2021
YOUR GUIDE TO THE LATEST RESOURCES IN
COMMUNICATIONS ENGINEERING AND PHOTONICS

ORDER

US, CANADA, SOUTH AMERICA, AUSTRALIA
US.ARTECHHOUSE.COM

UK, EUROPE, EMEA, ASIA
UK.ARTECHHOUSE.COM

VISIT US
A leading technical book publisher, Artech House provides today’s professionals and students with cutting-edge books and software from the world’s top authorities. From RF/microwave design, wireless communications, radar engineering, and electronic defense, to GPS/GNSS, power engineering, computer security, and building technology, Artech House publishes the forward-looking titles that engineers and managers need to excel.

Artech House is a subsidiary of Horizon House Publications, Inc., publisher of the internationally acclaimed magazine Microwave Journal®.

Artech House operates two full service offices: the main headquarters in suburban Boston, and a European division located in Central London. Both offices offer full publishing capabilities, from sales and distribution, to acquisitions and editorial, to promotion and marketing functions.

Shop and Save US.ARTECHHOUSE.COM UK.ARTECHHOUSE.COM

Need Assistance?

US, CANADA or South America, Australia, New Zealand:

1-800-225-9977 or 1-781-769-9750, ext. 4030
artech@ArtechHouse.com

UK, EMEA, Asia or international orders:

+44(0)20 7596-8750
artech-uk@ArtechHouse.com
Named Data Networking Architecture and Applications
Alex Afanasyev, Tamer Refaei, Lan Wang, Lixia Zhang

Named Data Networks (NDN) is an evolving network paradigm that can revolutionize today’s networks into much more efficient, effective, secure, and resilient communication environments. NDN has been designed and developed based on a realization that today’s applications have shifted to a data-centric model, a shift from the host-centric model upon which the network was designed. NDN re-designs the network layer and above to meet the needs of today’s applications and to address decade-old deficiencies in the legacy host-centric network protocol architecture. Today, NDN is being considered in a variety of different communication environments, including Internet of Things (IoT), Industrial Control Systems (ICS), scientific applications, edge computing, and even DoD tactical networks. These networks vary in terms of the objectives and the challenges they face. Some strive for efficiency while for others security and resiliency are paramount. By making named, secured data as the centerpiece of the architecture, NDN has shown tremendous improvements in each of these environments when applied, sometimes orders of magnitude better than their respective state of the art.

This exciting new book describes the design of NDN and how it compares to today’s TCP/IP-based legacy networks. Readers will learn the fundamental building blocks and applications of NDN, and where the technology is heading. It identifies where NDN can be applied today and where it will be considered in the future. The fundamental building blocks of NDN are explored, as well how NDN can utilize Transmission Control Protocol/Internet Protocol (TCP/IP) based legacy networks. Readers gain a firm grasp on how NDN works, how it can be applied in practice, and all the available NDN tools and resources that have been built by the NDN community.

300 pp. • 2021 • eBook ISBN: 978-1-63081-648 • $119 / £79
Print ISBN: 978-1-63081-646-9 • Check Website for pricing
Many wireless systems could benefit from the ability to transmit and receive on the same frequency at the same time, which is known as In-Band Full-Duplex (IBFD). This technology could lead to enhanced spectral efficiency for future wireless networks, such as fifth-generation New Radio (5G NR) and beyond, and could enable capabilities and applications that were previously considered impossible, such as IBFD with phased array systems. In this exciting new book, experts from industry, academic, and federal research institutions discuss the various approaches that can be taken to suppress the inherent self-interference that is generated in IBFD systems. Both static and adaptive techniques that span across the propagation, analog and digital domains are presented.

Details and measured results that encompass high-isolation antenna designs, RF, and photonic cancellation as well as signal processing approaches, which include beamforming and linear/non-linear equalization are detailed. Throughout this book, state-of-the-art IBFD systems that utilize these technologies will be provided as practical examples for various applications. Expert IBFD perspectives from multiple research organizations and companies, which would provide readers with the most accurate state-of-the-art approaches. This is the first book that dives into both the techniques that make IBFD systems possible as well as several different applications that use IBFD technology.

440 pp. • 2021 • eBook ISBN: 978-1-63081-790-9 • $149 / £129
Print ISBN: 978-1-63081-789-3 • $199 / £173
The Handbook of Next-Generation Emergency Services
Barbara Kemp, Bart Lovett

This exciting new resource comprehensively describes Next Generation Emergency Services. It will enable implementers, regulators, legal and technical professionals to understand how the introduction of this new approach to delivering emergency services will impact their work. Beginning with an overview of the field and explaining what will change as the transition is made from circuit-switched to IP-based networks, the book provides guidance and detail related to the technologies that enable Next Generation services; the current state of emergency services; how to plan and execute a move to a standards-compliant NG9-1-1 service including the network design, the operations and maintenance procedures, and the legal and regulatory requirements and mandates.

This Handbook explains NG9-1-1 networks: functions that they provide; the environments in which they are implemented; and the process by which they can be built and maintained. It provides a comparison to Basic 9-1-1 and E9-1-1 systems that dominate the field of emergency services today. The reader is guided through an emergency call from its inception by the Caller to the Public Safety Answering Point (PSAP) Call Taker to Dispatch to First Responders, explaining how Basic 9-1-1, E9-1-1 and NG9-1-1 support each leg of this journey. Chapters explaining the underlying networks and the service standards provide details to those who need them for their daily work or as reference.

Next Generation 9-1-1 services are carried over data networks that use the Internet Protocol (IP) to establish communications flows between the calling and called parties. These flows are created in a fundamentally different way than are those created on the circuit switched networks that carry Basic 9-1-1 and E9-1-1 calls. The differences between packet switched and circuit switched networks are explained and the challenges and opportunities offered by creating call flows using packet switched networks are also described.

