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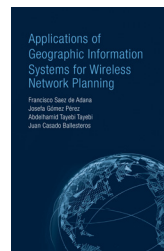
|                                                       |           |
|-------------------------------------------------------|-----------|
| <b>RF &amp; Microwave Design</b>                      | <b>2</b>  |
| <b>Electromagnetics</b>                               | <b>6</b>  |
| <b>Antennas</b>                                       | <b>7</b>  |
| <b>Signal Processing</b>                              | <b>9</b>  |
| <b>GNSS / GPS</b>                                     | <b>9</b>  |
| <b>Satellite Communications</b>                       | <b>10</b> |
| <b>Radar</b>                                          | <b>11</b> |
| <b>Remote Sensing</b>                                 | <b>14</b> |
| <b>Electronic / Information Warfare</b>               | <b>15</b> |
| <b>Communications Engineering</b>                     | <b>19</b> |
| <b>Photonics</b>                                      | <b>21</b> |
| <b>Transportation Technology</b>                      | <b>22</b> |
| <b>Computer Security</b>                              | <b>23</b> |
| <b>Software Engineering / IT / Project Management</b> | <b>24</b> |
| <b>MEMS / Nanotechnology</b>                          | <b>26</b> |
| <b>Semiconductor Devices &amp; Materials</b>          | <b>26</b> |
| <b>Sensors</b>                                        | <b>27</b> |
| <b>Building Technology</b>                            | <b>27</b> |
| <b>Power Engineering</b>                              | <b>28</b> |
| <b>Engineering and Business Essentials</b>            | <b>30</b> |
| <b>Artech eBook Collections</b>                       | <b>32</b> |



Page 22

## Medical Device Cybersecurity for Engineers and Manufacturers

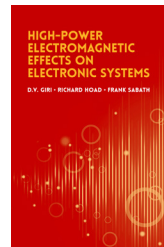
Axel Wirth, Christopher Gates, Jason Smith



Page 7

## Applications of Geospacial Information Systems for Wireless Planning

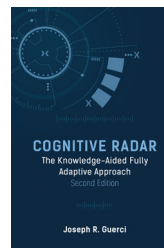
Saez De Adana, Josefa Perez, Abdelhamid Tayebi Tayebi, Juan Casado Ballesteros



Page 6

## High-Power Radio Frequency Effects on Electronic Systems

D.V. Giri, Richard Hoad, Frank Sabath



Page 11

## Cognitive Radar, Second Edition

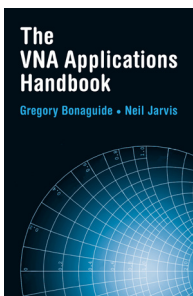
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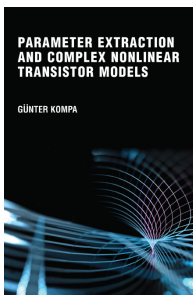
## The VNA Applications Handbook

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.

**Contents:** Architecture of the Modern VNA; Calibration Techniques; Cable, Adapter and Attenuator Measurements; Filter, Transformer, Coupler, Circulator Measurements; Amplifier Measurements; Measurements on Mixers and Frequency Converters; Pulse Measurements; Antenna Measurements; Waveguide and Millimeter-Wave Measurements; Measurements on a Probe Station.

Hardcover • 388 pp. • 2019 • ISBN: 978-1-63081-600-1 • £139



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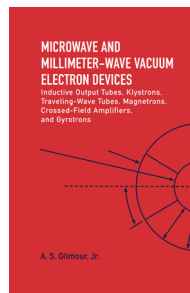
Günter Kompfa

This comprehensive resource presents all aspects concerning the modeling of semiconductor field-effect device parameters based on gallium-arsenide (GaAs) and generative adversarial network (GAN) technology. Metal-semiconductor field-effect transistors (MESFETs), high electron mobility transistors (HEMTs) and heterojunction

bipolar transistors (HBTs), their structures and functions, and existing transistor models are also classified.

**Contents:** Introduction; Transistor Concepts; Classification of Transistor Models; Classical Shockley Model and Enhanced Modifications; Extrinsic Transistor DC Network; Estimation of FET Model Element Values; Transistor Model Complexity; Reliable Estimates of Model Parameters from Low-Frequency; Small-Signal Measurement Techniques; Uncertainties in the Device Modeling Process; Optimization Methods for Model Parameter Extraction; Extraction Methods; All-At-Once Model Parameter Extraction; Decomposition-Based Model Parameter Extraction; Bidirectional Search Method; Pure Analytical Model Parameter Extraction; Analytical Model Parameter Extraction Using Rational Functions; Repetitive Random Optimization with Adaptive Search Space; Frequency Scanning for Bias-Dependence Analysis of Series Resistances; Model Parameter Extraction with Measurement-Correlated Parameter Starting Values; Basics of Nonlinear FET Modeling; Nonlinear Dispersive FET Device Model; Large-Signal Measurement Techniques for Device; Standard FET Models—Capabilities and Limitations; Developed Advanced Large-Signal Device Model Verification; Appendices.

Hardcover • 570 pp. • 2019 • ISBN: 978-1-63081-744-2 • £164



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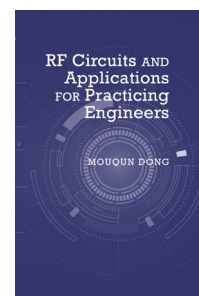
A.S. Gilmour, Jr.

Written by an internationally recognized expert on the subject of microwave tubes, this book presents and describes the many types of MW tubes,

despite competition from solid-state devices (those using GaN, SiC, et cetera), which continue to be used widely and find new applications in defense, communications, medical, industrial drying, and more.

**Contents:** Introduction; Capabilities of Micro and MM wave tubes; Characteristics of Micro and MM waves; The Vacuum Level; Cathodes; Electron Guns; Electron Beams; Beam Modulation; Current Induction and Circuit Response; Klystrons; High Performance Klystrons; Klystrons and Other Gridded Tubes; Helix TWTs; Coupled-Cavity TWTs; Collectors; Nonlinearities, Distortion and Noise; Noise; Magnetrons; Crossed-Field Amplifiers; Gyrotrons; Windows; Appendices.

Hardcover • 950 pp. • 2020 • ISBN: 978-1-63081-728-2 • £164



## RF Circuits and Applications For Practicing Engineers

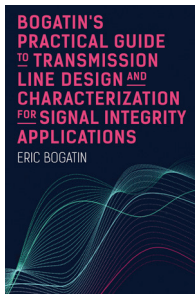
Mouqun Dong

This authoritative resource examines the underpinnings of RF circuits and systems and their design. The book covers the fundamentals of linear and low-noise amplifiers, including the S and noise parameters and their applications in amplifier and matching network designs using the Smith chart. Theories of RF and high-efficiency power amplifiers are also explained. Readers

gain insight into wireless communications systems as well as passive components commonly used in RF circuits and measurements. RF measurement techniques and RF switches are also presented. It explores stability criteria and the invariant property of lossless networks and includes detailed theoretical treatments.

**Contents:** S Parameters; The Smith Chart and Impedance Matching Networks; Circuit Designs Using S Parameters; Noise and Its Characterization in RF Circuit Applications; Low Noise RF Amplifier Design and Constant-Circle Method; High Power RF Amplifiers; High Efficiency RF Power Amplifiers; RF Characterization of Wireless Communication Systems; RF Measurements; Passive Components; RF Switches.

Hardcover • 320 pp. • 2020 • ISBN: 978-1-60807-631-5 • £147



## Bogatin's Practical Guide to Transmission Line Design and Characterization in Signal Integrity Applications

Eric Bogatin

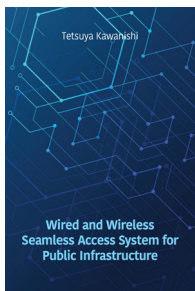
This book establishes a solid foundation of the essential principles of how systems interact with transmission lines, how the physical design of interconnects affects transmission line properties, and how to interpret transmission line design (TDR) measurements to extract important figures of merits and avoid common misinterpretations.

**Contents:** What are transmission lines and why should we care; Single-ended lossless and differential lossy transmission lines; Calculating characteristic impedance; Reflections when the instantaneous impedance changes; The TDR; Practical TDR Measurements; Exploring geometry and impedance: 1st order effects; Second order factors; Dielectric Materials and Dk; Practical design issues; The capacitance and inductance in a transmission line; Input impedance of a transmission line; Simple point to point transmission line circuits; What every scope user needs to know about transmission lines; Terminating transmission line circuits; Appendixes.

eBook only • 420 pp. • 2020 • ISBN: 978-1-63081-692-6 • £73

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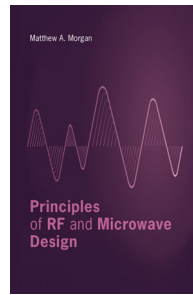
## Wire and Wireless Seamless Access Systems for Public Infrastructure

Tetsuya Kawanishi

This innovative resource presents comprehensive and detailed information on wired and wireless seamless access systems consisting of various types of transmission media including microwave, millimeter-wave, THz wave, and lightwave in fibers. This book explains heterogenous networks consisting of various transmission media with many media converters. Applications of seamless access networks for public infrastructure such as airports, rail-

ways and information and communications systems are described. The book focuses on two important features of seamless access systems, including high-capacity transmission capacity limitation due to economics as well as physics, and low-latency transmission. Latency has significant impact on applications including financial transactions and online gaming. Low-latency data is very important for self-driving cars as well. This book presents the concept of sensor-over-fiber, where many antenna units are connected through optical fibers to gather sensor responses coherently. networks, and dense wavelength division multiplexing.

Hardcover • 330 pp. • 2020 • ISBN: 978-1-63081-740-4 • £138



## Principles of RF and Microwave Design

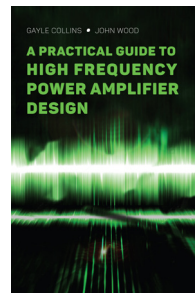
Matthew Morgan

This comprehensive resource provides a thorough introduction to the principles of electronic circuits operating in the radio, microwave, and millimeter-wave frequency ranges. The book highlights the fundamental physical laws of classical electromagnetics using a foundation of Maxwell's equations to give insight into the operating principles of circuit elements of all kinds, from lumped elements to transmission lines, waveguides, optical fibers, and

quasi-optical structures. Standard passive system components like filters, splitters, couplers, hybrids, baluns, and antennas are explained to acclimate the reader to considering multiple technological solutions for common design problems.

