

Pulse Doppler Radar Principles Technology Applications

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Doppler Radar Physiological Sensing - Olga Boric-Lubecke 2015-12-15

Presents a comprehensive description of the theory and practical implementation of Doppler radar-based physiological monitoring This book includes an overview of current physiological monitoring techniques and explains the fundamental technology used in remote non-contact monitoring methods. Basic radio wave propagation and radar principles are introduced along with the fundamentals of physiological motion and measurement. Specific design and implementation considerations for physiological monitoring radar systems are then discussed in detail. The authors address current research and commercial development of Doppler radar based physiological monitoring for healthcare and other applications. Explains pros and cons of different Doppler radar architectures, including CW, FMCW, and pulsed Doppler radar Discusses nonlinear demodulation methods, explaining dc offset, dc information, center tracking, and demodulation enabled by dc cancellation Reviews advanced system architectures that address issues of dc offset, spectrum folding, motion interference, and range resolution Covers Doppler radar physiological measurements demonstrated to date, from basic cardiopulmonary rate extractions to more involved volume assessments Doppler Radar Physiological Sensing serves as a fundamental reference for radar, biomedical, and microwave engineers as well as healthcare professionals interested in remote physiological monitoring methods.

Air and Missile Defense Systems Engineering - Warren J. Boord 2016-04-05

Air and Missile Defense Systems Engineering fills a need for those seeking insight into the design procedures of the air and missile defense system engineering process. Specifically aimed at policy planners, engineers, researchers, and consultants, it presents a balanced approach to negating a target in both natural and electronic attack environments, and applies physics-based system engineering to designing and developing a balanced air and missile defense system. The book provides an in-depth description of the missile defense design development process as well as the underlying technical foundation of air and missile defense systems engineering. Utilizing the authors' many years of combined engineering experience, this book considers new air missile defense system technologies and innovative architectures that can be used to meet performance requirements while also minimizing design, development, and operational costs over the lifecycle of a combat system. It also includes the latest systems design techniques that can be applied to new and existing systems, and introduces systems engineering principles that can be discussed and readily applied to other missile defense system scenarios. Additionally, this book: Focuses on shipborne missile defense systems that provide their own ship defense against missiles and protection of other nearby ships Emphasizes the analysis and trade space associated with producing a balanced air and missile defense system (AMDS) Addresses the importance of architectures and technologies Traces requirements development through system performance tradeoffs Includes results of radar and missile performance tradeoffs in a realistic environment Air and Missile Defense Systems Engineering provides an understanding of the physics of missile defense systems and the key performance parameters that drive the capabilities of these systems. This book serves as a valuable resource for missile defense engineers and other practicing professionals, as well as a teaching reference for graduate-level courses.

Radar Principles for the Non-Specialist - J.C. Toomay 2004-06-30

This updated edition provides a solid understanding of radar fundamentals and applications with far less of

the mathematical rigor and technical data presented in engineering books for specialists.

Fundamentals of Radar Signal Processing - Mark A. Richards 2005-07-15

Advances in DSP (digital signal processing) have radically altered the design and usage of radar systems -- making it essential for both working engineers as well as students to master DSP techniques. This text, which evolved from the author's own teaching, offers a rigorous, in-depth introduction to today's complex radar DSP technologies. Contents: Introduction to Radar Systems * Signal Models * Sampling and Quantization of Pulsed Radar Signals * Radar Waveforms * Pulse Compression Waveforms * Doppler Processing * Detection Fundamentals * Constant False Alarm Rate (CFAR) Detection * Introduction to Synthetic Aperture Imaging

