTD), which was developed around 1951 by J. B. Keller [1,2,3]. A class of diffracted rays are introduced systematically in the GTD via a generalization of the concepts of classical geometrical optics (GO). According to the GTD these diffracted rays exist in addition to the usual incident, reflected, and transmitted rays of GO. The diffracted rays in the GTD originate from certain "localized" regions on the surface of a radiating structure, such as at discontinuities in the geometrical and electrical properties of a surface, and at points of grazing incidence on a smooth convex surface as illustrated in Fig. 1. In particular, the diffracted rays can enter into the GO shadow as well as the lit regions. Consequently, the diffracted rays entirely account for the fields in the shadow region where the GO rays cannot exist.

This book presents the state-of-the-art of Terahertz spectroscopy. It is a modern source for a beginners and researcher interested in THz spectroscopy. The basics and physical background of THz spectroscopy and technology are explained, and important applications are described. The book presents the highlights of scientific research in the field of THz science and provides an excellent overview of the field and future directions of research. Over the last decade the field of terahertz spectroscopy has developed into one of the most rapidly growing fields of spectroscopy with large impact across a wide range of scientific disciplines. Due to substantial advances in femtosecond laser technology, terahertz time-domain spectroscopy (THz-TDS) has established itself as the dominant spectroscopic technique for experimental scientists interested in measurements in this frequency range. In solids and liquids terahertz radiation is at resonance with both phonon modes and hydrogen bonding modes which makes it an ideal tool to study the interaction between molecules in a unique way, thus opening a wealth of opportunities for research in physics, chemistry, biology, materials science and pharmaceuticals. This book provides an easy access to scientists, engineers and students alike who want to understand the theory and applications of modern terahertz spectroscopy.

"Presenting information typically not found in other books, the authors explore the numerous advantages of these antennas - including high-speed signal acquisition, fixed input impedance, low loss, and small footprint. Professionals find practical design examples, strategies, and optimization methods for designing economical switched parasitic antennas for applications such as direction finding and multibeam communications systems. Cutting-edge technologies and applications such as MEMs RF switches are also discussed."--Jacket.

Adaptive Array Measurements in Communications

Theory, Applications, and Design
Electromagnetic Modeling of Composite Metallic and Dielectric Structures
Terahertz Spectroscopy and Imaging
Handbook of Microwave and Radar Engineering
Antenna Engineering Using Physical OpticsPractical CAD Techniques and SoftwareArtech House Antenna Library
A practical book written for engineers who design and useantennas The author has many years of hands on experience designingantennas that were used in such applications as the Venus and Marsmissions of NASA The book covers all important topics of modern antenna designfor communications Numerical methods will be included but only as much as areneeded for practical applications
The high-speed capabilities and learning abilities of neural networks can be applied to quickly solving numerous complex optimization problems in electromagnetics, and this book shows you how. Even if you have no background in neural networks, this book helps you understand the basics of each main network architecture in use today, including its strengths and limitations. Moreover, it gives you the knowledge you need to identify situations when the use of neural networks is the best problem-solving option.
Written by a leading expert in the field, this practical new resource presents the fundamentals of electromagnetics and antenna technology. This book covers the design, electromagnetic simulation, fabrication, and measurements for various types of antennas, including impedance matching techniques and beamforming for ultrawideband dipoles, monopoles, loops, vector sensors for direction finding, HF curtain arrays, 3D printed nonplanar patch antenna arrays, waveguides for portable radar, reflector antennas, and other antennas. It explores the essentials of phased array antennas and includes detailed derivations of important field equations, and a detailed formulation of the method of moments. This resource exhibits essential derivations of equations, providing readers with a strong foundation of the underpinnings of electromagnetics and antennas. It includes a complete chapter on the details of antenna and electromagnetic test and measurement. This book explores details on 3D printed non-planar circular patch array antenna technology and the design and analysis of a planar array-fed axisymmetric gregorian reflector. The lumped-element impedance matched antennas are examined and include a look at an analytic impedance matching solution with a parallel LC network. This book provides key insight into many aspects of antenna technology that have broad applications in radar and communications.
Foundations of Antenna Engineering: A Unified Approach for Line-of-Sight and Multipath
Switched Parasitic Antennas for Cellular Communications
Antenna Engineering Using Physical Optics