300 pp. • 2021 • eBook ISBN: 978-1-63081-6544 • $104 / £89
Print ISBN: 978-1-63081-652-0 • $139 / £119
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.
The Internet of Things (IoT) has grown from a niche market for machine-to-machine communication into a global phenomenon that is touching our lives daily. The key aspects of IoT are covered in this book, including the anatomy of an IoT device and how it is connected to a backend system, the nuances of data extraction and keeping the data safe and secure, the role of the SIM card in cellular connected IoT devices, and how IoT devices are controlled. Low-power wide-area devices that will allow almost anything to be connected, how IoT devices are being connected around the world, and how 5G and edge computing will continue to drive new use cases are explained. Overcoming the challenges of creating IoT applications and hardware is covered. Detailed examples of how IoT is being used in the spaces of industrial, consumer, transportation, robotics, and wearables are provided. The IoT industry is explained. Finally, the future of IoT is covered in light of technical, social, and economic advances.
Implementing Full Duplexing for 5G
David B. Cruickshank

This exciting new book examines the feasibility of using a method of doubling the capacity of cellular networks by simultaneously transmitting and receiving signals at the same frequency, a process known as full duplexing (FD). To realize full duplexing, changes in the hardware of the cell-base stations, relaying equipment, “hot spot” access points and mobile phones are necessary to prevent the hardware’s transmitters from interfering with their own receivers. This requires looking at how to separate the strong transmitted signal from the very weak received signal, a process requiring both hardware (analog) changes and more complex digital signal processing. Different ways of achieving that goal are examined. The books reviews the merits of hardware changes involving new duplexing components that may be different depending on the frequency band and cell hardware being used.

Developing full duplex (FD) systems in 5G LTE cellular communications and what can be achieved with ferrite-based circulators in terms of size reduction and performance enhancement, especially at millimetric frequencies, is considered. The relative merits of ferrite and non-ferrite circulators are compared in terms of their fundamental materials and device technologies, such as isolation, insertion loss, bandwidth and non-linearity. FD in the entire 5G cell is also examined and its resulting range of equipment and device communication. This includes front-hauling, more sophisticated back and front-hauling, backhaul beam switching, and cell extenders and relays, all of which could involve FD.

“Finally, at the threshold of 5G cellular communications and their promise of the Internet of Things, machine-to-machine communication, self-driving cars, and faster-than-ever data, audio, and video communication, there is a complete text, written by an eminent expert in the industry, on the state of the art in full duplexing with respect to its physical implementation in transceivers.”

– Prof. Rick Ubic, PhD, MInstP, Micron School of Materials Science and Engineering, Boise State University
This practical, hands-on resource describes functional units and circuits of telecommunication systems. The functions characterizing these systems, including RF amplifiers (both low noise and power amplifiers), signal sources, mixers and phase lock loops, are explored from an operational level viewpoint. And as all functions are migrating to digital implementations, this book describes functional units and circuits of telecommunication systems (with radio, wire, or optical links), from functional level viewpoint to the circuit details and examples. The structure of a radio transceiver is described and a view of all functional units, including migration to SDR (Software Defined Radio) is provided.

Chapters include a functional identification of the units described and analysis of possible circuit solutions and analysis of error sources. The sequence reflects the actual design procedure: functional identification, search and analysis of solutions, and critical review to provide an understanding of the various solutions and tradeoffs, with guidelines for design and/or selection of proper functional units.

Print ISBN: 978-1-63081-736-7 • $179 / £155
Designing Delay-Tolerant Applications for Store-and-Forward Networks
Ed J. Birrane and Jason A. Soloff

This exciting book explores motivation, characteristics, and examples of how network application engineers benefit from new store-and-forward protocols. The motivating factors that caused delay tolerant networks (DTNs) to be standardized are discussed, as well as the unique nature of applications running within a DTN. The underpinnings of DTN development are explored, including space-based networking, Internet of Things communications, and delayed-overlays as a means of achieving quality-of-service. Topics such as RESTful interfaces and research into autonomy and open-loop systems are discussed.

The motivation and design of DTNs is addressed, along with design patterns and examples of delay-tolerant application development and deployment. Cases involving terrestrial Internet encounters problems, like those that define challenged networks, are identified and standard solutions to those problems are presented. Readers learn how to cache content in the network, perform open-loop autonomous control of nodes, annotate messages to reduce traffic needs, perform distributed error correction, in-network data fusion, and regional administration. Special considerations unique to DTNs that must be accommodated by delay-tolerant applications, examples of using these patterns, and a case study for their deployment are also included. This book is intended as a resource for network engineers, systems engineers, and communication system architectures to use in the specification, design, implementation, and verification of advanced, high reliability networks.

340 pp. • 2020 • eBook ISBN: 978-1-63081-630-8 • $134 / £114
Print ISBN: 978-1-63081-628-5 • $179 / £152
This practical book is an accessible introduction to Orthogonal frequency-division multiplexing (OFDM) receiver design, a technology that allows digitized data to be carried by multiple carriers. It offers a detailed simulation study of an OFDM algorithm for Wi-Fi and 4G cellular that can be used to understand other OFDM waveforms. Extensive simulation studies are included using the transmission waveform given by the IEEE 802.11 standard. Scrambler, error-correcting codes, interleaver and radio-wave propagation model are included.

OFDM waveform characteristics, signal acquisition, synchronization issues, channel estimation and tracking, hard and soft decision decoding are all covered. Detailed derivations leading to the final formula for any algorithm are given, which allows the reader to clearly understand the approximations and conditions behind the formulas and apply them appropriately. The algorithms are selected not just for the best performance from simulation study but also for easy implementation. An example is a unique algorithm for signal acquisition using the principle of maximum likelihood detection.