**Contents:** Fields and Waves; Lumped Elements; Transmission Lines; Network Parameters; Transformations and Identities; Impedance Matching; Waveguides; Launchers and Transitions; Quasi-Optical Components; Flat-Frequency Components; Frequency-Selective Components; Amplifiers; Frequency Conversion; Appendix.

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## A Practical Guide to High Frequency Power Amplifier Design

Gayle Collins and John Wood

This practical resource introduces power amplifier (PA) design and a valuable reference and guide for practicing PA designers. The book considers the device technology and the interaction of the transistor with the circuit, providing a frequency-based approach to enable narrow-band and wide-band PA designs, accommodating the practical trade-offs between performance and

costs, and including system-level considerations such as linearization and efficiency enhancement techniques.

**Contents:** Introduction and Background; The beginning: Choice of Technology and Device; Device Behavior and Characterization; Transistor Models; Loadpull Characterization for PA Design; Design Tradeoffs; Classes of Power Amplifiers and the Classless Power Amplifier; Power Combined Power Amplifiers; S-parameters; Impedance Matching and Network Synthesis; Performance Assisted Power Amplifiers; Video Bandwidth; Linearization Techniques; Stability; Supporting cast; Thermal and Packaging; Benchmarks and Practical Examples; Thoughts on debugging: what to do if it doesn't work as expected?

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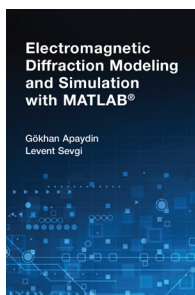
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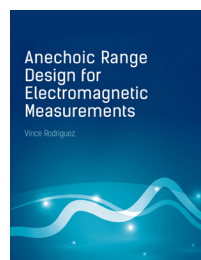
Gokhan Apaydin, Levent Sevgi

This exciting new resource presents a comprehensive introduction to the fundamentals of diffraction of two-dimensional canonical structures, including wedge, strip, and triangular cylinder with different boundary conditions. Maxwell equations are discussed, along with wave equation and scattered, dif-

fracted and fringe fields. Geometric optics, as well as the geometric theory of diffraction are explained. MATLAB scripts included for several well-known electromagnetic diffraction problems.

**Contents:** Introduction; Two-Dimensional Canonical Wedge Problem; Two-Dimensional Canonical Strip Problem; Two-Dimensional Canonical Triangular Cylinder Problem; Diffraction at a Rectangular Plate; Diffraction with Rounded Edges; Double Tip Diffraction Modeling; WedgeGUI Virtual Package; FringeGUI Virtual Package; WedgeTOOL Virtual Package.

**Hardcover • 364 pp. • 2021 • ISBN: 978-1-63081-779-4 • check website for pricing**



## Anechoic Range Design for Electromagnetic Measurements

Vince Rodriguez

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 iden-

tify what type of range is the better choice, based on physical limitations and economics.

**Contents:** Introduction; Basic Electromagnetics; Antenna Measurements; RF Absorber; RF Shielding; Anechoic Ranges for Far Field Measurements; Anechoic Ranges for Near Field Measurements; Anechoic Ranges for Compact Range Measurements; Anechoic Ranges for RCS Measurements; Anechoic Ranges for Aircraft Weather Radar Radome; Anechoic Ranges for EMC Measurements; Specialty Ranges.

**Hardcover • 360 pp. • 2019 • ISBN: 978-1-63081-537-0 • £139**

## Practical Guide to EMC Engineering

Levent Sevgi

**Hardcover • 328 pp. • 2017 • ISBN: 978-1-63081-383-3 • £96**

## New Foundations for Applied Electromagnetics: The Spatial Structure of Fields

Said Mikki and Yahia Antar

**Hardcover • 470 pp. • 2016 • ISBN: 978-1-60807-919-3 • £77**

## Advanced Computational Electromagnetic Methods and Applications

Wenhua Yu, Wenxing Li, Atef Elsherbeni, and Yahya Rahmat-Samii

**Hardcover • 600 pp. • 2015 • ISBN: 978-1-60807-896-7 • £102**

## Advances in FDTD Computational Electrodynamics: Photonics and Nanotechnology

Allen Taflove, Steven G. Johnson, and Ardavan Oskooi, *Editors*

**Hardcover • 623 pp. • 2013 • ISBN: 978-1-60807-170-8 • £133**

## Advanced FDTD Methods: Parallelization, Acceleration, and Engineering Applications

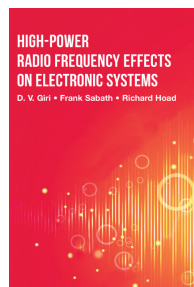
Wenhua Yu, Xiaoling Yang, Yongjun Liu, Raj Mittra, and Akira Muto

**Hardcover • 266 pp. • 2011 • ISBN: 978-1-60807-176-0 • £113**

## Electromagnetic Scattering and Material Characterization

Abbas Omar

**Hardcover • 312 pp. • 2010 • ISBN: 978-1-59693-216-6 • £93**



## High-Power Radio Frequency Effects on Electronic Systems

D.V. Giri, Frank Sabath, and Richard Hood

This is the first book that comprehensively addresses the issues relating to the effects of radio frequency (RF) signals and the environment of electrical and electronic systems. It covers testing methods as well as methods to analyze radio frequency.

This book also covers antennas and antenna calibration, including communication antennas, normalized site attenuation (NSA), loop antennas, and loop antenna calibration (LAC). Time-saving MATLAB® code is

included in this resource to help engineers with their projects in the field.

**Contents:** Introduction; Brief Review of RF Environments of Interest; Examples of RF Effects on Civilian and Military Systems; RF Effects on Electronics; System Level; Subsystem and Component Level Consequences of RF Effects on Electronic Systems; Characterization of RF Effects; RF Effects Mechanisms and Their Relation to Incident RF parameters; RF Effects Testing Methodologies; Methods to analyze RF Effects; Methods to detect RF Environments and EF Effects; Protection concepts and methods.

**Hardcover • 320 pp. • 2020 • ISBN: 978-1-63081-588-2 • £146**

## Intersystem EMC Analysis, Interference and Solutions

Uri Vered

**Hardcover • 254 pp. • 2018 • ISBN: 978-1-63081-561-5 • £155**

## Practical Applications of Asymptotic Techniques in Electromagnetics

Francisco Saez de Adana, Oscar Gutierrez, Iván González, Manuel Felipe Cátedra, and Lorena Lozano

**Hardcover • 230 pp. • 2010 • ISBN: 978-1-60807-063-3 • £133**

## EMI Protection for Communication Systems

Kresimir Malaric

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Yang Hao and Raj Mittra

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## High Frequency Electromagnetic Dosimetry

David A. Sánchez-Hernández, *Editor*

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## Quick Finite Elements for Electromagnetic Waves, Second Edition

Giuseppe Pelosi, Roberto Coccioli, and Stefano Selleri

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## Analytical and Computational Methods in Electromagnetics

Ramesh Garg

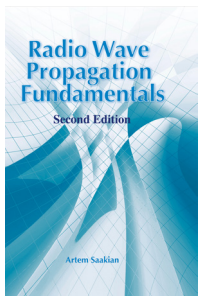
**Hardcover • 552 pp. • 2008 • ISBN: 978-1-59693-385-9 • £171**

## Numerical Analysis for Electromagnetic Integral Equations

Karl F. Warnick and Weng Cho Chew

**Hardcover • 300 pp. • 2008 • ISBN: 978-1-59693-333-0 • £121**

## Electromagnetics, Microwave Circuit, and Antenna



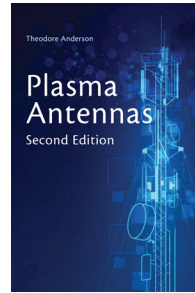
**COMING 2021**  
**Radio Wave Propagation Fundamentals, Second Edition**

Artem Saakian

This completely updated second edition of an Artech House classic provides a thorough introduction to the basic principles of electromagnetic wave propagation of radio frequencies in real-world conditions, fully updated by including new achievements in theory and technology. It serves as an invaluable daily reference for practitioners in the field and as a complete, organized text on the subject. This comprehensive resource covers a wide range of essential topics, from the classification of radio waves, electromagnetwave theory, and antennas for RF radio links, to the impact of the earth surface on the propagation of ground waves, atmospheric affects in radio wave propagation, and radio wave reception.

**Contents:** Introduction; Basics of Electromagnetic Waves Theory; Basics of Antennas for RF Radio Links; Propagation of the Ground Waves; Atmospheric Effects in Radio Waves Propagation; Radio Waves Reception; Appendices; Index.

**Hardcover • 500 pp. • 2021 • ISBN: 978-1-63081-844-9 • £164**



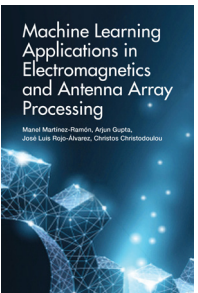
**DECEMBER 2020**  
**Plasma Antennas, Second Edition**

Theodore Anderson

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 is 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 is also presented.

**Contents:** Introduction; Plasma Physics for Plasma Antennas; Fundamental Plasma Antenna Theory; Building a Basic Plasma Antenna; Plasma Antenna Nesting, Stacking Plasma Antenna Arrays, and Reduction of Co-Site Interference; Plasma Antenna Windowing; Smart Plasma Antenna; Plasma Frequency Selective Surfaces; Fundamental Experimental Work; Directional and Electronically Steerable Plasma Antennas by Reconfigurable Multiple Expansions of Plasma Antennas; Satellite Plasma Antenna Concepts; Plasma Antenna Thermal Noise; Steering, Focusing, and Spreading of Antenna Beams using the Physics of Refraction of EM Waves through a Plasma; Pulsing Circuitry for Ionizing Plasma Antennas with Low Power Requirements; New and Improved Smart Plasma Antenna and Applications to Wi-Fi; Applications of Plasma Antennas to MR/PET; Experimental work on Plasma Antenna Noise; New Progress on Ruggedization and Custom Made Plasma Tubes.

