Radar Data Processing With Applications | 81ba7d74f7bf0edbc360fc9cf546803f

Cent 75 ansWeather RadarNovel Radar Techniques and ApplicationsRadar HydrologyRadar Principles with Applications to Tracking SystemsRadar Data Processing with ApplicationsMIMO Radar: Theory and ApplicationDeep Learning Applications of Short-Range RadarsSignal Processing Fundamentals and Applications for Communications and Sensing SystemsIntroduction to Ground Penetrating RadarRadar Signal Processing for Autonomous DrivingApplications of Wavelets to Radar Data ProcessingModulation, Resolution and Signal Processing in Radar, Sonar and Related SystemsRadar Data Processing: Introduction and trackingFundamentals of Radar Signal ProcessingDiscrete Wavelet Analysis with Applications in Radar Data ProcessingSignal Processing Algorithms for Communication and Radar SystemsMIMO Radar Signal ProcessingHigh Frequency Over-the-Horizon RadarHigh Spatial Resolution Remote SensingSignal Processing and Networking for Big Data ApplicationsPolarimetric Radar ImagingCalibration and Data Processing Techniques for Ground Penetrating Radar Systems with Applications in Dispersive GroundGround Penetrating Radar Theory and ApplicationsTime-Frequency Signal Analysis with ApplicationsRadar Data Processing: Advanced topics and applicationsRadar Data Processing with ApplicationsTopics in Radar Signal ProcessingRadar Micro-Doppler SignaturesRadar Rainfall DataRadar Data Processing With ApplicationsSeismic Data Interpretation using Digital Image ProcessingSpace Based RadarRadar Data Processing: Advanced topics and applicationsKnowledge Based Radar Detection, Tracking and ClassificationApplications of Weather Radar SystemsRadar Signal Analysis and Processing Using MATLABRadar Signal Processing and Its ApplicationsOptical Data ProcessingDigital Signal Processing Techniques and Applications in Radar Image Processing

Cent 75 ans

Weather Radar

Novel Radar Techniques and Applications This comprehensive new resource provides in-depth and timely coverage of the underpinnings and latest advances of MIMO radar. This book provides a comprehensive introduction to MIMO radar and demonstrates it’s utility in real-world applications, then culminates with the latest advances in optimal and adaptive MIMO radar for enhanced detection and target ID in challenging environments. Signal processing prerequisites are explained, including radar signals, orthogonal waveforms, matched filtering, multi-channel beam forming, and Doppler processing. This book discusses MIMO radar signal model, antenna properties, system modeling and waveform alternatives. MIMO implantation challenges are covered, including computational complexity, adaptive clutter mitigation, calibration and equalization, and hardware constraints. Applications for GMTI radar, OTH radar, maritime radar, and automotive radar are explained. The book offers an introduction to optimum MIMO radar and includes details about detection, clutter, and target ID. Insight into adaptive MIMO radar and MIMO channel estimation is presented and techniques and illustrative examples are given. Readers find exclusive flight testing data from DARPA. The breadth of coverage in this all-inclusive resource makes it suitable for both practicing engineers and advanced researchers. The book concludes with

discussions on areas for future research.

Radar Hydrology

Radar Principles with Applications to Tracking Systems Bridging the gap between modern image processing practices by the scientific community at large and the world of geology and reflection seismology This book covers the basics of seismic exploration, with a focus on image processing techniques as applied to seismic data. Discussions of theories, concepts, and algorithms are followed by synthetic and real data examples to provide the reader with a practical understanding of the image processing technique and to enable the reader to apply these techniques to seismic data. The book will also help readers interested in devising new algorithms, software and hardware for interpreting seismic data. Key Features: Provides an easy to understand overview of popular seismic processing and interpretation techniques from the point of view of a digital signal processor. Presents image processing concepts that may be readily applied directly to seismic data. Includes ready-to-run MATLAB algorithms for most of the techniques presented. The book includes essential research and teaching material for digital signal and image processing individuals interested in learning seismic data interpretation from the point of view of digital signal processing. It is an ideal resource for students, professors and working professionals who are interested in learning about the application of digital signal processing theory and algorithms to seismic data.

*Radar Data Processing with Applications 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*

MIMO Radar: Theory and Application

Deep Learning Applications of Short-Range Radars With contributions by numerous experts

Signal Processing Fundamentals and Applications for Communications and Sensing Systems A systematic introduction to the theory, development and latest research results of radar data processing technology- Presents both classical theory and development methods of radar data processing- Provides state-of-the-art research results, including data processing for modern style radars, and tracking performance evaluation theory- Includes coverage of performance evaluation, registration algorithm for Radar network, data processing of passive radar, pulse Doppler radar, and phased array radar- Has applications for those engaged in information engineering, radar engineering, electronic countermeasures, infrared techniques, sonar techniques, and military command.