The book is written in an easy to read fashion to provide a fundamental understanding of the OFDM algorithms. Examples are provided in many cases to help to understand the design subject. Digital signal processing is extensively used to explain the OFDM fundamentals.
This authoritative resource covers the fundamentals of wireless and PLC technologies. Different types of wireless and PLC technologies used for indoor IoT applications are described. The channel models for both wireless and power line communications are introduced, highlighting the main challenges for these types of communications inside the indoor environment. The book explores the hybrid technologies with television white space (TVWS), very high frequency (VHF) wireless technology, and broadband PLC (BPLC) for indoor high speed IoT networks. A TVWS standardized BPLC system is proposed, which integrates the requirement of primary user sensing and the permissible transmission power spectral density (PSD) for TVWS users into BPLC standard, regarding VHF band access.
“I truly believe that this book will soon become a must and an essential consulting material in the engineering school libraries as well as part of the stuff of engineers and technologists devoted to testing and measurements in anechoic sites of equipment, components or systems.”

– Dr. Israel Garcia-Ruiz
Director for the Metrology in Radiofrequencies Area, National Center for Metrology, CENAM

Anechoic Range Design for Electromagnetic Measurements
Vince Rodriguez

As technologies for wireless communications, including 5G and Internet of Things (IoT), require more complex antennas, practitioners need more information on the best methods to perform measurements on these different types of antennas. This exciting resource provides guidance on the proper design of indoor ranges for RF antenna measurements. The important aspects of specifying the range or resources needed in a development program are explored. Analysis of existing ranges to determine their suitability for performing specific test that a user of the range may require is also introduced. Readers find in-depth coverage of the design of ranges and how to evaluate the error contributions of the range and the best approach to measure a system, antenna, or other radiating hardware.

The book provides information on selecting the right range to make a specific type of measurement and understanding for an RF absorber. Matlab scripts are also included to help readers estimate the performance of an RF absorber. Readers will be able to estimate the required space for a given type of measurement, as well as identify what type of range is the better choice, based on physical limitations and economics. Simple rules for the design of an anechoic chamber, based on the required accuracy and parameters to be measured are described. Packed with examples and references, this book is a prime reference for any practitioner that uses or designs facilities for the measurement of electromagnetic energy.

416 pp. • 2019 • eBook ISBN: 978-1-63081-539-4 • $127 / £104
Print ISBN: 978-1-63081-537-0 • $169 / £139
INSTANT ACCESS TO OUR DIGITAL COLLECTIONS AT YOUR FINGERTIPS

COMMUNICATION & NETWORK ENGINEERING eBook TITLES

• Performance Of TCP/IP Over ATM Networks
• Understanding Digital Terrestrial Broadcasting
• Wide-Area Data Network Performance Engineering
• SIP: Understanding the Session Initiation Protocol
• Managing Internet-Driven Change in International Telecommunications
• Principles of Modern Communications Technology
• Smart Card Security And Applications, 2nd Edition
• Strategies for Success in the New Telecommunications Marketplace
• ATM Interworking In Broadband Wireless Applications
• Engineering Internet QoS
• Next Generation Intelligent Networks
• Telecommunications Cost Management
• Telemetry Systems Engineering
• Broadband Local Loops for High-Speed Access
• Centrex or PBX: The Impact of IP
• Digital Clocks for Synchronization and Communications
• Gigabit Ethernet Technology And Applications
• Home Networking Technologies and Standards
• Installation and Maintenance of SDH/SONET, ATM, Xdsl, and Synchronization Networks
• Introduction to Telecommunications Network Engineering
• LANs to WANs: The Complete Management Guide
• Mission-Critical Network Planning
• Spectrum Wars: The Policy and Technology Debate
• Telecommunications Technology Handbook, 2nd Edition
• A Professional’s Guide to Data Communication in a TCP/IP World
• Customer-Centered Telecommunications Services Marketing
• Deploying and Managing IP over WDM Networks
• Open Source Software Law

WHY SUBSCRIBE TO ARTECH ACCESS?

• Multiuser, concurrent access to over 700 new, recent and classic titles authored by recognized experts, many unavailable through other eBook services
• Subject areas include: Electronic Defense, Radar, Aerospace, RF/Microwave, Antennas, BPS/GNSS, MEMS, Nanotechnology, Software Development and IT, Computer Security, Communications Engineering, Power Engineering and more!
• eBooks transferable to any device