**Hardcover • 350 pp. • 2020 • ISBN: 978-1-63081-750-3 • £164**



**COMING 2021**  
**Machine Learning Applications in Electromagnetics and Antenna Array Processing**

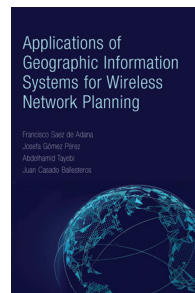
Manel Martínez-Ramón, Arjun Gupta, José Luis Rojo-Álvarez, Christos Christodoulou

This practical resource provides an overview of machine learning (ML) approaches as applied to electromagnetics and antenna array processing. Detailed coverage of the main trends in ML, including uniform and random array processing (beamforming and detection of angle of arrival), antenna optimization, wave propagation, remote sensing, radar, and other aspects of electromagnetic design are explored. An introduction to machine learning principles and the most common machine learning architectures and algorithms used today in electromagnetics and other applications is presented, including basic neural networks, gaussian processes, support vector machines, kernel methods, deep learning, convolutional neural networks, and generative adversarial networks.

processing (beamforming and detection of angle of arrival), antenna optimization, wave propagation, remote sensing, radar, and other aspects of electromagnetic design are explored. An introduction to machine learning principles and the most common machine learning architectures and algorithms used today in electromagnetics and other applications is presented, including basic neural networks, gaussian processes, support vector machines, kernel methods, deep learning, convolutional neural networks, and generative adversarial networks.

**Contents:** Part I: Introduction to Machine Learning: Kernel methods for array processing; Support Vector Machines; Gaussian Processes for signal processing; Neural Networks; Convolutional neural networks; Recursive neural networks for signals; Restricted Boltzmann Machines; Generative Adversarial Networks; Part II: Applications in Electromagnetics and Antenna Array Signal Processing: Antenna Array Signal Processing; Radar and Remote Sensing; Computational Electromagnetics; Reconfigurable Antennas and Cognitive Radio; Design and Optimization of Antennas and RF devices; Wave Propagation and Modelling; Electromagnetics for Medicine and Healthcare.

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**NEW AS OF FALL 2020!**  
**Applications of Geographic Information Systems for Wireless Network Planning**

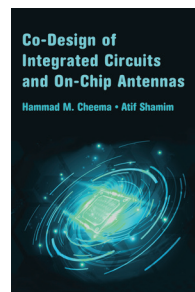
Francisco Saez de Adana, Josefa Gómez Pérez, Abdelhamid Tayebi, Juan Casado Ballesteros

This practical book shows the procedure to integrate, in a practical way, empirical propagation methods with geographical information systems (GIS) to obtain the radio coverage in open environments. It includes the theoretical explanation of empirical methods and GIS but as a basis to develop a real tool

that combines both aspects to provide the user a suitable method for the wireless network planning in urban areas.

**Contents:** Introduction; Empirical propagation methods; Geographical information systems; Description of the application; Applications.

**Hardcover • 200 pp. • 2020 • ISBN: 978-1-63081-763-3 • £119**



**COMING SPRING 2021!**  
**Co-Design of Integrated Circuits and On-Chip Antennas**

Hammad M. Cheema and Atif Shamim

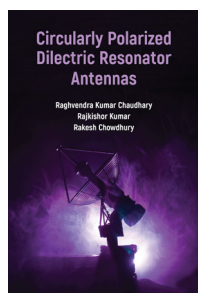
This comprehensive book comprehensively addresses the challenges, benefits and trade-offs of on-chip antenna implementation. It presents practical design and integration considerations of the integrated circuits (IC) and antenna combination and how both ends of the system can be utilized in a complimentary way. The book includes on-chip antenna layout considerations, layout for testability and various

methods of their characterization. It also includes the state-of-the-art on-chip antennas in III-V and Silicon IC technologies and their usage in transmitter and receiver ICs. A look at the future trends and utilization of on-chip antennas for different applications concludes the book.

**Contents:** Introduction; Why On-Chip Antennas?; On-Chip Antenna Implementation Challenges; On-Chip Antenna Implementations: State of the Art; Co-Design of On-Chip Antenna with Transmitter and Receiver Circuits; Future Applications and Design Trends; Conclusions.

**Hardcover • 230 pp. • 2020 • ISBN: 978-1-63081-818-9 • £129**





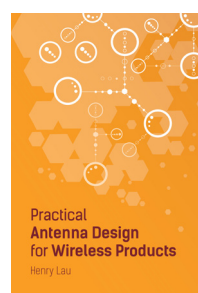
## COMING SPRING 2021 Circularly Polarized Dielectric Resonator Antennas

Raghvendra Kumar Chaudhary, Rajkishor Kumar, Rakesh Chowdhury

This book introduces 5 key feeding techniques such as coaxial probe, microstrip, conformal strip, aperture, and coplanar waveguide and covers different shapes of dielectric resonator antennas leading to improvement in circularly polarized (CP) performance.

**Contents:** Introduction to Short Range Radars; Vital Sensing & Occupancy Sensing; Material Classification; Gesture Sensing; Air Writing/Drawing; Human Activity Classification; People Counting and Tracking; Door and Street Lighting (Pedestrian/Bike/Car classification); Other Applications.

Hardcover • 310 pp. • 2021 • ISBN: 978-1-63081-817-3 • Check website for pricing



## Practical Antenna Design for Advanced 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.

Hardcover • 450 pp. • 2019 • ISBN: 978-1-63081-325-3 • £119

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Anil Pandey

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Warren Stutzman

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V. I. Koshlev, YU. I. Buyanov, and V. P. Belichenko

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Robert J. Mailloux

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Youssef Tawk, Joseph Costantine, and Christos Christodoulou

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Hans G. Schantz

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Kok Yeow You

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Tayeb A. Denidni and Gijo Augustin

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Aldo Petosa

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Bruno Delorme

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Hiroyuki Arai

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Hiroaki Kogure, Yoshie Kogure, and James Rautio

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Artem Saakian

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Charles T. Stelzried, Macgregor S. Reid, and Arthur J. Freiley

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## HANDBOOK OF REFLECTOR ANTENNAS AND FEED SYSTEMS

### Volume I: Theory and Design of Reflectors

Satish K. Sharma, Sudhakar Rao, and Lotfollah Shafai, *Editors*

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### Volume II: Feed Systems

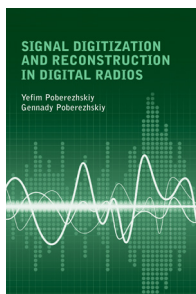
Lotfollah Shafai, Satish K. Sharma, and Sudhakar Rao, *Editors*

Hardcover • 450 pp. • 2013 • ISBN: 978-1-60807-517-1 • £209

### Volume III: Applications of Reflectors

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## 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. You 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.

**Contents:** Signals and Waveforms; Radio Systems; Signal Processing in Communication Systems; Digital Photo Transmitters; Digital Radio Receivers; Sampling Theory Fundamentals; Conventional D&R in Digital Receivers; Alternative Digitization Techniques; Conventional D&R in Digital Receivers; Digital-to-Analog Converters (D/As); Analog-to-Digital Conversion (A/D) in Digital Radios; Methods of Increasing Speed and Resolution of A/Ds; Novel Digitization Circuits (NCDs) in Digital Receivers; Novel Reconstruction Circuits (NRCs) in Digital Transmitters; Selection of Weight Functions for NDCs and NRCs.

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**NEW AS OF FALL 2020!**

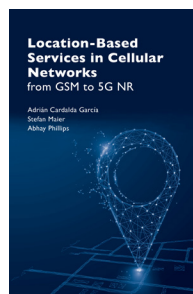
## All Source Positioning, Navigation and Timing

Rongsheng (Ken) Li

This is the first book on the topic of all source positioning, navigation and timing (PNT) which is a topic of research and development funded by both government and the private industry worldwide. This book explores when the most convenient PNT measurement source available today, the GPS system, may be come unavailable, jammed or spoofed.

**Contents:** Introduction; Propagation Based Timing Solutions and Error Models; "Measurement" based PNT Solution Overview; Essence of Kalman Filters.

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**NEW RELEASE**

## Location-Based Service in Cellular Networks: From GSM to 5G NR

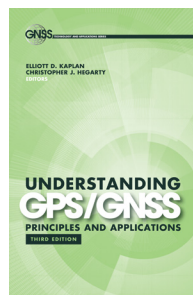
Adrián Cardalda García, Stefan Maier, and Abhay Phillips

The comprehensive guide to positioning technologies in the cellular networks includes an explanation of the positioning fundamentals and a summary of the use cases. The book also focuses on the different positioning technologies used in cellular networks,

divided in satellite positioning, terrestrial radio positioning, non-RF positioning and a brief introduction to sensor fusion and Bayesian theory. Explanation of different signaling parameters will enable the reader to understand better how positioning works in a cellular network.

**Contents:** Introduction to e-Navigation; Maritime Navigation-Current Equipment and Practices; Performance Gaps; E-Navigation Solutions; Standards; The Future.

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## Understanding GPS: Principles and Applications, Third Edition

Elliott Kaplan and Christopher J. Hegarty

This thoroughly updated third edition of an Artech House bestseller brings together a team of leading experts who provide you with a current and comprehensive treatment of the Global Positioning System (GPS). The third edition includes new chapters on the system engineering details of GPS, covers the European Galileo system, Chinese Beidou GPS systems, GLONASS, and explores advanced receiver autonomous integrity

monitoring (ARAIM). The book covers all the latest advances in technology, applications, and systems.

This single-source reference provides both a quick overview of GPS essentials and an in-depth treatment of advanced topics. The book guides you in developing new applications and shows you how to evaluate their performance. It explains all the differential GPS services available to let you decide which is best for your particular application. You learn how to build GPS receivers and integrate them into navigational and communications equipment. Moreover, this unique volume helps you determine how technology is affecting the marketplace and where best to invest your company's resources.

**Contents:** Fundamentals of Satellite Navigation; Global Positioning System; GLONASS; Galileo; BeiDou; Regional Systems; GNSS Receivers; GNSS Disruptions; GNSS Errors; Performance of Stand-Alone GNSS; Differential GNSS and Precise Point Positioning; Integration of GNSS with other Sensors and Network Assistance; GNSS Markets and Applications

**Hardcover • 826 pp. • 2017 • ISBN: 978-1-63081-058-0 • £155**







## NEW FALL 2020! Countermeasures for Aerial Drones

Garik Markarian, Andrew Staniforth

This comprehensive resource explains the development of UAVs, drone threats, counter-UAV systems, and strategies to handle UAVs, focusing on the practical aspects of counter-unmanned aerial vehicle (UAV) systems and technologies. Theory, technical and operational practice with insights from industry and policing are covered, and the full rogue drone threat landscape and counter-drone technologies and systems is explored.