Radar Systems - Paul A. Lynn 2012-12-06

The rapid development of electronics and its engineering applications ensures that new topics are always competing for a place in university and polytechnic courses. But it is often difficult for lecturers to find suitable books for recommendation to students, particularly when a topic is covered by a short lecture module, or as an 'option'. Macmillan New Electronics offers introductions to advanced topics. The level is generally that of second and subsequent years of undergraduate courses in electronic and electrical engineering, computer science and physics. Some of the authors will paint with a broad brush; others will concentrate on a narrower topic, and cover it in greater detail. But in all cases the titles in the Series will provide a sound basis for further reading of the specialist literature, and an up-to-date appreciation of practical applications and likely trends. The level, scope and approach of the Series should also appeal to practising engineers and scientists encountering an area of electronics for the first time, or needing a rapid and authoritative update. vii Preface The basic principles of radar do not change, but the design and technology of practical radar systems have developed rapidly in recent years. Advances in digital electronics and computing are having a major impact, especially in radar signal processing and display. I hope that this book will prove a useful introduction to such developments, as well as to the underlying principles of radar detection.

Pulse Doppler Radar - Clive Alabaster 2012-06-30

The book is organized into three parts, each one building on the material of the previous sections. Part I (Chapters 1-8) covers the basic principles to lay sound foundations for the following parts of the book. It emphasizes classic processing techniques, especially the fast Fourier transform (FFT), and microwave engineering issues, antennas, and hardware. The second part of the book deals with the theory and techniques specific to pulse Doppler radar. This is subdivided into Part IIA (Chapters 9-10), which covers high PRF pulse Doppler, and Part IIB (Chapters 11-15), which covers medium PRF pulse Doppler. A major theme is that of PRF selection and optimization, other waveform design issues, and the problem of ghosting. While high and medium PRF pulse Doppler techniques have become synonymous with airborne fire control radars, they are used over a broad spectrum of airborne and surface-based radar applications. Part II does emphasize the airborne radar case, but it does not neglect the surface-based radar. Finally, Part III (Chapters 16-19) presents a series of four case studies. Each of these case studies applies the material of Part II whilst also highlighting additional radar techniques (and, in some cases, non-radar considerations) specific to the application. Such is the prevalence of pulse Doppler radars today; the number of case studies that could have been considered is well into double figures. However, the four

presented here suffice to illustrate the wide variety of pulse Doppler radar applications.

Advanced Algorithms for Mineral and Hydrocarbon Exploration Using Synthetic Aperture Radar - Maged Marghany 2021-12-02

Advanced Algorithms for Mineral and Hydrocarbon Exploration Using Synthetic Aperture Radar is a research- and practically-based reference that bridges the gap between the remote sensing industry and the mineral and hydrocarbon exploration industry. In this context, the book explains how to commercialize the applications of synthetic aperture radar and quantum interferometry synthetic aperture radar (QInSAR) for mineral and hydrocarbon exploration. This multidisciplinary reference is useful for oil and gas companies, the mining industry, geoscientists, and coastal and petroleum engineers. Presents both theoretical and practical applications of various types of remote sensing for hydrocarbon and mineral exploration Covers specific problems for exploration professionals and provides applications for solving each problem Includes more than 100 images and figures to help explain the concepts and applications described in the book

Challenges and Solutions for Sustainable Smart City Development - R. Maheswar 2021-05-22

This book discusses advances in smart and sustainable development of smart environments. The authors discuss the challenges faced in developing sustainable smart applications and provide potential solutions. The solutions are aimed at improving reliability and security with the goal of affordability, safety, and durability. Topics include health care applications, sustainable smart transportation systems, intelligent sustainable wearable electronics, and sustainable smart building and alert systems. Authors are from both industry and academia and present research from around the world. Addresses problems and solutions for sustainable development of smart cities; Includes applications such as healthcare, transportation, wearables, security, and more; Relevant for scientist and researchers working on real time smart city development.