eBook Package
one year subscription package $499 / £345
<table>
<thead>
<tr>
<th>COMMUNICATION &amp; NETWORK ENGINEERING</th>
<th>eBook Titles Continued...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Essentials of Modern Telecommunications Systems</td>
<td>Military Communications in the Future Battlefield</td>
</tr>
<tr>
<td>Systems Reliability and Failure Prevention</td>
<td>5G and Satellite Spectrum, Standards, and Scale</td>
</tr>
<tr>
<td>Voice Over 802.11</td>
<td>Design Solution for Wireless Sensor Networks in Extreme Environments</td>
</tr>
<tr>
<td>The Great Telecom Meltdown</td>
<td>Anechoic Range Design for Electromagnetic Measurements</td>
</tr>
<tr>
<td>Implementing Value-Added Telecom Services</td>
<td>The VNA Applications Handbook</td>
</tr>
<tr>
<td>Introduction to Communication Systems Simulation</td>
<td>5G New Radio: Beyond Mobile Broadband</td>
</tr>
<tr>
<td>Digital Modulation Techniques, Second Edition</td>
<td>Introduction to OFDM Receiver Design and Simulation</td>
</tr>
<tr>
<td>Understanding Voice over IP Security</td>
<td>Designing Delay-Tolerant Applications for Store-and-Forward Networks</td>
</tr>
<tr>
<td>Litigating with Electronically Stored Information</td>
<td>Telecommunication Electronics</td>
</tr>
<tr>
<td>Power Line Communications in Practice</td>
<td>High-Power Radio Frequency Effects on Electronic Systems</td>
</tr>
<tr>
<td>The Business Privacy Law Handbook</td>
<td>Hybrid Wireless-Power Line Communication for Indoor IoT Networks</td>
</tr>
<tr>
<td>Disaster Recovery Planning for Communications and Critical Infrastructure</td>
<td>Implementing Full Duplexing for 5G</td>
</tr>
<tr>
<td>EMI Protection for Communication Systems</td>
<td>Location Based Services in Cellular Networks: from GSM to 5G NR</td>
</tr>
<tr>
<td>Understanding SIP Servlets 1.1</td>
<td>Introduction to Communication Networks</td>
</tr>
<tr>
<td>3D and HD Broadband Video Networking</td>
<td>Building the FirstNet Public Safety Broadband Network</td>
</tr>
<tr>
<td>Introduction to Communication Networks</td>
<td>Creating Value-Added Services and Applications for Converged Communications Networks</td>
</tr>
<tr>
<td>Building the FirstNet Public Safety Broadband Network</td>
<td>Telecommunication Electronics</td>
</tr>
<tr>
<td>Creating Value-Added Services and Applications for Converged Communications Networks</td>
<td>High-Power Radio Frequency Effects on Electronic Systems</td>
</tr>
<tr>
<td>Telecommunication Networks for the Smart Grid</td>
<td>Hybrid Wireless-Power Line Communication for Indoor IoT Networks</td>
</tr>
<tr>
<td>IoT Technical Challenges and Solutions</td>
<td>Implementing Full Duplexing for 5G</td>
</tr>
<tr>
<td>The ABCs of Fiber Optic Communication</td>
<td>Location Based Services in Cellular Networks: from GSM to 5G NR</td>
</tr>
<tr>
<td>Delay-Tolerant Satellite Networks</td>
<td>Internet of Things Technical Challenges and Solutions</td>
</tr>
<tr>
<td>High-Efficiency Load Modulation Power Amplifiers for Wireless Communications</td>
<td>Third Networks and Services</td>
</tr>
<tr>
<td>The Technical Foundations of IoT</td>
<td>Interference and Resource Management in Heterogeneous Wireless Networks</td>
</tr>
<tr>
<td>Third Networks and Services</td>
<td>From LTE to LTE-Advanced Pro and 5G</td>
</tr>
<tr>
<td>Interference and Resource Management in Heterogeneous Wireless Networks</td>
<td>Software-Defined Radio for Engineers</td>
</tr>
<tr>
<td>From LTE to LTE-Advanced Pro and 5G</td>
<td>Signal Digitization and Reconstruction in Digital Radios</td>
</tr>
<tr>
<td>Software-Defined Radio for Engineers</td>
<td>ARTECH ACCESS E-BOOKS ARE BETTER THAN EVER</td>
</tr>
<tr>
<td>Signal Digitization and Reconstruction in Digital Radios</td>
<td>DRM-FREE files</td>
</tr>
<tr>
<td></td>
<td>Enhanced search capabilities across entire collection</td>
</tr>
<tr>
<td></td>
<td>Improved personalization features including bookmark, highlight, copy and paste</td>
</tr>
<tr>
<td></td>
<td>More Intuitive Interface</td>
</tr>
</tbody>
</table>
5G New Radio: Beyond Mobile Broadband
Amitav Mukherjee

Fifth-generation cellular radio access networks are currently being standardized as 5G New Radio (NR). The primary objectives of 5G NR are to provide enhanced mobile broadband (eMBB) and ultra-reliable low latency communication (URLLC) capabilities. This innovative resource analyzes these applications in detail to help readers understand how the flexible design of NR makes it suitable for a wide range of use cases and applications. The rationale behind the design decisions made during the NR standardization process are explored. Readers will be able to understand the performance limits of NR when applied to non-eMBB scenarios and how NR compares to 4G and IEEE 802.x connectivity solutions for such scenarios.

316 pp. • 2019 • eBook ISBN: 978-1-63081-642-1 • $104 / £89
Print ISBN: 978-1-63081-640-7 • $139 / £119

Photonic Applications for Radio Systems Networks
Fabio Cavaliere and Antonio D’Errico

This hands-on, practical new resource provides optical network designers with basic but necessary information about radio systems air interface and radio access network architecture, protocols, and interfaces, using 5G use cases as relevant example. The book introduces mobile network designers to the transmission modeling techniques for the design of a radio access optical network. The main linear and non-linear propagation effects in optical fiber are covered.

301 pp. • 2019 • eBook ISBN: 978-1-63081-666-7 • $127 / £104
Print ISBN: 978-1-63081-665-0 • $169 / £139
The VNA Applications Handbook
Gregory Bonaguide and Neil Jarvis

Written by prominent experts in the field, this authoritative new resource provides guidelines for performing a wide variety of Vector Network Analyzers (VNA) measurements. The capabilities and limitations of modern VNA in the context of challenging real-world applications are explained, as well as insights for optimizing test setups and instrument settings, making accurate measurements and, equally important, avoiding costly mistakes. Organized by topic, the readers can focus on chapters covering particular measurement challenges.

400 pp. • 2019 • eBook ISBN: 978-1-63081-602-5 • $127 / £104
Print ISBN: 978-1-63081-600-1 • $169 / £139

Practical Antenna Design for Wireless Products
Henry Lau

This comprehensive resource covers both antenna fundamentals and practical implementation strategies, presenting antenna design with optimum performance in actual products and systems. The book helps readers bridge the gap between electromagnetic theory and its application in the design of practical antennas in real products. Practical implementation strategies in products and systems will be addressed in order to design antennas in the context of actual product environments, including PCB layout, component placement and casing design. Practical design examples on wearable electronic products are presented with a systematic approach to designing antennas for actual products.