Applications of Neural Networks in Electromagnetics
Understanding electromagnetic wave theory is pivotal in the design of antennas, microwave circuits, radars, and imaging systems. Researchers behind technology advances in these and other areas need to understand both the classical theory of electromagnetics as well as modern and emerging techniques of solving Maxwell's equations. To this end, the book provides a graduate-level treatment of selected analytical and computational methods. The analytical methods include the separation of variables, perturbation theory, Green's functions, geometrical optics, the geometrical theory of diffraction, physical optics, and the physical theory of diffraction. The numerical techniques include mode matching, the method of moments, and the finite element method. The analytical methods provide physical insights that are valuable in the design process and the invention of new devices. The numerical methods are more capable of treating general and complex structures. Together, they form a basis for modern electromagnetic design. The level of presentation allows the reader to immediately begin applying the methods to some problems of moderate complexity. It also provides explanations of the underlying theories so that their capabilities and limitations can be understood.
This new resource covers the latest developments in computational electromagnetic methods, with emphasis on cutting-edge applications. This book is designed to extend existing literature to the latest development in computational electromagnetic methods, which are of interest to readers in both academic and industrial areas. The topics include advanced techniques in MoM, FEM and FDTD, spectral domain method, GPU and Phi hardware acceleration, metamaterials, frequency and time domain integral equations, and statistics methods in bio-electromagnetics.
This ground-breaking resource gives you the background theories and know-how you need to effectively design active phased array antennas with wider bandwidth and scan volume utilizing sparse array technology. The book shows you how to incorporate aperiodic arrays and sparse arrays as a solution for overcoming the restrictions faced in conventional phased antenna designs – such as blind spots, limited scan volume, large power and cooling requirements, RF path losses, and increased complexity – while adhering to the maintenance of SWAP-C resources widely used in aerospace and defence. Packed with step-by-step information and research results unavailable in any other single source to date, the book presents new concepts and techniques that potentially can be applied to many critical defense and commercial requirements such as: radars, satcom on move, sonars, weather monitoring, 5G and 6G for mobile communication, fault and crack detection in buildings and underground pipelines, automotive anti-collisions mechanism in automobiles, mine detection, through wall imaging, and more. The book helps you to understand the fundamental antenna technology being deployed in modern systems and equips you to design problem-solving sparse array models proven by electromagnetic simulations that can reduce the cost and overall complexity of the existing systems. Numerous design studies are documented to validate the theories presented. The book takes into account the functional constraints in designing commercial and military systems while demonstrating provable techniques that are practical and achievable. This is an important resource for phased array antenna designers interested in utilizing sparse array technology with wider bandwidth and scan volume. The book's straightforward approach and easy-to-follow language also make it accessible to students and those new to the field.
This comprehensive resource presents antenna fundamentals balanced with the design of printed antennas. Over 70 antenna projects, along with design dimensions, design flows and antenna performance results are discussed, including antennas for wireless communication, 5G antennas and beamforming. Examples of smartphone

antennas, MIMO antennas, aerospace and satellite remote sensing array antennas, automotive antennas and radar systems and many more printed antennas for various applications are also included. These projects include design dimensions and parameters that incorporate the various techniques used by industries and academia. This book is intended to serve as a practical microstrip and printed antenna design guide to cover various real-world applications. All Antenna projects discussed in this book are designed, analyzed and simulated using full-wave electromagnetic solvers. Based on several years of the author's research in antenna design and development for RF and microwave applications, this book offers an in-depth coverage of practical printed antenna design methodology for modern applications.

Analyzing the Physics of Radio Telescopes and Radio Astronomy
A Hybrid Framework for Antenna/Platform Analysis
Microstrip and Printed Antennas: Applications-Based Designs
Practical CAD Techniques and Software
Theory, Designs, and Applications
This comprehensive handbook provides readers with a single-source reference to the theoretical fundamentals, physical mechanisms and principles of operation of all known microwave devices and various radars. The author discusses proven methods of computation and design development, process, schematic, schematic-technical and construction peculiarities of each breed of the microwave devices, as well as the most popular and original technical solutions for radars. Coverage also includes the history of creation of the most widely used radars, as well as guidelines for their potential upgrading. Offers readers a comprehensive, systematized view of all contemporary knowledge, acquired during the last 20 years, on radars and related disciplines; Provides a single-source reference on the physical mechanisms and principles of operation of the basic components of radio location devices, including theoretical aspects of designing the necessary, high-efficiency electronic devices and systems, as well as key, practical methods of computation and design; Presents complex topics using simple language, minimizing mathematics.