Contents: Part 1: Threat from Unmanned Aerial Vehicles: Game of drones – Assessing the threat and risk of Unmanned Aerial Vehicles; Public nuisance – The reckless use of Unmanned Aerial Vehicles; Political protest – Rogue drone incursions and public disorder; Hostile reconnaissance – The threat from rogue drone surveillance; Payload – Adaption of drones for organized crime; International security – The terrorist threat from Unmanned Aerial Vehicles; Part 2: The Development of Unmanned Aerial Vehicle Technology: Understanding drone technologies; Navigation and flight control; Payloads and sensors; Classification of UAVs; Part 3: Counter-Unmanned Aerial Vehicle Technology and System: The concept of Counter UAV; UAV detection radars; RF detection system; Optical detection system; Counter Measures; Part 4: Strategies to Counter-Unmanned Aerial Vehicles: A strategic approach – Countering rogue drone incursions; The Rule of law – Regulatory frameworks for Unmanned Aerial Vehicles; Counter-drone training – The detection, evaluation, neutralisation and investigation of rogue drone incursions; Part 5: Future Challenges: Innovation – Bringing counter-drone research to operational reality; From threat to threat – Advancements in drone technology; Conclusions; References.

Hardcover • 350 pp. • 2020 • ISBN: 978-1-63081-801-2 • £129



## BESTSELLER-UPDATED EDITION! Basic Radar Analysis, Second Edition

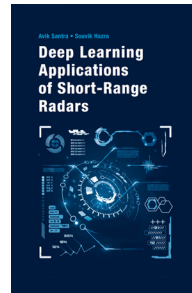
Mervin C. Budge, Jr. and Shawn German

This 2nd edition covers several key radar analysis areas, including the radar range equation, detection theory, ambiguity functions, waveforms, antennas, active arrays, receivers, signal processors, CFAR and chaff analysis. Analog signal processors and digital signal processors of the types used in modern phased array radars are discussed. Fundamentals of radar analysis including the range equation, detection theory, ambiguity functions, antennas, receivers, and signal processors for modern radars are also covered. This book addresses details of the radar range and detection probability equations and the tools radar engineers commonly use to perform signal processor and clutter analyses.

processors for modern radars are also covered. This book addresses details of the radar range and detection probability equations and the tools radar engineers commonly use to perform signal processor and clutter analyses.

**Contents:** Radar Basics; Radar Range Equation; Radar Cross Section; Noise; Radar Losses; Detection Theory; Matched Filter; Detection Probability Improvement Techniques; Ambiguity Function; Waveform Coding; Stretch Processing; Phased Array Antenna Basics; Clutter Model; Signal Model; Pulse Signal Processor; Moving Target Indicator (MTI); Moving Target Detector (MTD); Pulsed Doppler Processors; Chaff Analysis; Radar Receiver Basics; Introduction to Synthetic Aperture Radar Signal Processing; Introduction to Space-Time Adaptive Processing; Sidelobe Cancellation; Appendixes.

Hardcover • 950 pp. • 2020 • ISBN: 978-1-63081-555-4 • £155



## RECENT RELEASE Deep Learning Applications of Short Range Radars

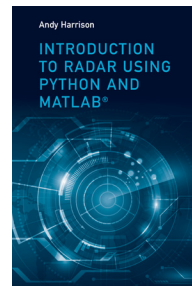
Avik Santra, Souvik Hazra

This exciting resource covers various emerging applications of short range radars, including people counting and tracking, gesture sensing, human activity recognition, air-drawing, material classification, object classification, vital sensing by extracting features such as range-Doppler Images (RDI), range-cross range images, Doppler Spectrogram or directly feeding raw ADC data to the classifiers. The book also presents

how deep learning architectures are replacing conventional radar signal processing pipelines enabling new applications and results. It describes how deep convolutional neural networks (DCNN), long-short term memory (LSTM), feedforward networks, regularization, optimization algorithms, connectionist This exciting new resource presents emerging applications of artificial intelligence and deep learning in short-range radar.

**Contents:** Introduction to Short Range Radars; Vital Sensing & Occupancy Sensing; Material Classification; Gesture Sensing; Air Writing/Drawing; Human Activity Classification; People Counting and Tracking; Dooring & Street Lighting (Pedestrian/Bike/Car classification); Other Applications.

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## BEST SELLER! Introduction to Radar Using Python and MATLAB®

Lee Andrew Harrison

This comprehensive resource provides readers with the tools necessary to perform analysis of various waveforms for use in radar systems. It provides information about how to produce synthetic aperture (SAR) images by giving a tomographic formulation and implementation for SAR imaging. Tracking filter fundamentals, and each parameter associated with the filter

and how each affects tracking performance are also presented. Various radar cross section measurement techniques are covered, along with waveform selection analysis through the study of the ambiguity function for each particular waveform from simple linear frequency modulation (LFM) waveforms to more complicated coded waveforms.

The text includes the Python tool suite, which allows the reader to analyze and predict radar performance for various scenarios and applications. Also provided are MATLAB® scripts corresponding to the Python tools. The software includes a user-friendly graphical user interface (GUI) that provides visualizations of the concepts being covered. Users have full access to both the Python and MATLAB® source code to modify for their application. With examples using the tool suite are given at the end of each chapter, this text gives readers a clear understanding of how important target scattering is in areas of target detection, target tracking, pulse integration, and target discrimination.

**Contents:** Introduction; Electromagnetic Fields and Waves; Antenna Systems; The Radar Range Equation; Radar Receivers; Target Detection; Radar Cross Section; Pulse Compression; Target Tracking; Tomographic Synthetic Aperture Radar; Countermeasures.

Hardcover • 496 pp. • 2019 • ISBN: 978-1-63081-597-4 • £139



## RECENT RELEASE

**Cognitive Radar: The Knowledge-Aided Fully Adaptive Approach, Second Edition**

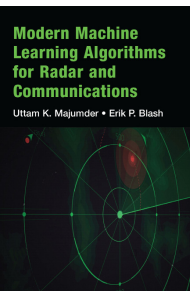
Joseph Guerci

This highly-anticipated second edition of the bestselling *Cognitive Radar: The Knowledge-Aided Fully Adaptive Approach*, the first book on the subject, provides up-to-the-minute advances in the field of cognitive radar (CR). Adaptive waveform methods are discussed in detail, along with optimum resource allocation and radar scheduling. Chronicling the

field of cognitive radar (CR), this cutting-edge resource provides an accessible introduction to the theory and applications of CR, and presents a comprehensive overview of the latest developments in this emerging area. It covers important breakthroughs in advanced radar systems, and offers new and powerful methods for combating difficult clutter environments. You find details on specific algorithmic and real-time high-performance embedded computing (HPEC) architectures. This practical book is supported with numerous examples that clarify key topics, and includes more than 370 equations.

**Introduction; Optimum Multi-Input Multioutput (MIMO) Radar; Adaptive Multi-Input Multioutput (MIMO) Radar; Introduction to Knowledge-Aided (KA) Adaptive Radar; Putting It All Together; Optimum Radar Resource Allocation and Scheduling; Areas for Future Research.**

**Hardcover • 320 pp. • 2020 • ISBN: 978-1-60807-773-2 • £104**

**Modern Machine Learning Algorithms for Radar and Communications**

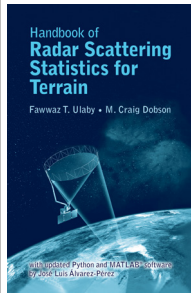
Uttam K. Majumder and Erik P. Blasch

This exciting resource identifies technical challenges, benefits, and directions of Deep Learning (DL) based object classification using radar data (i.e., Synthetic Aperture Radar / SAR and High range resolution Radar / HRR data). An overview of machine learning (ML) theory to include a history, background primer, and example and performance of ML algorithm (i.e., DL method) on video imagery is provided. Radar data with issues of collection, application, and examples for SAR/HRR data and communication signals analysis is also discussed. Practical considerations of deploying such techniques, including performance evaluation, hardware issues, and the future unresolved issues are presented.

communication signals analysis is also discussed. Practical considerations of deploying such techniques, including performance evaluation, hardware issues, and the future unresolved issues are presented.

**Contents:** Introduction; Mathematical foundations for ML; A Review of various ML algorithms; Radio Frequency Data as Big Data; ML Algorithms on RF Data; ML algorithms Implementation for Radar Image Classification; ML algorithms Implementation for communication signal classification; Computational advancements for ML algorithms: Neuromorphic processor, Memristor, GPUs, FPGA; Emerging Research Topics.

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**Handbook of Radar Scattering Statistics for Terrain**

Software update by José Álvarez-Pérez

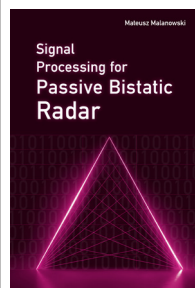
Fawwaz T. Ulaby and M. Craig Dobson

The classic reference for radar and remote sensing engineers, *Handbook of Radar for Scattering Statistics for Terrain*, has been reissued with updated, practical software for modern data analysis applications. First published in 1989, this update features a new preface, along with three new appendices that explain how to use the new software and graphical user interface.

Python- and MATLAB®-based software has been utilized so remote sensing and radar engineers can utilize the wealth of statistical data that came with the original book and software. This update combines the book and software, previously sold separately, into a single new product.

**Contents:** Theory of Radar Scattering Statistics; Distribution Functions of the Backscattering Coefficient; Appendices: Each appendix gives you the following: L-Band Data; S-Band Data; C-Band Data; X-Band Data; Ku-Band Data; Ka-Band Data; W-Band Data. Appendix A: Backscatter Data for Soil and Rock Surfaces. Appendix B: Backscattering Data for Trees. Appendix C: Backscattering Data for Grasses. Appendix D: Backscattering Data for Shrubs. Appendix E: Backscattering Data for Short Vegetation. Appendix F: Backscattering Data for Road Surfaces. Appendix G: Backscattering Data for Urban Areas. Appendix H: Backscattering Data for Dry Snow. Appendix I: Backscattering Data for Wet Snow. References. Index.