230 pp. • 2019 • eBook ISBN: 978-1-63081-326-0 • $104 / £89
Print ISBN: 978-1-63081-325-3 • $139 / £119
Multimedia Networking Technologies, Protocols, and Architectures
Ivan Vidal, Ignacio Soto, Albert Banchs, and Jaime Garcia-Reinoso

This practical resource provides a survey on the technologies, protocols, and architectures that are widely used in practice to implement networked multimedia services. The book presents the background and basic concepts behind multimedia networking, and provides a detailed analysis of how multimedia services work, reviewing the diverse network protocols that are of common use to implement them. To guide the explanation of concepts, the book focuses on a representative set of networked multimedia services with proven success and high penetration in the telecommunication market, namely Internet telephony, Video-on-Demand (VoD), and live IP television (IPTV).

300 pp. • 2019 • eBook ISBN: 978-1-63081-379-6 • $112 / £97
Print ISBN: 978-1-63081-378-9 • $149 / £129

Signal Digitization and Reconstruction in Digital Radios
Yefim Poberezhskiy and Gennady Poberezhskiy

This comprehensive resource provides the latest information on digitization and reconstruction (D&R) of analog signals in digital radios. Readers learn how to conduct comprehensive analysis, concisely describe the major signal processing procedures carried out in the radios, and demonstrate the dependence of these procedures on the quality of D&R. The book presents and analyzes the most promising and theoretically sound ways to improve the characteristics of D&R circuits and illustrate the influence of these improvements on the capabilities of digital radios.

230 pp. • 2019 • eBook ISBN: 978-1-63081-326-0 • $104 / £89
Print ISBN: 978-1-63081-325-3 • $139 / £119
Design Solutions for Wireless Sensor Networks in Extreme Environments
Habib F. Rashvand and Ali Abedi

This innovative resource introduces new approaches to diversify the practical use of wireless sensor networks. The book explores ways to incorporate wireless sensing techniques for use in unconventional environments, including harsh industrial working conditions, space, underwater and underground, using heterogeneous, agile and unconventional methods. It explores system challenges of working in these extreme locations, as well as designing for longevity, electronics and hardware issues, and facilitating information-flow in hard to reach areas. Readers gain an understanding of throughput and interference trade-offs in these challenging environments.

230 pp. • 2019 • eBook ISBN: 978-1-63081-326-0 • $104 / £89
Print ISBN: 978-1-63081-325-3 • $139 / £119

Handbook of Antennas for EMC, Second Edition
Thereza M. MacNamara and John McAuley

Finally - a completely revised, updated, and expanded edition of the Artech House classic, Handbook of Antennas for EMC. The second edition features a wealth of brand new material, including chapters on recent techniques, standards, and measurements. This invaluable resource provides a thorough understanding of the practical aspects and underpinnings of antennas in EMC systems. Professionals find summaries of important underlying mathematics without the heavy theoretical emphasis that characterizes much of the existing literature. Professionals discover which antennas to choose for electromagnetic (EM) compatibility.

380 pp. • 2018 • eBook ISBN: 978-1-63081-426-7 • $127 / £110
Print ISBN: 978-1-63081-424-3 • $169 / £146
Military Communications in the Future Battlefield
Marko Suojanen

Taking an applications-oriented view, this unique volume delivers a forward-looking roadmap to military communications. This hands-on reference offers military and security technology practitioners insights into the key issues related to long-term development within the battlefield communications area. The book presents the technological alternatives for communication in the battlefield in unexpected situations and environments. This authoritative resource discusses unstructured formations of actors using a holistic approach that considers key capability requirements. Professionals and officers learn how to prepare for the unexpected and start building agile, adaptive and cognitive systems that are needed in future operating environments.

228 pp. • 2018 • eBook ISBN: 978-1-63081-606-3 • $104 / £89
Print ISBN: 978-1-63081-333-9 • $139 / £119

Antennas for Small Mobile Terminals
Kyohei Fujimoto and Koichi Ito

With the progress and rapid increase in mobile terminals, the design of antennas for these small systems is becoming more and more important. This forward-looking volume offers professionals current and comprehensive coverage of the design, development, and implementation of small, compact, and lightweight antennas in mobile communication terminals. The book discusses a wide range of communication systems, from Radio-frequency identification (RFID), and near field communications (NFC), to wireless power transmission (WPT) and broadband wireless networks. Engineers learn how to use small antennas in mobile phones, wearable systems, laptop computers, radio watches, and broadband wireless networks such as WLAN and WiMAX.

340 pp. • 2018 • eBook ISBN: 978-1-63081-521-9 • $127 / £104
Print ISBN: 978-1-63081-095-5 • $169 / £139
Delay-Tolerant Satellite Networks
Juan A. Fraire, Jorge M. Finochietto, and Scott C. Burleigh

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.

272 pp. • 2017 • eBook ISBN: 978-1-63081-517-2 • $112 / £97
Print ISBN: 978-1-63081-344-4 • $149 / £129

 Technologies for RF Systems
Terry Edwards

This comprehensive resource provides an introduction to the main concepts, technologies, and components in microwave and RF engineering. This book presents details about how to design various amplifiers, circuits, and chips for communication systems. It offers insight into selecting appropriate ADC and DAC technology. Several worked examples are found throughout the book. This book provides a summary of 21st century RF systems and electronics and discusses the challenges of frequency bands and wavelengths, software-defined radio (SDR) and cognitive radio. RF semiconductors are covered, including bandgap, drift velocity, resistors, diodes, and various transistors. This book offers details about passive RF components, capacitors, inductors, resistors, coaxial, and microstrip lines as well as coplanar waveguide.