The most up-to-date, comprehensive treatment of classical and modern antennas and their related technologies Modern Antenna Handbook represents the most current and complete thinking in the field of antennas. The handbook is edited by one of the most recognizable, prominent, and prolific authors, educators, and researchers on antennas and electromagnetics. Each chapter is authored by one or more leading international experts and includes cover-age of current and future antenna-related technology. The information is of a practical nature and is intended to be useful for researchers as well as practicing engineers. From the fundamental parameters of antennas to antennas for mobile wireless communications and medical applications, Modern Antenna Handbook covers everything professional engineers, consultants, researchers, and students need to know about the recent developments and the future direction of this fast-paced field. In addition to antenna topics, the handbook also covers modern technologies such as metamaterials, microelectromechanical systems (MEMS), frequency selective surfaces (FSS), and radar cross sections (RCS) and their applications to antennas, while five chapters are devoted to advanced numerical/computational methods targeted primarily for the analysis and design of antennas.

Hybrid combinations of numerical and asymptotic methods are utilized to evaluate in-situ antenna performance, and coupling to other systems on a shared platform such as a ship topside. This paper describes a combination of the finite element-boundary (FE-BI) method with ray techniques for evaluating antenna patterns in the presence of complex platforms. Specifically, a very complex array antenna may be modeled with FE-BI, and interfaced to the platform via the use of equivalent currents. For the case considered here, the FE-BI is accelerated with the array decomposition fast multipole method (AD-FMM) so that large arrays may be considered. A novel discrete Fourier transform method is also introduced to provide a greatly reduced representation of the fields over a planar array aperture and the uniform theory of diffraction (UTD) along with iterative physical optics (IPO) are used to characterize the platform. To tie it all together, a matrix framework is formulated to iteratively increment the higher order interactions between antennas and platform.

Fourth-generation (4G) wireless communications systems are on the horizon, promising to deliver integrated voice, data, and multimedia streaming anywhere, anytime. Antennas are a key aspect of these systems. This book offers engineers comprehensive coverage of the antennas that may be integrated in these complex 4G wireless communications systems.
An Introduction to Electromagnetic Wave Propagation and Antennas
Mobile Antenna Systems Handbook
Plasma Antennas, Second Edition
Sparse Phased Array Antennas: Theory and Applications

Microwave Journal

Annotation This practical, new book provides a much wider choice of analytical solutions to problems faced by antenna design engineers and researchers working in electromagnetic modeling. Based on leading-edge method-of-moments procedures, the book presents new theories and techniques that help professionals optimize computer performance in numerical analysis of composite metallic and dielectric structures in the complex frequency domain. For the first time, comparisons and new combinations of techniques bring the elements of flexibility, ease of implementation, accuracy, and efficiency into clear focus for all practitioners.

Stutzman's 3rd edition of Antenna Theory and Design provides a more pedagogical approach with a greater emphasis on computational methods. New features include additional modern material to make the text more exciting and relevant to practicing engineers; new chapters on systems, low-profile elements and base station antennas; organizational changes to improve understanding; more details to selected important topics such as microstrip antennas and arrays; and expanded measurements topic.

This is the first truly comprehensive and most up-to-date handbook available on modern reflector antennas and feed sources for diversified space and ground applications. There has never been such an all-encompassing reflector handbook in print, and no currently available title offers coverage of such recent research developments. The Handbook consists of three volumes. Volume I provides a unique combination of theoretical underpinnings with design considerations and techniques. The need for knowledge in reflector antennas has grown steadily over the last two decades due to increased use in space and ground applications, as well as their high gain and wide bandwidth capabilities at relatively low cost. This volume brings you to the leading edge of developments in the field related to numerical techniques, classical reflector geometries, adaptive reflector antennas, shaped reflectors, bifocal and bicollimated dual reflectors, advanced reflectors, and reflect arrays. A must-have reference for both practicing engineers as well as academic researchers.

Due to the spectacular growth of electronic systems and the steady demand for new services with increased functionality, the development of more efficient measurement techniques has become of paramount importance. This practical resource details the cutting-edge Modulated Scatterer Technique, which offers a low-invasive and rapid method for testing and maesuring systems and equipment used in a wide range of electronic engineering applications. Extensively refrenced with 125 illustrations and 100 equations.

Antenna and EM Modeling with MATLAB Antenna Toolbox
Multiband Integrated Antennas for 4G Terminals
Electromagnetic Propagation and Waveguides in Photonics and Microwave Engineering
Scientific and Technical Aerospace Reports