Weather Radar - Peter Meischner 2013-04-17

With their images practically ubiquitous in the daily media, weather radar systems provide data not only for understanding weather systems and improving forecasts (especially critical for severe weather), but also for hydrological applications, flood warnings and climate research in which ground verification is needed for global precipitation measurements by satellites. This book offers an accessible overview of advanced methods, applications and modern research from the European perspective. An extensive introductory chapter summarizes the principles of weather radars and discusses the potential of modern radar systems, including Doppler and polarisation techniques, data processing, and error-correction methods. Addressing both specialist researchers and nonspecialists from related areas, this book will also be useful for graduate students planning to specialize in this field

Radar Principles for the Non-Specialist - John C. Toomay 2012-12-06

What This Book Is This book is about radar. It will teach you the essentials of radar, the underlying principles. It is not like an engineering handbook which provides detailed design equations without explaining either derivation or rationale. It is not like a graduate school textbook which may be abstruse and esoteric to the point of incomprehensibility. And it is not like an anthology of popular magazine articles which may be gaudy but superficial. It is an attempt to distill the very complex, rich technology of radar into its fundamentals, tying them to the laws of nature on one end and to the most modern and complex systems on the other. Who It's For If your work requires you to supervise or meet as coequals with radar systems engineers or designers, this book will allow you to understand them, to question them intelligently and perhaps to provide them with a perspective (a dispassionate yet competent view) that they lack. If you are trained in another discipline but have been made the manager of a radar project or a system program that has one or more radars as sub-systems, this book will provide you with the tools you need, not only to give your team members confidence, but also to make a substantive technical contribution yourself.

Introduction to Radar Systems - Merrill I. Skolnik 1988

Doppler Radar Observations - Joan Bech 2012-04-05

Doppler radar systems have been instrumental to improve our understanding and monitoring capabilities of phenomena taking place in the low, middle, and upper atmosphere. Weather radars, wind profilers, and

incoherent and coherent scatter radars implementing Doppler techniques are now used routinely both in research and operational applications by scientists and practitioners. This book brings together a collection of eighteen essays by international leading authors devoted to different applications of ground based Doppler radars. Topics covered include, among others, severe weather surveillance, precipitation estimation and nowcasting, wind and turbulence retrievals, ionospheric radar and volcanological applications of Doppler radar. The book is ideally suited for graduate students looking for an introduction to the field or professionals intending to refresh or update their knowledge on Doppler radar applications.

Digital Signal Processing Techniques and Applications in Radar Image Processing - Bu-Chin Wang 2008-08-29

A self-contained approach to DSP techniques and applications in radar imaging The processing of radar images, in general, consists of three major fields: Digital Signal Processing (DSP); antenna and radar operation; and algorithms used to process the radar images. This book brings together material from these different areas to allow readers to gain a thorough understanding of how radar images are processed. The book is divided into three main parts and covers: * DSP principles and signal characteristics in both analog and digital domains, advanced signal sampling, and interpolation techniques * Antenna theory (Maxwell equation, radiation field from dipole, and linear phased array), radar fundamentals, radar modulation, and target-detection techniques (continuous wave, pulsed Linear Frequency Modulation, and stepped Frequency Modulation) * Properties of radar images, algorithms used for radar image processing, simulation examples, and results of satellite image files processed by Range-Doppler and Stolt interpolation algorithms The book fully utilizes the computing and graphical capability of MATLAB[®] to display the signals at various processing stages in 3D and/or cross-sectional views. Additionally, the text is complemented with flowcharts and system block diagrams to aid in readers' comprehension. Digital Signal Processing Techniques and Applications in Radar Image Processing serves as an ideal textbook for graduate students and practicing engineers who wish to gain firsthand experience in applying DSP principles and technologies to radar imaging.

Principles of Electronic Warfare - General Dynamics Corporation. Convair Division 1961

Principles of Waveform Diversity and Design - Michael Wicks 2010

This is the first book to discuss current and future applications of waveform diversity and design in subjects such as radar and sonar, communications systems, passive sensing, and many other technologies. Waveform diversity allows researchers and system designers to optimize electromagnetic and acoustic systems for sensing, communications, electronic warfare or combinations thereof. This book enables solutions to problems, explaining how each system performs its own particular function, as well as how it is affected by other systems and how those other systems may likewise be affected. It is an excellent standalone introduction to waveform diversity and design, which takes a high potential technology area and makes it visible to other researchers, as well as young engineers.