330 pp • 2018 • eBook ISBN: 978-1-63081-452-6 • $119 / £104
5G and Satellite Spectrum, Standards and Scale
Geoff Varrall

This new resource presents the emerging role of Low Earth Orbit (LEO), Medium Earth Orbit (MEO), and Geostationary satellites (GSO) as a delivery option for backhaul and wide area rural and urban mobile broadband and fixed access. The book offers insight into recently established Non Terrestrial Network standards. Readers learn which bands will need to be supported in next generation 5G and satellite devices and networks and how the bands will be characterized. Channel spacing, guard bands, FDD or TDD, out of band emission limits, and in band performance requirements are discussed. Readers learn how modulation choices will affect co-existence issues.

310 pp. • 2018 • eBook ISBN: 978-1-63081-504-2 • $127 / £104
Print ISBN: 978-1-63081-502-8 • $169 / £139

5G Spectrum and Standards
Geoff Varrall

This new resource provides key insight into future 5G radio systems and the technical and economic impact on industries, communities and end-users. The book offers a comprehensive understanding of the options available for teams tasked with bringing 5G products and services to market or developing supporting standards and regulatory frameworks. Readers find contemporary examples of millimeter band radio hardware including 60 GHz and V band and E Band point to point radio. This book demonstrates the profound progress with 4G radio signal processing and RF hardware to reveal its potential applicability to 5G radio systems.

Print ISBN: 978-1-63081-044-3 • $149 / £129
Microwave Imaging Methods and Applications
Matteo Pastorino and Andrea Randazzo

This book provides practitioners and researchers with a complete overview of the latest and most important noninvasive and nondestructive techniques for inspecting structures and bodies by using microwaves. Placing emphasis on applications, the book considers many areas, from medical imaging and security... to industrial engineering and subsurface prospection. For each application, readers are presented with the objectives of the inspection and related challenges. Moreover, this groundbreaking resource details computational methods that can be used to solve inverse problems related to specific applications.

310 pp. • 2018 • eBook ISBN: 978-1-63081-526-4 • $119 / £104
Print ISBN: 978-1-63081-348-2 • $159 / £138

Software-Defined Radio for Engineers
Travis F. Collins, Robin Getz, Di Pu, and Alexander M. Wyglinski

Based on the popular Artech House classic, Digital Communication Systems Engineering with Software-Defined Radio, this book provides a practical approach to quickly learning the software-defined radio (SDR) concepts needed for work in the field. This up-to-date volume guides readers on how to quickly prototype wireless designs using SDR for real-world testing and experimentation. This book explores advanced wireless communication techniques—such as OFDM, LTE, WLA, and hardware targeting. Readers will gain an understanding of the core concepts behind wireless hardware, such as the radio frequency front-end, analog-to-digital and digital-to-analog converters, as well as various processing technologies.

Print ISBN: 978-1-63081-457-1 • $159 / £138
Interference and Resource Management in Heterogeneous Wireless Networks
Jiandong Li, Min Sheng, Xijun Wang, and Hongguang Sun

This authoritative resource offers a comprehensive overview of heterogeneous wireless networks, small cells, and device-to-device (D2D) communications. The book provides insight into network modeling and performance analysis of heterogeneous wireless networks. Interference management framework and design issues are covered as well as details about resource mobility, channel models, and typical and statistical interference modeling. This resource explains leveraging resource heterogeneity in interference mitigation and presents the challenges and feasible solutions for concurrent transmission.

Optoelectronics for Low-Intensity Conflicts and Homeland Security
Anil Maini

This authoritative new resource provides an overview of the deployment of various devices in systems in actual field conditions and efficacy established in warfare. The book covers laser and optronic technologies that have evolved over the years to build practical devices and systems for use in Homeland Security and low-intensity conflict scenarios. Readers will be able to assess combat and battle-worthiness of various available devices and systems. This book covers state-of-the-art and emerging trends in various optoelectronics technologies having applications in Homeland Security.

Engineering Optical Networks
Sudhir Warier

Written by a leading expert in the field, this book provides a comprehensive introduction to the fundamental concepts of transport and data networks. This resource examines back-bone network architectures and functions. The evolution, key components, and techniques of telecommunication networks are presented, including voice and data transmission, fiber optic communication and optical link design. This book explores the photonic network architecture and includes chapters on transport networks, synchronous optical networks, optical transport networks, and dense wavelength division multiplexing. Professionals are brought up-to-speed with the applications and architecture of next generation photonic networks, and are provided with references for all applicable standards.

400 pp. • 2017 • eBook ISBN: 978-1-63081-449-6 • $119 / £104

Applications of Modern RF Photonics
Preetpaul Singh Devgan

This unique new resource presents applications of modern RF photonic systems that use RF photonic components for commonly used signal processing systems. This book provides insight into how a variety of systems work together, including RF down conversion, analog to digital conversion, RF oscillators, and frequency identification. A comparison of analog versus digital systems is presented. Readers find in-depth coverage of analog delay lines using RF photonics, various system architectures, and details about RF photonic component performance. Signal processing utilizing RF photonics and the need for down conversion is discussed. The many advancements in analog delay line performance are explained, including those in photodetector, optical fibers, and optical and amplifier modulators.