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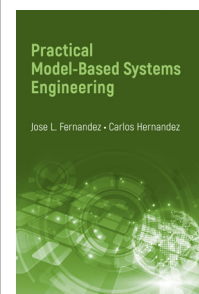
**Signal Processing for Bistatic Radar**

Mateusz Malanowski

This cutting-edge resource introduces the basic concepts of passive bistatic radar, such as bistatic geometry, bistatic radar equation and analysis of different illuminating signals. These techniques, although known for almost a century, have not been developed intensively for decades, mainly due to technical limitations, but today, the passive radar concept can be realized in practice, and is of great interest for military and civilian users. This book provides insight into understanding the potential

and limitations of passive radar systems, as well as the differences between signal processing in active and passive radar.

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Jose L. Fernandez and Carlos Hernandez

This comprehensive resource provides systems engineers and practitioners with the analytic, design and modeling tools of the Model-Based Systems Engineering (MBSE) methodology of Integrated Systems Engineering (ISE) and Pipelines of Processes in Object Oriented Architectures (PPOOA) methodology.

**Contents:** Introduction; Systems Engineering; Model-Based Systems Engineering; The ISE & PPOOA process; Functional Architecture; Heuristics to apply in the engineering of systems; Physical Architecture; Example of Application; Unmanned Aerial Vehicle- Electric Subsystem; Example of Application: Collaborative robot; Example of Application: Energy Efficiency for the Steam Generation Process of a Coal Power Plant; To Conclude; Appendix A: SysML Notation; Appendix B: Requirements Framework.

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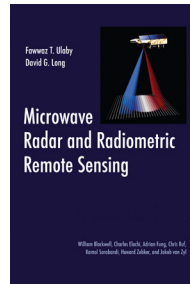
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includes interactive modules based on theoretical and empirical models.

**Contents:** Introduction; Electromagnetic Wave Propagation; Remote-Sensing Antennas; Microwave Dielectric Properties of Natural Earth Materials; Radar Scattering; Microwave Radiometry and Radiative Transfer; Microwave Radiometric Systems; Microwave Interaction with Atmospheric Constituents; Radiometric Sounding of the Atmosphere; Surface-Scattering Models and Land Observations; Volume-Scattering Models and Land Observations; Emission Models and Land Observations; Radar Measurements and Scatterometers; Real- and Synthetic-Aperture Side-Looking Airborne Radar; Interferometric SAR; Radar Remote Sensing of the Ocean; Spaceborne Altimetry; Radiometric Remote Sensing of the Ocean.

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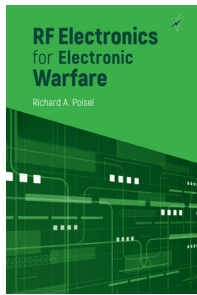
Samuel Blackman and Robert Popoli

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Gabriel Thomas, Jae Sok Son, and Benjamin Flores

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## RF Electronics for Electronic Warfare

Richard A. Poisel

This exciting new resource investigates the function of RF communication in electronic warfare systems. The book provides in-depth coverage of how RF signals must be constructed to perform jamming missions, which prevent a receiver from properly extracting a target signal. Technical descriptions of oscillators and modulators, which generate the RF signals, are presented and explored.

Power supplies that generate adequate power for fueling high power amplifiers are also described and their operations investigated. Oscillator basics, including principles of oscillator operation, phase locked loop synthesizers and direct digital synthesis are examined. Fundamentals of RF communications, including power supplies for RF power amplifiers, are included, making it useful for both novice and advanced practitioners. Written by a prominent expert in the field, this authoritative book is the first available that combines the topics of electronic warfare and oscillator design and analysis.

**Contents:** Introduction; Modulation and Modulators; EW Exciters; Introduction to RF Amplifiers; Semiconductor Technologies; BJT Amplifiers; MOSFET Amplifiers; Biasing Active Devices; RF Power Amplifiers; Amplifier Stability; Power Amplifier Linearity; Thermal Management of RF Power Amplifiers; Power Supplies for RF Power Amplifiers.

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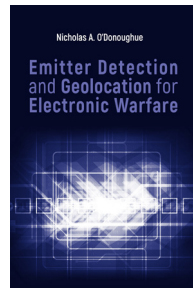
Isaac R. Porche, III

Conflict in cyberspace is becoming more prevalent in all public and private sectors and is of concern on many levels. As a result, knowledge of the topic is becoming essential across most disciplines.

This book reviews and explains the technologies that underlie offensive and defensive cyber operations, which are practiced by a range of cyber actors including state actors, criminal enterprises, activists, and individuals. It explains the processes and technologies

that enable the full spectrum of cyber operations. Readers will learn how to use basic tools for cyber security and pen-testing, and also be able to quantitatively assess cyber risk to systems and environments and discern and categorize malicious activity. The book provides key concepts of information age conflict technical basics/fundamentals needed to understand more specific remedies and activities associated with all aspects of cyber operations. It explains techniques associated with offensive cyber operations, with careful distinctions made between cyber ISR, cyber exploitation, and cyber attack. It explores defensive cyber operations and includes case studies that provide practical information, making this book useful for both novice and advanced information warfare practitioners.

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## Emitter Detection and Geolocation for Electronic Warfare

Nicholas A. O'Donoghue

This comprehensive resource provides theoretical formulation for detecting and geolocating non-cooperative emitters. Implementation of geolocation algorithms are discussed, as well as performance prediction of a hypothetical passive location system for systems analysis or vulnerability calculation. Comparison of novel direction finding and geolocation algorithms to classical forms are also included. Rooted in statistical signal processing and array processing theory, this book also provides an overview of the application of novel detection and estimation algorithms to real world problems in EW.

The book is divided into three parts: detection, angle of arrival estimation, and geolocation. Each section begins with an introductory chapter covering the relevant signal processing theory (either detection or estimation), then provides a series of chapters covering specific methods to achieve the desired end-product. MATLAB® code is provided to assist readers with relevant probability and statistics, RF propagation, atmospheric absorption, and noise, giving readers an understanding of the implementation of the algorithms in the book, as well as developing new approaches to solving problems. Packed with problem sets and examples, this book strikes a balance between introductory texts and reference manuals, making it useful for novice as well as advanced practitioners.

**Contents:** Introduction; Part I: Detection of Threat Emitters; Detection Theory; Detection of CW Signals; Detection of Pulsed Signals; Detection of Spread Spectrum Signals; Scanning Receivers; Part II: Geolocation of Threat Emitters from a Single Sensor; Estimation Theory & Cramer-Rao Lower Bound; Array-Based Angle of Arrival Techniques; Vector-Sensor-Based Angle of Arrival Techniques; Monopulse-Based Angle of Arrival Techniques; Part III: Geolocation of Threat Emitters from Multiple Sensors; Trilateration of AOA Measurements; Time-Difference of Arrival; Frequency-Difference of Arrival; Hybrid Methods; Appendices.

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## Sensor Management in ISR

Kenneth J. Hintz

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**Contents:** Sensor management; Historical basis for sensor management; Sensor Management Macro Problems; Sensor management micro problems; Sensor management approaches (academic theories); Global Hawk: a case study (practical implementation of one current system); Human interaction with a sensor management system (human interaction w/ sensor system); Information theoretic approach to sensor management (IBSM); IBSM Optimization criterion: expected information value rate (EIVR); IBSM implementation approaches; Human-Machine Teaming for SM; SM Performance Monitoring; Future Technologies and Implications; Summary.

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Tim D. Cole

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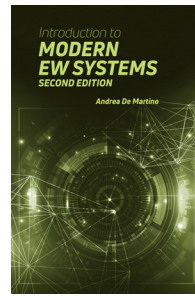
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Marko Suojanen

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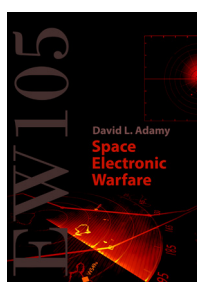
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### EW 105: Space Electronic Warfare

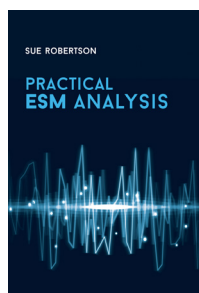
The fifth book in the bestselling Artech House EW 100 series explores electronic warfare (EW) in space. Practical problems – including intercept and jamming of hostile signals transmitted from the Earth's surface and the vulnerability of satellite links to attack from the Earth's surface are discussed. Spherical trigonometry is covered to provide the background necessary to understand the scope of satellite problems.

Orbit mechanics, specifically the way the Earth and its satellites revolve around one another, is also explained. The basics of radio propagation and how it applies to communications Electronic Warfare are demonstrated, as well as the special considerations that apply to radio transmission to and from an Earth satellite. Satellite links and link vulnerability are discussed.

**Contents:** Introduction; Spherical Trigonometry; Orbit Mechanics; Radio Propagation; Radio Propagation in Space Satellite Links; Duration of Observations; Intercept of Ground Targets from Space; Jamming of Ground Targets from Space.

**Hardcover • 230 pp. • 2020 • ISBN: 978-1-63081-834-0 • £112**





## Practical ESM Analysis

Sue Robertson

The book explains phenomena seen in ESM systems with examples of how to recognize issues in the ESM data and solutions. Techniques for visualizing ESM data and how to set up ESM trials are given. The identification of radars by ESM systems is considered with ideas presented on how to generate an effective radar library.

**Contents:** Introduction; Radar Parameters and how they affect ESM Systems; The RF Environment; Types of ESM; Amplitude Comparison ESM;

Time Difference of Arrival ESM; Phase Comparison ESM; De-interleavers and ESM Processing; Location Estimation; ESM Performance Analysis; ESM Trials; Multi-tracking; Reflections and Multipath; Factors affecting multipath; The Extent of the Multipath Problem and Possible Solutions; Radar Identification and ESM Libraries; ESM Library Construction; Advanced Topics.