Principles of Modern Radar - James A. Scheer 2013-12-20

Principles of Modern Radar: Radar Applications is the third of the three-volume series of what was originally designed to be accomplished in one volume. As the final volume of the set, it finishes the original vision of a complete yet bounded reference for radar technology. This volume describes fifteen different system applications or class of applications in more detail than can be found in Volumes I or II. As different as the applications described, there is a difference in how these topics are treated by the authors. Whereas in Volumes I and II there is strict adherence to chapter format and level of detail, this volume has a wider dynamic range of technical depth. Some system applications lend themselves to a deeper level of technical description than others.

Polarimetric Doppler Weather Radar - V. N. Bringi 2001-08-30

This 2001 book provides a detailed introduction to the principles of Doppler and polarimetric radar, focusing in particular on their use in the analysis of weather systems. The design features and operation of practical radar systems are highlighted throughout the book in order to illustrate important theoretical foundations. The authors begin by discussing background topics such as electromagnetic scattering, polarization, and wave propagation. They then deal in detail with the engineering aspects of pulsed Doppler

polarimetric radar, including the relevant signal theory, spectral estimation techniques, and noise considerations. They close by examining a range of key applications in meteorology and remote sensing. The book will be of great use to graduate students of electrical engineering and atmospheric science as well as to practitioners involved in the applications of polarimetric radar systems.

Intelligent Communication, Control and Devices - Rajesh Singh 2018-04-10

The book focuses on the integration of intelligent communication systems, control systems, and devices related to all aspects of engineering and sciences. It contains high-quality research papers presented at the 2nd international conference, ICICCD 2017, organized by the Department of Electronics, Instrumentation and Control Engineering of University of Petroleum and Energy Studies, Dehradun on 15 and 16 April, 2017. The volume broadly covers recent advances of intelligent communication, intelligent control and intelligent devices. The work presented in this book is original research work, findings and practical development experiences of researchers, academicians, scientists and industrial practitioners.

Advances in Bistatic Radar - Nicholas J. Willis 2007-06-30

This comprehensive reference updates bistatic and multistatic radar developments since the publication of Nicholas Willis' seminal book Bistatic Radar published in 1991 and revised in 1995. The book is organized into two major sections: Bistatic/ Multistatic Radar Systems and Bistatic Clutter and Signal Processing. New and recently declassified military applications are documented. Civil applications are detailed for the first time, including commercial and scientific systems. Several of the most honored radar engineers of this era provide expertise in each of these applications. Professionals in radar and sonar will find this book a valuable resource

Fundamentals of Radar Signal Processing, Third Edition - Mark A. Richards 2022-04-01

A complete guide to the full spectrum of fundamental radar signal processing systems—fully updated for the latest advances This thoroughly revised resource offers comprehensive coverage of foundational digital signal processing methods for both pulsed and FMCW radar. Developed from the author's extensive academic and professional experience, Fundamentals of Radar Signal Processing, Third Edition covers all of the digital signal processing techniques that form the backbone of modern radar systems, revealing the common threads that unify them. The basic tools of linear systems, filtering, sampling, and Fourier analysis are used throughout to provide a unified tutorial approach. You will get end-of-chapter problems that reinforce and apply salient points as well as an online suite of tutorial MATLAB(R) demos and supplemental technical notes. Classroom instructors additionally receive a solutions manual and sample MATLAB® tutorial demos. Coverage includes: An introduction to radar systems Signal models Data acquisition and organization Waveforms and pulse compression Doppler processing Threshold detection and CFAR Measurements and tracking Synthetic aperture imaging Adaptive array processing and STAP