230 pp. • 2018 • eBook ISBN: 978-1-63081-524-0 • $119 / £104
Print ISBN: 978-1-63081-159-4 • $159 / £138
Fiber-Optic Sensors for Biomedical Applications
Daniele Tosi and Guido Perrone

This authoritative new resource presents fiber optic sensors and their applications in medical device design and biomedical engineering. Readers gain an understanding of which technology to use and adopt, and how to connect technologies with their respective applications. This book explores the innovation of diagnostics and how to use diagnostic tools. Principles of fiber optic sensing are covered and include details about intensity-based sensors, fiber bragg gratings, distributed sensors, and fabry-perot interferometers. This book explores interrogation software, standards for medical sensors, and discusses protocols and tools for validation.

330 pp. • 2017 • eBook ISBN: 978-1-63081-495-3 • $127 / £104
Print ISBN: 978-1-60807-152-5 • $169 / £139

The ABCs of Fiber Optic Communication
Sudhir Warier

This unique practical handbook is the only one of its kind to provide the conceptual framework and troubleshooting tactics related to the manufacturing, selection, and installation of modern photonic networks, including optical fiber plants, optical transceivers, test and measurement equipment, and network architecture of SDH, OTN, IP/MPLS, FTTx networks, and PON. This resource includes the latest technological advancements and industry applications while covering the entire fiber ecosystem from installation to troubleshooting. This book also provides an overview of the current and future developments in optical fibers, interfaces, transceivers and backbone networks.

322 pp. • 2017 • eBook ISBN: 978-1-63081-416-8 • $112 / £97
Print ISBN: 978-1-63081-414-4 • $149 / £129
From LTE to LTE-Advanced Pro and 5G
Moe Rahnema and Marcin Dryjanski

This practical hands-on new resource presents LTE technologies from end-to-end, including network planning and the optimization tradeoff process. This book examines the features of LTE-Advanced and LTE-Advanced Pro and how they integrate into existing LTE networks. Professionals find in-depth coverage of how the air interface is structured at the physical layer and how the related link level protocols are designed and work. This resource highlights potential 5G solutions as considered in releases 14 and beyond, the migration paths, and the challenges involved with the latest updates and standardization process.

372 pp. • 2017 • eBook ISBN: 978-1-63081-455-7 • $104 / £89
Print ISBN: 978-1-63081-453-3 • $139 / £119

Third Networks and Services
Mehmet Toy and Hakki Candan Cankaya

This comprehensive new resource presents applications of MEF’s (Metro Ethernet Forum) Carrier Ethernet architecture and provides insight into building end-to-end systems with third network services like MPLS-TP, VPLS, and PBT. This book includes new use cases and explores the new MEF/CEN specifications, services, and applications. While providing a look into lifecycle service orchestration (LSO), virtualization, and cloud series, this book highlights the pros and cons of these technologies for service providers and enterprise network owners.

544 pp. • 2017 • eBook ISBN: 978-1-63081-430-4 • $88 / £77
Print ISBN: 978-1-63081-175-4 • $118 / £118
Virtualized Software-Defined Networks and Services
Qiang Duan and Mehmet Toy

This comprehensive new resource presents the latest developments in key Software-Defined Network (SDN) technologies including SDN controllers, network control and management applications, southbound protocols, and northbound interfaces. NFV technologies are reviewed, including network function virtualization infrastructure, virtualized network functions, virtual network management and orchestration. Professionals find comprehensive discussions on the relationship between SDN and NFV and how they may integrate into unified future network architecture. Virtualization network services including, cloud, carrier Ethernet services, and IP VPN services are also covered.

336 pp. • 2016 • eBook ISBN: 978-1-63081-440-3 • $72 / £72
Print ISBN: 978-1-63081-130-3 • $97 / £97

Inside Bluetooth Low Energy, Second Edition
Naresh Kumar Gupta

This updated and expanded second edition of the Artech House bestseller, Inside Bluetooth Low Energy, presents the recent developments within the Bluetooth Core Specifications 4.1 and 4.2. This new edition explores both Internet of Things (IoT) and Bluetooth Low Energy (LE) in one single flow and demonstrates how this technology is very well suited for IoT implementations. The book covers all the advances within the new specifications including Bluetooth LE enhanced power efficiency, faster connections, and enhanced privacy and security. Developed for ultra-low power devices, such as heart rate monitors, thermometers, and sensors, Bluetooth LE is one of the latest, most exciting enhancements to Bluetooth technology.

458 pp. • 2016 • eBook ISBN: 978-1-63081-370-3 • $112 / £97
Print ISBN: 978-1-63081-089-4 • $149 / £129
Radio Frequency Interference in Communications Systems
Bruce Elbert

This authoritative resource describes how to assess and mitigate RF interference in radio systems and presents effective methods to identify and resolve RFI before, during and after its appearance. Authored by a leading authority in the field, this book provides engineers and managers with the knowledge they need in the control of Radio Frequency Interference. Readers find practical guidance in an array of critical areas, including engineering of radiocommunication and wireless systems in light of RFI, identifying RFI modes, electromagnetic compatibility and spectrum sharing. This book concludes with prospective for RFI resolution in future radiocommunication systems.

Print ISBN: 978-1-60807-965-0 • $104 / £90

High-Efficiency Load Modulation Power Amplifiers for Wireless Communications
Zhancang Wang

This cutting-edge resource presents a complete and systematic overview of the practical design considerations of radio frequency (RF) high efficiency load modulation power amplifiers (PA) for modern wireless communications for 4G and beyond. It provides comprehensive insight into all aspects of load modulation PA design and optimization not only covering design approaches specifically for passive and active load modulation operation but also hybrid with dynamic supply modulation and digital signal processing algorithms required for performance enhancement.