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## Introduction to OFDM Receiver Design and Simulation

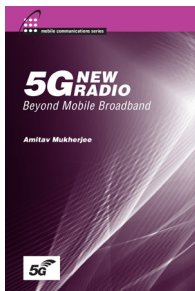
Y. J. Liu

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. Wi-Fi digital communications are based on several IEEE 802.11 standards. Extensive simulation studies are included using the transmission

waveform given by the IEEE 802.11a standard.

**Contents:** Discrete Time Signals and Discrete Fourier Transform; Single Carrier Modulation; Multi-Carrier Modulation; OFDM Transmission; Shift-Register Sequence and Data Scrambler; Radio Wave Propagation Model; Error Correcting Codes and Interleaver; OFDM Signal Detection Synchronization; Channel Estimation and Tracking; Data Decoding; Simulation Study of a Multipath Channel on OFDM.

**Hardcover • 260 pp. • 2019 • ISBN: 978-1-63081-738-1 • £138**



## 5G New Radio: Beyond Mobile Broadband

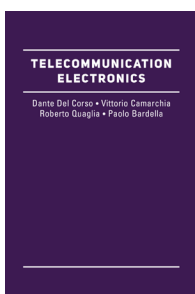
Amitav Mukherjee

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.

design decisions made during the NR standardization process are explored.

**Contents:** The Road to 5G New Radio; NR Radio Access Network; Network Architecture; Disaggregated 5G RAN; NR in Unlicensed Spectrum; Vehicle-to-Anything (V2X); Fixed Wireless Access; Industrial Internet of Things; NR User Equipment Positioning; Mobile Backhaul; Ultra-Reliable Low Latency Communications; Multi-access Edge Computing; Non-Terrestrial Networks; Power Saving and Interference Management; The Road Ahead for 5G Systems and Beyond.

**Hardcover • 320 pp. • 2019 • ISBN: 978-1-63081-640-7 • £119**



## Telecommunication Electronics

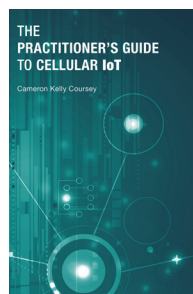
Dante Del Corso, Vittorio Camarchia, and Roberto Quaglia

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.

from functional level viewpoint to the circuit details and examples.

**Contents:** Radio systems; Amplifiers; Mixers and special functions; Phase Lock Loops; Analog/Digital converters.

**Hardcover • 260 pp. • 2019 • ISBN: 978-1-63081-736-7 • £155**



## RECENT RELEASE

### The Practitioner's Guide to Cellular IoT

Cameron Coursey

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.

**Contents:** Introduction; Section 1: Fundamentals of Cellular IoT: What is the Internet of Things and Why Should You Care?; Connectivity: IoT's Life Blood; Data, Small and Big; Security and Privacy; AI, Blockchain, and Other Buzzwords; Section 2: Cellular IoT Differentiators: SIMs and Remote SIM Provisioning; Controlling IoT Devices; Low Power Wide Area; Going Global; 5G and Edge Computing; Building IoT Applications; IoT for Developers; The IoT Industry; Section 3 – Applying Cellular IoT: Industrial IoT; Consumer IoT; Intelligent Transportation; Drones and Robots; Wearables for All Occasions; IoT for Good

**Hardcover • 350 pp. • 2020 • ISBN: 978-1-63081-595-7 • £119**



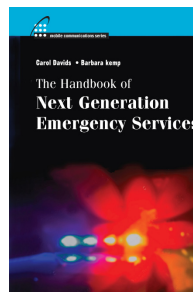
## Implementing Full Duplex for 5G

David Cruickshank

This book examines the current state of the art in developing full duplex (FD) systems in 5G LTE cellular communications. The book also considers what can be achieved with ferrite-based circulators in terms of size reduction and performance enhancement, especially at millimetric frequencies.

**Contents:** Full Duplexing; Self Interference; SI reduction-Solutions from Academic Groups; Non-Reciprocal Magnetism Physics; Practical Spatio-Temporal circulation approaches; Limitations of Semiconductor based Circulators; Current Ferrite Circulator Technology; Unbiased Ferrite Devices; Newer Transmission Line Technologies; New Materials and Packaging; Comparison of Ferrite and Semiconductor based Circulators for Full Duplex; Future Full Duplex 5G Applications.

**Hardcover • 300 pp. • 2020 • ISBN: 978-1-63081-695-7 • £138**



## COMING 2021

### The Handbook of Next Generation Emergency Services

Barbara Kemp and Bart Lovett

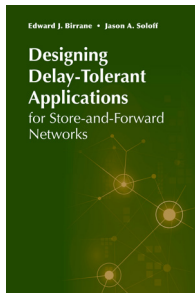
This book presents Next Generation Emergency Services, to help implementers, regulators, legal and technical professionals to understand how the introduction of this new approach to delivering emergency services will impact their work. Beginning with an overview of the field and explaining what will 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.

**Contents:** Next Generation Emergency Services; Anatomy of NG9-1-1 Implementation; Infrastructure; Neighboring Jurisdictions; Access Carriers – Originating Service Providers; Large Customers; Test Plans – Key Components and Samples; Cutover; Ongoing Operations; Emerging Solutions; Legal and Regulatory/Financial; International Market for Next Generation Emergency Services.

**Hardcover • 270 pp. • 2021 • ISBN: 978-1-63081-652-0 • Check website for pricing**





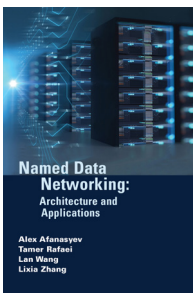
## Delay Tolerant Applications

Ed Birrane and Jason A. Soloff

This exciting book explores motivation, characteristics, and examples 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.

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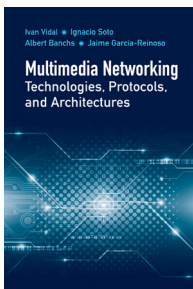
## Named Data Networking: Architecture and Applications

Alex Afanasyev, Tamer Refaei, Lan Wang, and Lixia Zhang

The Named Data Networks (NDN) community has grown to hundreds of researchers and engineers from at least forty countries and has influential networking and computing vendors behind it who are slowly adopting some of the NDN components into their equipment. This book describes the design of NDN and how it compares to today's TCP/IP-based

legacy networks. It identifies where NDN can be applied today and where it will be considered in the future. The reader will be able to have 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. This book will offer significant value to network engineers and technical professionals who will build the fundamental components and applications of Named Data Networks.

Hardcover • 210 pp. • 2021 • ISBN: 978-1-63081-646-9 • Check website for pricing



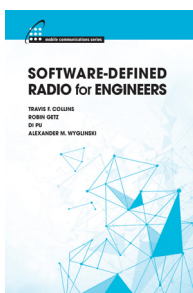
## Multimedia Networking Technologies, Protocols and Architectures

Ivan Vidal, Ignacio Soto, Albert Banchs, and Jaime Garcia-Reinoso

This practical resource provides you 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.

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## Software-Defined Radio for Engineers

Travis F. Collins, Robin Getz, Di Pu, and Alexander M. Wyglinski

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

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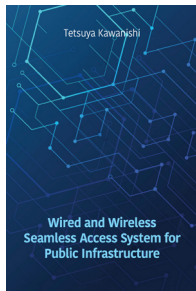
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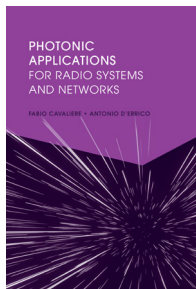
## RECENT RELEASE

### Wired and Wireless Seamless Access Systems for Public Infrastructure

Tetsuya Kawahishi  
This innovative resource presents comprehensive and detailed information on wired and wireless seamless access systems consisting of various types of transmission media including microwave, millimeter-wave, THz wave, and lightwave in fibers. This book explains heterogeneous networks consisting of various transmission media with many media converters. Applications of seamless access

networks for public infrastructure such as airports, railways and information and communications systems are described.

**Contents:** Introduction; Role of radio and optical technologies in public infrastructure; Basics on transmission media; Concept of seamless access systems; High-capacity transmission system; Low latency data transfer; Concept of sensor-over-fiber; Application to transport infrastructure; Application to mobile networks; Requirement for opto-electric devices; Measurement technologies for seamless access systems.

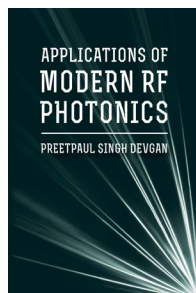


### Photonics Applications for Radio Systems Networks

Fabio Cavaliere

This hands-on, practical book 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.

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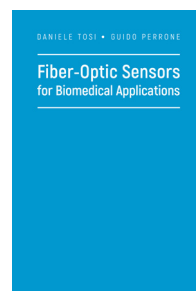


### Applications of Modern RF Photonics

Preetpaul Singh Devgan

This unique resource presents applications of modern RF photonic systems that use RF photonic components for commonly used signal processing systems. This book provides you with 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.

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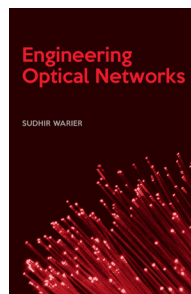


### Fiber-Optic Sensors for Biomedical Applications

Daniele Tosi and Guido Perrone

This authoritative resource presents you with fiber optic sensors and their applications in biomedical engineering. This book provides you with insight into the core areas of photonics, medical device engineering, and biomedical engineering. You will learn which technology to use and adopt, and how to connect technologies with applications. This book explores how to innovate diagnostics and how to use diagnostic tools.

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### Engineering Optical Networks

Sudhir Warier

This resource examines backbone 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.

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Milorad Cvijetic

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Alan J. Rogers

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## RECENT RELEASE Blockchain for Cyberphysical Systems

Ali Dorri, Salil Kanhere, Raja Jurak

This exciting book will explore how Blockchain (BC) technology has the potential to overcome challenges in the current cyber-physical system (CPS) environment. BC is a timestamp ledger of blocks that is used for storing and sharing data in a distributed manner. BC has attracted attention from practitioners and academics in different disciplines, including law, finance, and computer

science, due to its use of distributed structure, immutability and security and privacy. However, applying blockchain in a cyber-physical system (CPS) is not straightforward and involves challenges, including lack of scalability, resource consumption, and delay.