Introduction to Radar Analysis - Bassem R. Mahafza 1998-05-22

Introduction to Radar Analysis outlines the fundamental principles and applications of radar as well as important mathematical derivations - serving as a reference for engineers, technical managers, and students. This comprehensive book divides into two parts: General analytical treatment of radar signal processing Specific discussion of radar topics and radar types Chapters contain: derivations of the radar equation in many forms for an essential understanding of radar principles examination of radar cross section and receiver noise practical aspects of radar systems, including stretch processing, multipath propagation, and track filters analysis of probability of detection and radar losses; CW and pulsed radars; and pulse compression investigation of current research and industry trends, including clutter and wave propagation, Moving Target Indicator (MTI), tracking radars, and array antennas a unique approach in presenting Synthetic Aperture Radar (SAR) 756 equations and formulas providing detailed mathematical derivations 165 examples and exercise problems as well as 149 figures and plots Introduction to Radar Analysis acts as an essential stepping stone toward specialized topics - providing a clear, accessible framework of radar fundamentals as well as a thorough study of advanced topics and radar technology issues.

Principles of Modern Radar - Mark A. Richards 2013-12-20

Principles of Modern Radar: Radar Applications is the third of the three-volume series of what was originally designed to be accomplished in one volume. As the final volume of the set, it finishes the original vision of a

complete yet bounded reference for radar technology. This volume describes fifteen different system applications or class of applications in more detail than can be found in Volumes I or II. As different as the applications described, there is a difference in how these topics are treated by the authors. Whereas in Volumes I and II there is strict adherence to chapter format and level.

Radar Micro-Doppler Signatures - Victor C. Chen 2014-05-30

Radar Micro-Doppler Signatures: Processing and applications concentrates on the processing and application of radar micro-Doppler signatures in real world situations, providing readers with a good working knowledge on a variety of applications of radar micro-Doppler signatures.

Radar System Design and Analysis - Shahen A. Hovanesian 1984

En lærebog i radarteknik. Beskriver systematisk alle væsentlige sider af radarteknikken.

Radar Essentials - G. Richard Curry 2011

When you need vital data fast, turn to Radar Essentials. This compact yet comprehensive reference has compiled the most used principles, data, tables, and equations that are used by radar and aerospace system designers on a daily basis. Experts and non-experts alike will find this to be their go-to source for recalling and understanding the fundamentals and employing them in design and performance analysis.

Space-time Adaptive Processing - Richard Klemm 1998

This is a systematic introduction to airborne MTI radar design in use in the fields of earth observation, surveillance and reconnaissance, with particular regard to the suppression of clutter returns. It explores signal processing techniques, jamming and system applications, including sonar.

Air and Spaceborne Radar Systems - Philippe Lacomme 2001-03-27

A practical tool on radar systems that will be of major help to technicians, student engineers and engineers working in industry and in radar research and development. The many users of radar as well as systems engineers and designers will also find it highly useful. Also of interest to pilots and flight engineers and military command personnel and military contractors. "This introduction to the field of radar is intended for actual users of radar. It focuses on the history, main principles, functions, modes, properties and specific nature of modern airborne radar. The book examines radar's role within the system when carrying out its assigned missions, showing the possibilities of radar as well as its limitations. Finally, given the changing operational requirements and the potential opened up by modern technological developments, a concluding section describes how radar may evolve in the future. The authors review the current state of the main types of airborne and spaceborne radar systems, designed for specific missions as well as for the global environment of their host aircraft or satellites. They include numerous examples of the parameters of these radars. The emphasis in the book is not only on a particular radar technique, but equally on the main radar functions and missions. Even if a wide range of techniques are described in this book, the focus is on those which are connected to practical applications.