414 pp. • 2016 • eBook ISBN: 978-1-63081-467-0 • $134 / £81
Complex and Hypercomplex Analytic Signals: Theory and Applications
Stefan L. Hahn and Kajetana M. Snopek

Based on the bestselling Artech House classic title, Hilbert Transforms Signal Processing, this comprehensive new resource introduces complex and hypercomplex analytic signals and their applications. Professionals find in-depth explanations of the theory of multidimensional complex and hypercomplex signals illustrated with numerous examples and followed by practical applications. The survey of chosen hypercomplex algebras and the orthants of the n-dimensional Cartesian space and single-orthant operators are explored. This book also covers topics including, the polar representation of analytic signals, quasi-analytic signals, the space–frequency of n-D complex and hypercomplex signals as well as the causality of signals.

316 pp. • 2016 • eBook ISBN: 978-1-63081-438-0 • $89 / £77
Print ISBN: 978-1-63081-132-7 • $118 / £118

The Technical Foundations of IoT
Boris Adryan, Dominik Obermaier, and Paul Fremantle

This comprehensive new resource presents a technical introduction to the components, architecture, software, and protocols of IoT. This book is especially catered to those who are interested in researching, developing, and building IoT. The book covers the physics of electricity and electromagnetism laying the foundation for understanding the components of modern electronics and computing. Readers learn about the fundamental properties of matter along with security and privacy issues related to IoT. This book offers insight into the software components that impinge on IoT solutions, development, network protocols, backend software, data analytics and conceptual interoperability.

480 pp. • 2017 • eBook ISBN: 978-1-63081-466-3 • $94 / £84
Print ISBN: 978-1-63081-251-5 • $129 / £112
Cognitive Radio: Interoperability Through Waveform Reconfiguration
Leszek Lechowicz and Mieczyslaw M. Kokar

In the span of a century, radio technology advanced from spark transmitters, through analog radios based on vacuum tubes to solid state radios to finally software defined radios where most of the transmit and receive functionalities are implemented as programs running on specialized microprocessors. In recent years, cognitive radio emerged, which combines a software defined radio with an intelligent agent, and promises to deliver a new level of functionality. This new resource addresses cognitive radio design from the perspective of interoperability with an emphasis on waveform configuration for increased flexibility and enhanced performance.

Telecommunication Networks for the Smart Grid
Alberto Sendin, Miguel A. Sanchez-Fornie, Inigo Berganza, Javier Simon, and Iker Urrutia

This comprehensive new resource demonstrates how to build smart grids utilizing the latest telecommunications technologies. Readers find practical coverage of PLC and wireless for smart grid and are given concise excerpts of the different technologies, networks, and services around it. Design and planning guidelines are shown through the combination of electricity grid and telecommunications technologies that support the reliability, performance and security requirements needed in smart grid applications. This book covers a wide range of critical topics, including telecommunications for power engineers, power engineering for telecommunications engineers, utility applications projecting in smart grids, technologies for smart grid networks, and telecommunications architecture.

Cognitive Radio: Interoperability Through Waveform Reconfiguration
Leszek Lechowicz and Mieczyslaw M. Kokar

In the span of a century, radio technology advanced from spark transmitters, through analog radios based on vacuum tubes to solid state radios to finally software defined radios where most of the transmit and receive functionalities are implemented as programs running on specialized microprocessors. In recent years, cognitive radio emerged, which combines a software defined radio with an intelligent agent, and promises to deliver a new level of functionality. This new resource addresses cognitive radio design from the perspective of interoperability with an emphasis on waveform configuration for increased flexibility and enhanced performance.
Internet Technologies for Fixed and Mobile Networks

Toni Janevski

The convergence of legacy telecommunications towards the Internet and Internet technologies is an ongoing process, resulting in converged Telecom and Internet worlds. Based on current and developing industry practice, this book focuses on the Internet technologies, in particular, on Internet principles, protocols, and services for fixed and mobile networks, including technologies, regulation, and business aspects. This timely resource provides readers with all-around coverage of standardized Internet technologies, Internet standardization regarding the Telecom sector, as well as the convergence of all services onto the Internet.

394 pp. • 2015 • eBook ISBN: 978-1-60807-922-3 • $104 / £89
Print ISBN: 978-1-60807-921-6 • $139 / £119

SIP: Understanding the Session Initiation Protocol, Fourth Edition

Alan B Johnston

Now in its fourth edition, the ground-breaking Artech House bestseller SIP: Understanding the Session Initiation Protocol offers you the most comprehensive and current understanding of this revolutionary protocol for call signaling and IP Telephony. The fourth edition incorporates changes in SIP from the last five years with new chapters on internet threats and attacks, WebRTC and SIP, and substantial updates throughout. This cutting-edge book shows how SIP provides a highly-scalable and cost-effective way to offer new and exciting telecommunication feature sets, helping practitioners design next generation network and develop new applications and software stacks.

530 pp. • 2015 • eBook ISBN: 978-1-60807-864-6 • $89 / £77
Print ISBN: 978-1-60807-863-9 • $119 / £103
## EASY ORDERING

<table>
<thead>
<tr>
<th>US, CANADA</th>
<th>UK, EUROPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOUTH AMERICA, AUSTRALIA</td>
<td>EMEA, ASIA</td>
</tr>
</tbody>
</table>

### US, CANADA

- **US.ARTECHHOUSE.COM**
- **1-800-225-9977 or 1-781-769-9750, ext. 4030**
- **artech@ArtechHouse.com**
- **ARTECH HOUSE**
  - 685 Canton Street,
  - Norwood, MA 02062 USA

### UK, EUROPE

- **UK.ARTECHHOUSE.COM**
- **+44(0)20 7596-8750**
- **artech-uk@ArtechHouse.com**
- **ARTECH HOUSE**
  - 16 Sussex Street,
  - London, SW1V 4RW, UK

Receive special offers by e-mail—sign up at [WWW.ARTECHHOUSE.COM](http://WWW.ARTECHHOUSE.COM)