**Contents:** Introduction to Cyberphysical Systems (CPS); State-of-the-art distributed solutions for CPS security and transparency; Blockchain for CPS; Lightweight scalable blockchain (LSB); Memory optimized blockchain (MOF-BC); Managing data trust in blockchain; User anonymity in blockchain; Blockchains applications in Smart Grids; Blockchain applications in smart vehicles; Blockchain applications in Supply Chain; Blockchain applications in IoT Data Marketplaces; Concluding Remarks and Future Directions.

Hardcover • 312 pp. • 2017 • ISBN: 978-1-63081-321-5 • £120



## Big Data Analytics for Connected Vehicles and Smart Cities

Bob McQueen

This practical book presents you with the application of "big data" analytics to connected vehicles, smart cities, and transportation systems. This book enables you to understand how data analytics can and will expand the design and engineering of connected vehicles and smart

cities.

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Umit Ozguner, Tankut Acarman, and Keith Redmill,

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ly avoid common cybersecurity vulnerabilities introduced during development and production. Grow your awareness of cybersecurity development topics ranging from high-level concepts to practical solutions and tools. Get insight into emerging regulatory and customer expectations. Uncover how to minimize schedule impacts and accelerate time-to-market while still accomplishing the main goal: reducing patient and business exposure to cybersecurity risks.

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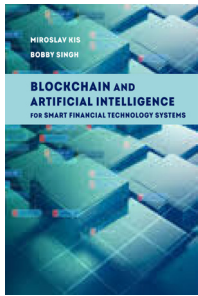
It describes each of the Open Web Application Security Project (OWASP) top ten vulnerabilities, including broken authentication, cross-site

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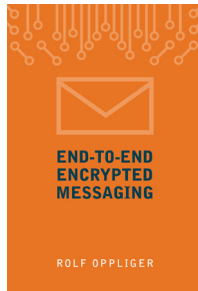
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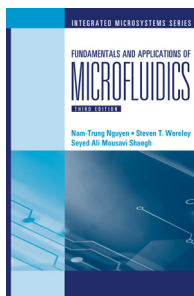
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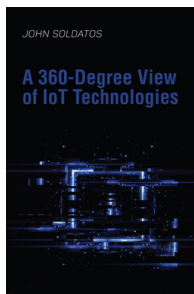


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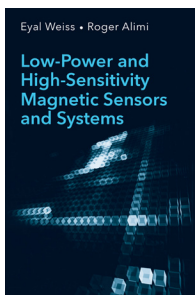
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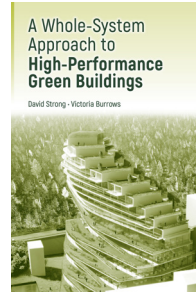
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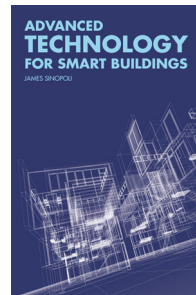
**Applications of Energy Harvesting Technologies in Buildings**

Joseph W. Matiko and Stephen P. Beeby

This timely resource explores the available energy sources within commercial and residential buildings and the available technologies for energy harvesting. Energy harvesting within built environments is presented using strong research and commercial examples. This book includes clear and concise case studies on solar cell powered sensor nodes for emotion monitoring systems in ambient assistive

living environments and inductive/RF power transfers. Thermoelectric energy harvesting and power management circuit design, airflow and vibration energy harvesting is also explored.

**Hardcover • 230 pp. • 2017 • ISBN: 978-1-60807-981-0 • £77**



**Advanced Technology for Smart Buildings**

James Sinopoli

Authored by a recognized expert in the field, this timely resource introduces technologies that can be used for advanced smart buildings, including renewable power, communications, indoor positioning, security management, and control systems. This book speaks to the innovation of advanced technology, particularly information technology within the building industry today and explores the potential benefits and issues

with advanced technology and its applications and presents practical real-world case studies.

**Hardcover • 222 pp. • 2016 • ISBN: 978-1-60807-865-3 • £138**

**Implementing Successful Building Information Modeling**

Erika Epstein

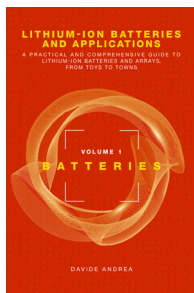
**Hardcover • 282 pp. • 2012 • ISBN: 978-1-60807-139-5 • £112**

**Embedded Commissioning of Building Systems**

Omer Akin

**Hardcover • 300 pp. • 2011 • ISBN: 978-1-60807-147-0 • £112**





## RECENT RELEASE Lithium-Ion Batteries and Applications, A Practical and Comprehensive guide to Lithium-Ion Batteries and Arrays from Toys to Towns, Volume 1, Batteries

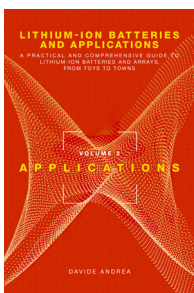
Davide Andrea

Volume One focuses on the Li-ion cell and its types, formats, and chemistries. Cell arrangements and issues, including series (balance) and parallel (fusing, inrush current) are also discussed. Li-ion Battery

Management Systems are explored, focusing on types and topologies, functions, and selection.

**Contents:** Fundamental concepts; Li-ion cell; Cell arrangement; Li-ion BMS; Battery design; Modules & arrays; Assembly; Dysfunctions; Appendix.

**Hardcover • 550 pp. • 2020 • ISBN: 978-1-63081-767-1 • £138**



## RECENT RELEASE Lithium-Ion Batteries and Applications, A Practical and Comprehensive guide to Lithium-Ion Batteries and Arrays from Toys to Towns, Volume 2, Applications

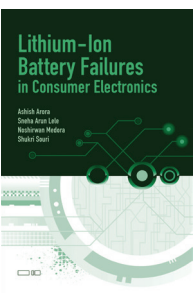
Davide Andrea

Volume Two focuses on small batteries in consumer products and power banks, as well as large low voltage batteries in stationary or mobile house power,

telecom, residential, marine and microgrid. Traction batteries, including passenger, industrial, race vehicles, public transit, marine, submarine and aircraft are also discussed.

**Contents:** Small batteries; Large low voltage batteries; Traction batteries; High voltage stationary batteries; Accidents; Appendix.

**Hardcover • 396 pp. • 2020 • ISBN: 978-1-63081-769-5 • £138**



## Lithium Ion Battery Failures in Consumer Electronics

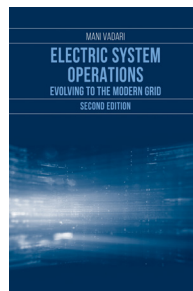
Ashish Arora, Sneha Arun Lele, Noshirwan Medora, and Shukri Sour

This comprehensive resource caters to system designers that are looking to incorporate lithium ion (Li-ion) batteries in their applications. Detailed discussion of the various system considerations that must be addressed at the design stage to reduce the risk of failures in the field is presented.

**Contents:** Li-ion Cells: Types and Constructions; Commonly used Terminology;

Li-ion Energy Storage System Design; AC Adapters and their Requirements; Li-ion Battery Charger Requirements and Designs; Battery Protection Circuit Considerations; Industry and Abuse Standards; Physical Construction of Battery Packs; Field Failures and Investigation Tools; Fire Investigations; System Checklists.

**Hardcover • 238 pp. • 2019 • ISBN: 978-1-63081-603-2 • £121**



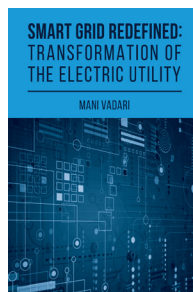
## Electric Systems Operations: Evolution to the Modern Grid, Second Edition

Subramanian Vadari

This completely updated second edition includes case studies and focus on the business of system operations. The broad range of actions under system operations – all the way from transmission to distribution is also explained.

**Contents:** Introduction; Define System Operations; Introduction to Power Systems; Impact of Deregulation on System Operations; Business of System Operations; Control Center – the Hub of System Operations; Energy Management Systems; Outage Management Systems; Distribution Management Systems; Distributed Energy Management System; System Operator Training Simulators; Conclusions.

**Hardcover • 300 pp. • 2020 • ISBN: 978-1-63081-688-9 • £119**



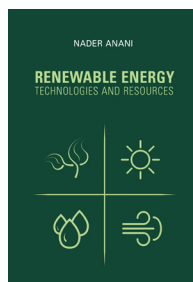
## Smart Grid Redefined: Transformation of the Electric Utility

Subramanian Vadari

Written by a leading expert in the utility field, this practical resource guides you in the evolution of the Smart Grid and offers insight into distribution automation, storage, and microgrid. This book highlights the journey to electric utility 3.0 and provides solid examples and includes real-world case studies.

**Contents:** Introduction; Smart Grid Redefined; Distribution Automation-Path to a Self-Healing Grid; Energy Storage-Electric Value Chain Disruptor; Distributed Energy Resources-Challenge of Integrating Supply/Demand Diversity; Microgrids-Fragmentation of the Grid; Data Analytics-Bringing Intelligence to the Grid; Electric Transportation-First Mover to a Mobile Carbon-Free Future; Smart Homes and building-The Final Frontier; Electric Utility Transformation; Transformed Utility-Springboard to a Smart City.

**Hardcover • 370 pp. • 2018 • ISBN: 978-1-63081-476-2 • £138**



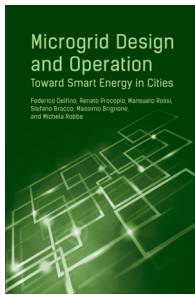
## Renewable Energy Technology and Resources

Nader Anani

This exciting new book presents an excellent coverage of renewable energy technologies and resources. The book focuses on photovoltaics, hydro, tidal, wind, and biomass systems.

**Contents:** Introduction: Basic Concepts; Photovoltaics Part I: Background Material; Photovoltaics Part II: Characteristics and Circuit Modeling of PV Cells; Photovoltaics Part III: PV Arrays Operation and Characteristics; Photovoltaics Part IV: PV Generating Systems; Hydro Energy; Tidal Energy; Wind Energy; BioEnergy; Costing a Renewable Energy Project.