WK02FM-002 - Optimal Flow Measurement: Understanding Selection, Application, Installation and Operation of Flowmeters Workshop Proceedings -

Radar Handbook, Third Edition - Merrill I Skolnik 2008-02-12

Publisher's Note: Products purchased from Third Party sellers are not guaranteed by the publisher for quality, authenticity, or access to any online entitlements included with the product. The Industry Standard in Radar Technology Now Updated with All the Advances and Trends of the Past 17 Years Turn to the Third Edition of Radar Handbook for state-of-the-art coverage of the entire field of radar technology from fundamentals to the newest applications. With contributions by 30 world experts, this resource examines methods for predicting radar range and explores radar subsystems such as receivers, transmitters, antennas, data processing, ECCM, and pulse compression. This radar handbook also explains the target cross section...radar echoes from ground and sea...and all radar systems, including MTI, AMTI, pulse doppler, and others. Using SI units, the Third Edition of Radar Handbook features: Unsurpassed guidance on radar fundamentals, theory, and applications Hundreds of examples and illustrations New to this edition: new chapters on radar digital signal processing, radar in air traffic control, ground penetrating radar, fighter aircraft radar, and civil marine radar; 22 thoroughly revised chapters; 17 new contributors Inside This Cutting-Edge Radar Guide • MTI Radar • Pulse Doppler Radar • Multifunctional Radar Systems for

Fighter Aircraft • Radar Receivers • Automatic Detection, Tracking, and Sensor Integration • Pulse Compression Radar • Radar Transmitters • Reflector Antennas • Phased Array Radar Antennas • Radar Cross Section • Sea Clutter • Ground Echo • Space-Based Radar • Meteorological Radar • HF Over-the-Horizon Radar • Ground Penetrating Radar • Civil Marine Radar • Bistatic Radar • Radar Digital Signal Processing • And More!

High Frequency Over-the-Horizon Radar - Dr. Giuseppe Fabrizio 2013-07-12

THE MOST COMPLETE GUIDE TO HIGH FREQUENCY OVER-THE-HORIZON RADAR SYSTEMS Written by a leading global expert on the topic, High Frequency Over-the-Horizon Radar provides in-depth coverage of the signal processing models and techniques that have significantly advanced OTH radar technology. This pioneering work describes the fundamental principles of OTH radar design and operation, and then delves into the mathematical modeling of HF signals received by actual OTH radar systems based on experimental data analysis. Numerous examples illustrate the practical application of modern adaptive signal processing techniques to real and simulated OTH radar data. This authoritative text covers skywave and surface-wave systems and is an invaluable resource for researchers, engineers, and practitioners working with OTH radar systems and technologies. Key Features: Offers a thorough and accurate treatment of essential concepts ranging from system design and operation, through to signal processing methods, and their practical application. Provides clear explanations of fundamental principles for scientists, engineers, students, practitioners, technicians, managers, and other professionals starting out in this field. Offers a detailed coverage of theoretical and applied signal-processing concepts and techniques that have become a cornerstone for the effective operation of real-world OTH radar systems. Fills a long-standing void in the contemporary OTH radar literature with over 350 illustrations (color figures available for download), and over 500 references.

Radar: Principles, Technology, Applications - Edde 1993-09

Radar Principles with Applications to Tracking Systems - Philip L. Bogler 1990-02

Of related interest ... Microwave Passive Direction Finding Stephen E. Lipsky This breakthrough work answers the need of every engineer in search of a comprehensive, single source on DF technology. Microwave Passive Direction Finding succinctly unifies DF theory, provides representative block diagrams of working equipment, and details the methods of calculating and predicting system performance. Sections cover evolution and use of monopulse passive DF receiver theory, design of antenna elements for conformal DF coverage, receiver configurations, DF antenna arrays, computation methods for signal detection, and much more. Never before published material includes new systems concepts such as digital preprocessing, supercommutation, and wide RF bandwidth noise detection methods. With tips on preparing proposals for new business, this reference covers every aspect of the principles and practice of DF technology. 1987 (0 471-83454-8) 298 pp. Radar Principles Nadav Levanon With this first published textbook on the subject, practicing engineers and graduate students will quickly master the basic concepts of radar science. A clear, straightforward introduction to the discipline through an analytical and problem-solving mode, this unique book features mathematical analysis and proofs, fully analyzed examples, and problem sections—all selected from the author's course assignments. Key topics include propagation, radar cross section, clutter, radar signals, the ambiguity function, measurement accuracy, coherent processing, Synthetic Aperture Radar and monopulse. The text's tutorial format, consistent terminology, and 141 illustrations (including 3-D plots of ambiguity functions) make it an optimal self-study tool, classroom text, and professional reference. 1988 (0 471-85881-1) 308 pp. Optimal Radar Tracking Systems George Biernson Here is a systematic unveiling of the methods and means underlying the design of radar tracking technology. Topics covered include issues essential to an understanding of Altair radar as well as target-tracking systems. Kalman filter theory, feedback control, modulation and demodulation of signals, digital sampled-data systems, digital computer simulation, statistical analysis of random signals, detection and tracking processes in a radar system are developed first from their rudiments toward a more advanced discussion. Offering a breadth of technical detail unusual in the unclassified literature, this study is of paramount importance to those involved in tracking applications that use optical signal, sonar signal, or RF telemetry signals. 1989 (0 471-50673-7) 560 pp.

Understanding Radar Systems - Simon Kingsley 1999

What is radar? What systems are currently in use? How do they work? Understanding Radar Systems provides engineers and scientists with answers to these critical questions, focusing on actual radar systems in use today. It's the perfect resource for those just entering the field or a quick refresher for experienced practitioners. The book leads readers through the specialized language and calculations that comprise the complex world of modern radar engineering as seen in dozens of state-of-the-art radar systems. The authors stress practical concepts that apply to all radar, keeping math to a minimum. Most of the book is based on real radar systems rather than theoretical studies. The result is a valuable, easy-to-use guide that makes the difficult parts of the field easier and helps readers do performance calculations quickly and easily.

Principles of Modern Radar - Mark A. Richards 2023-02-17

Principles of Modern Radar: Basic Principles is a comprehensive text for courses in radar systems and technology, a professional training textbook for formal in-house courses and for new hires; a reference for ongoing study following a radar short course and a self-study and professional reference book.

Radar Networks - Hai Deng 2020-06-09

Radar networks are increasingly regarded as an efficient approach to enhancing radar capabilities in the face of popular anti-radar techniques and hostile operating environments. Reader-friendly and self-contained, this book provides a comprehensive overview of the latest radar networking technologies. The text addresses basic, relevant aspects of radar signal processing and statistical theories, including both civilian and military radar applications. It also discusses emerging topics that directly relate to networks, such as multiple-input-multiple-output (MIMO) radars, waveform design, and diversity via multiple transmitters. Other topics covered include target recognition and imaging using radar networks. Features Gives a comprehensive view of the latest radar network technologies Covers both civilian and military applications of radar Provides basic statistics and signal processing necessary for understanding radar networks Includes up-to-date information on MIMO radars Presents waveform design and diversity for radar networks with multiple transmitters

Fundamentals of Radar Signal Processing, Second Edition - Mark A. Richards 2013-12-02

The most complete, current guide to the signal processing techniques essential to advanced radar systems Fully updated and expanded, Fundamentals of Radar Signal Processing, Second Edition, offers comprehensive coverage of the basic digital signal processing techniques and technologies on which virtually all modern radar systems rely, including target and interference models, matched filtering, waveform design, Doppler processing, threshold detection, and measurement accuracy. The methods and interpretations of linear systems, filtering, sampling, and Fourier analysis are used throughout to provide a unified tutorial approach. End-of-chapter problems reinforce the material covered. Developed over many years of academic and professional education, this authoritative resource is ideal for graduate students as well as practicing engineers. Fundamentals of Radar Signal Processing, Second Edition, covers:

Introduction to radar systems Signal models Pulsed radar data acquisition Radar waveforms Doppler processing Detection fundamentals Measurements and tracking Introduction to synthetic aperture imaging Introduction to beamforming and space-time adaptive processing