**Hardcover • 172 pp. • 2019 • ISBN: 978-1-63081-573-8 • £119**



## Microgrid Design and Operation Toward Smart Energy in Cities

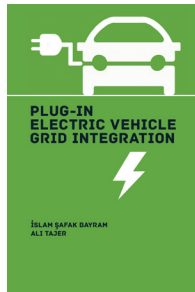
Frederico Delfino, Renato Procopio, Mansueto Rossi, Stefano Bracco, Massim Brignone, and Michela Robba

Based on the extensive real-world experience of the authors, this cutting-edge resource provides a basis for the design, installation, and day-by-day management of microgrids.

**Contents:** Introduction; Technology Overview: Devices and Equipment; Microgrid Installations: State of the Art; Communication and Monitoring Systems for Microgrids; Modelling and Simulation for Microgrids;

Optimization for Microgrid Planning; Optimization for Microgrid Management; Forecasting Tools; Islanded Microgrids; Commercial Tools for the Management of Microgrids; From Design to on Field Installation: A Practical Case Study; From Microgrids to Smart Cities.

Hardcover • 336 pp. • 2018 • ISBN: 978-1-63081-150-1 • £120



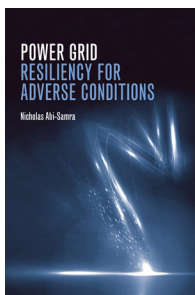
## Plug-in Electric Vehicle Grid Integration

Islam Safak Bayram and Ali Tajer

This authoritative resource introduces you to plug-in electric vehicles (PEVs), energy storage, and converter technology. The architecture for sustainable charging infrastructures and capacity planning of small scale fast charging stations are explored. This book highlights how PEVS provide services to the grid and how to build and design sustainable transportation systems.

**Contents:** Part 1 – Electrification of Light-Duty Vehicles; Introduction to Plug-In Electric Vehicles; Enabling Technologies; Bottlenecks for Electric Vehicles Penetration; Part 2 – Architectures, Control, and Optimization; Battery Model; Charging Facility Design; Capacity Planning of a Large Scale Plug-In Vehicle; Capacity Planning of Small Scale Fast Charging Stations; Optimal Arrival Rates; Optimal Service Rates; Facility Location Problem; Load Balancing and Demand Forecast; Part 3 – PEVs for Ancillary Services; Vehicle-to-Vehicle Technology; Vehicle-to-Grid Technology; Miscellaneous.

Hardcover • 276 pp. • 2017 • ISBN: 978-1-63081-051-1 • £129



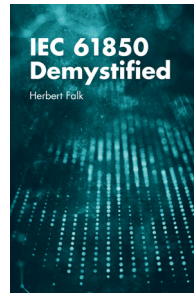
## Power Grid Resiliency for Adverse Conditions

Nicholas Abi-Samra

Written by a leading expert in the field, this practical book offers you a comprehensive understanding of the impact of extreme weather and the possible effects of climate change on the power grid. This book explores proven practices for successful restoration of the power grid, increased system resiliency, and ride-through after extreme weather.

**Contents:** Effects of Heat Waves on Power Systems; Effect of Droughts on Hydroelectric Power Plants; Effect of Droughts on Thermoelectric Power Plants; Extreme Weather Effects on Directly Buried Underground Cables; Effect of Heat Waves on Distribution Transformers; Effect of Lack of Ground Moisture on Transmission Line Performance; Effects of Heavy Winter Precipitation on Transmission Line Insulation; Effects of Heavy Winter Precipitation on Transmission Line Corona Losses; Effects of Winter Storms on Power Systems; Effects of Winter Storms on Wind Turbines; Structural Hardening Against Storms; System Resiliency.

Hardcover • 336 pp. • 2017 • ISBN: 978-1-63081-017-7 • £107



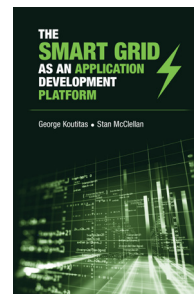
## IEC 61850 Demystified

Herbert Falk

This comprehensive overview of 61850 standard/protocol focuses on implementation, taking you through the development and concepts of IEC 61850. This includes the initial work by General Motors (Manufacturing Automation Protocol), EPRI (UCA 1.0 and UCA 2.0), IEEE (TR 1550), and IEC 61850. The standard is a significant piece of many IIoT (industrial internet of things) strategies for substation communication.

**Contents:** Introduction; What Makes IEC 61850 Different; History of IEC 61850; The Need for Speed: Networking versus Hardwire; Harmonizing IEC 61850 and IEEE TR1550; Structure of the IEC 61850 Standard; Read Before Proceeding: Use of UML in this Book; Integration Patterns; Basic IEC 61850; IEC 61850-7-2 and IEC 61850-7-3; Engineering; Client and Server Communications; Impact of Cybersecurity.

Hardcover • 332 pp. • 2018 • ISBN: 978-1-63081-329-1 • £138



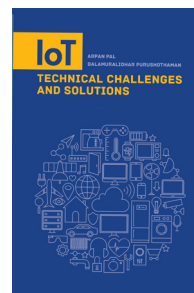
## The Smart Grid as an Application Development Platform

George Koutitas and Stan McClellan

This authoritative resource explores the power grid from its classical role as a utility or service provider towards its new role as an application development platform.

**Contents:** Smart Grid Model; The Power Grid at a Glance; Drawbacks of Current Network Design; Smart Grid Elements; The Cloud Environment of Application Providers; User Centric Applications; Transactive Energy Economy; Summary and Conclusions.

Hardcover • 220 pp. • 2017 • ISBN: 978-1-63081-109-9 • £103



## IoT Technical Challenges and Solutions

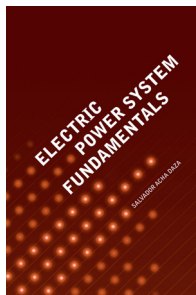
Arpan Pal and Balamuralidhar Purushothaman

This practical resource highlights the systematic problems Internet of Things is encountering on its journey to mass adoption. You are offered solutions to key questions about IoT systems today, including potential network scalability issues, storage, and computing. Security and privacy are explored and the value of sensor-collected data is explained.

**Contents:** Internet of Things Today; Scalability of Networks, Storage, and Computing; Security and Privacy; Sensor Informatics and Business Insights; Mobile Sensing; Democratizing Analytics - Analytics-as-a-Service; Real Internet of Things.

Hardcover • 208 pp. • 2016 • ISBN: 978-1-63081-111-2 • £103





## Electronic Power System Fundamentals

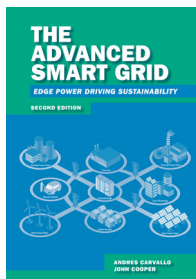
Salvador Acha Daza

This comprehensive resource presents you with the fundamentals of power systems, including the theory, practical steps, and methods used in the design and management of energy systems. You are provided with a uniquely comprehensive derivation of power electronics and will find practical advice based on real life scenarios.

**Contents:** Fundamentals of Energy Systems; Network Analysis; Power Transformer Modeling;

Transmission Line and Cable Modeling; Transmission Line Load Ability; Power Flows; Optimal Operation of Power Systems; Real and Reactive Power Control, General Fault Studies in Electrical Power Systems; Contingency Analysis; State Estimation in Electrical Power Systems.

Hardcover • 414 pp. • 2016 • ISBN: 978-1-63081-085-1 • £86



## The Advanced Smart Grid: Edge Power Driving Sustainability, Second Edition

Andres Carvallo and John Cooper

Placing emphasis on practical "how-to" guidance, this cutting-edge resource provides a first-hand, insider's perspective on the advent and evolution of smart grids in the 21st century.

**Contents:** The Inevitable Emergence of the Smart Grid; Smart Grid System Components; Smart Convergence; Smart Grid 1.0 Emerges;

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Hardcover • 284 pp. • 2015 • ISBN: 978-1-60807-963-6 • £86

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Alberto Sendin, Miguel A. Sanchez-Fornie, Iñigo Berganza, Javier Simon, and Iker Urrutia

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Shriram Santhanagopalan, Kandler Smith, Jeremy Neubauer, Gi-Heon Kim, Matthew Keyser, and Ahmad Pesaran

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## Battery Power Management for Portable Devices

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Mukhtar Ahmad

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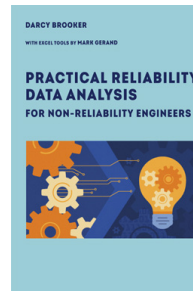
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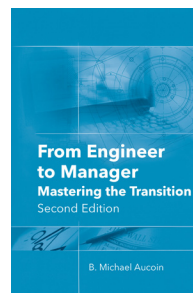
## Practical Reliability Data Analysis for Non-Reliability Engineers

Darcy Brooker, Mark Gerrard

This practical resource presents basic probabilistic and statistical methods or tools used to extract the information from reliability data to make sound decisions. It consolidates and condenses the reliability data analysis methods most often used in everyday practice into an easy-to-follow guide, while also providing a solid foundation from which to explore more complex methods if desired.

**Contents:** About this Book; Background: Ten Key Concepts Underlying Reliability Analysis; Check the Nature of the Data Before Assuming Identical and Independent Distributions; Non-Parametric Data Analysis; Probability Distribution Representations; Weibull (Continuous) Distribution; Life Data Analysis - Weibull Probability Plotting; Exponential (Continuous) Distribution; Normal (Continuous) Distribution; Lognormal (Continuous) Distribution; Binomial (Discrete) Distribution; Poisson (Discrete) Distribution; Analysing Degradation Data; Preview Of Advanced Techniques.

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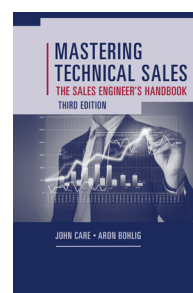


## Electrical Product Compliance and Safety Engineering

Steli Loznen, Constantin Bolintineanu, and Jan Swart

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John Care and Aron Bohlig

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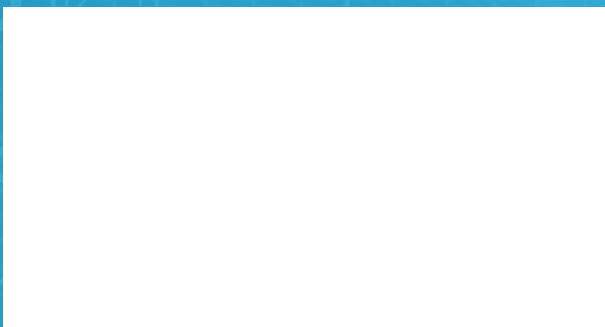
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