Fundamental Principles of Radar - Habibur Rahman 2019-05-15

The important and fascinating topics of radar enjoy an extensive audience in industry and government but deserve more attention in undergraduate education to better prepare graduating engineers to meet the demands of modern mankind. Radar is not only one of the major applications of electronics and electromagnetic communications, but it is also a mature scientific discipline with significant theoretical and mathematical foundations that warrant an intellectual and educational challenge. Fundamental Principles of Radar is a textbook providing a first exposure to radar principles. It provides a broad concept underlying the basic principle of operations of most existing radar systems and maintains a good balance of mathematical rigor to convince readers without losing interest. The book provides an extensive exposition of the techniques currently being used for radar system design, analysis, and evaluation. It presents a comprehensive set of radar principles, including all features of modern radar applications, with their underlying derivations using simple mathematics. Coverage is limited to the main concepts of radar in order to present them in a systematic and organized fashion. Topics are treated not as abstruse and

esoteric to the point of incomprehensibility, but the very complex and rich technology of radar is distilled into its fundamentals. The author's emphasis is on clarity without sacrificing rigor and completeness, thus making the book broad enough to satisfy a variety of backgrounds and interests. Thorough documentation provides an unusual degree of completeness for a textbook at this level, with interesting and sometimes thought-provoking content to make the subject even more appealing. Key Features: Covers a wide range of topics in radar systems Includes examples and exercises to reinforce the concepts presented and explain their applications Provides self-contained chapters useful for readers seeking selective topics Provides broad concepts underlying the basic principles of operations of most types of radars in use today Includes documentation to lead to further reading of interesting concepts and applications

Advanced Ultrawideband Radar - James D. Taylor 2016-12-19

This book presents the latest theory, developments, and applications related to high resolution materials-penetrating sensor systems. An international team of expert researchers explains the problems and solutions for developing new techniques and applications. Subject areas include ultrawideband (UWB) signals propagation and scattering, materials-penetrating radar techniques for small object detection and imaging, biolocation using holographic techniques, tomography, medical applications, nondestructive testing methods, electronic warfare principles, through-the-wall radar propagation effects, and target identification through measuring the target return signal spectrum changes.

Principles of Modern Radar - James A. Scheer 2013-12-31

This series will appeal to radar practitioners within military or government. The first volume was written as a textbook for courses in radar systems and technology and the second volume is aimed at practicing radar

engineers and graduate level students. The third volume is designed to serve as a self-contained reference for those aiming to become experts in an advanced technology or application area. POMR: Radar Applications Volume 3 includes concise descriptions of the purposes, principal issues and radar methods found in a wide variety of current radar types. POMR: Advanced Techniques Volume 2 is a professional reference for practicing engineers that provides a stepping stone to advanced practice. POMR: Basic Principles Volume 1 focuses on 4 keys areas; basic concepts, radar signal phenomenology, major subsystems of modern radars and signal and data processing basics.

Millimeter Wave Technology in Wireless PAN, LAN, and MAN - Shao-Qiu Xiao 2008-05-28

Driven by the demand for high-data-rate, millimeter wave technologies with broad bandwidth are being explored in high-speed wireless communications. These technologies include gigabit wireless personal area networks (WPAN), high-speed wireless local area networks (WLAN), and high-speed wireless metropolitan area networks (WMAN). As a result of this technological push, standard organizations are actively calling for specifications of millimeter wave applications in the above wireless systems. Providing the guidance needed to help you navigate through these new technologies, Millimeter Wave Technology in Wireless PAN, LAN, and MAN covers the fundamental concepts, recent advances, and potential that these millimeter wave technologies will offer with respect to circuits design, system architecture, protocol development, and standardization activities. The book presents essential challenges and solutions related to topics that include millimeter wave monolithic integrated circuit (MMIC), packaging technology of millimeter wave system and circuits, and millimeter wave channel models. With numerous figures, tables and references, this text allows speedy access to the fundamental problems, key challenges, open issues, future directions, and further readings on millimeter wave technologies in relation to WPAN, WLAN, and WMAN.