Introduction to Ground Penetrating Radar Radar Hydrology: Principles, Models, and Applications provides graduate students, operational

forecasters, and researchers with a theoretical framework and practical knowledge of radar precipitation estimation. The only text on the market solely devoted to radar hydrology, this comprehensive reference: Begins with a brief introduction to radar Focuses on the processing of radar data to arrive at accurate estimates of rainfall Addresses advanced radar sensing principles and applications Covers radar technologies for observing each component of the hydrologic cycle Examines state-of-the-art hydrologic models and their inputs, parameters, state variables, calibration procedures, and outputs Discusses contemporary approaches in data assimilation Concludes with methods, case studies, and prediction system design Includes downloadable MATLAB® content Flooding is the #1 weather-related natural disaster worldwide. Radar Hydrology: Principles, Models, and Applications aids in understanding the physical systems and detection tools, as well as designing prediction systems.

Radar Signal Processing for Autonomous Driving Discover the technology for the next generation of radar systems Here is the first book that brings together the key concepts essential for the application of Knowledge Based Systems (KBS) to radar detection, tracking, classification, and scheduling. The book highlights the latest advances in both KBS and radar signal and data processing, presenting a range of perspectives and innovative results that have set the stage for the next generation of adaptive radar systems. The book begins with a chapter introducing the concept of Knowledge Based (KB) radar. The remaining nine chapters focus on current developments and recent applications of KB concepts to specific radar functions. Among the key topics explored are: Fundamentals of relevant KB techniques KB solutions as they apply to the general radar problem KBS applications for the constant false-alarm rate processor KB control for space-time adaptive processing KB techniques applied to existing radar systems Integrated end-to-end radar signals Data processing with overarching KB control All chapters are self-contained, enabling readers to focus on those topics of greatest interest. Each one begins with introductory remarks, moves on to detailed discussions and analysis, and ends with a list of references. Throughout the presentation, the authors offer examples of how KBS works and how it can dramatically improve radar performance and capability. Moreover, the authors forecast the impact of KB technology on future systems, including important civilian, military, and homeland defense applications. With chapters contributed by leading international researchers and pioneers in the field, this text is recommended for both students and professionals in radar and sonar detection, tracking, and classification and radar resource management.

Applications of Wavelets to Radar Data Processing The recent launches of three fully polarimetric synthetic aperture radar (PolSAR) satellites have shown that polarimetric radar imaging can provide abundant data on the Earth's environment, such as biomass and forest height estimation, snow cover mapping, glacier monitoring, and damage assessment. Written by two of the most recognized leaders in this field, Polarimetric Radar Imaging: From Basics to Applications presents polarimetric radar imaging and processing techniques and shows how to develop remote sensing applications using PolSAR imaging radar. The book provides a substantial and balanced introduction to the basic theory and advanced concepts of polarimetric scattering mechanisms, speckle statistics and speckle filtering, polarimetric information analysis and extraction techniques, and applications typical to radar polarimetric remote sensing. It explains the importance of wave

polarization theory and the speckle phenomenon in the information retrieval problem of microwave imaging and inverse scattering. The authors demonstrate how to devise intelligent information extraction algorithms for remote sensing applications. They also describe more advanced polarimetric analysis techniques for polarimetric target decompositions, polarization orientation effects, polarimetric scattering modeling, speckle filtering, terrain and forest classification, manmade target analysis, and PolSAR interferometry. With sample PolSAR data sets and software available for download, this self-contained, hands-on book encourages you to analyze space-borne and airborne PolSAR and polarimetric interferometric SAR (Pol-InSAR) data and then develop applications using this data.

Modulation, Resolution and Signal Processing in Radar, Sonar and Related Systems Offering radar-related software for the analysis and design of radar waveform and signal processing, Radar Signal Analysis and Processing Using MATLAB® provides a comprehensive source of theoretical and practical information on radar signals, signal analysis, and radar signal processing with companion MATLAB® code. After an overview of radar systems operation and design, the book reviews elements of signal theory relevant to radar detection and radar signal processing, along with random variables and processes. The author then presents the unique characteristic of the matched filter and develops a general formula for the output of the matched filter that is valid for any waveform. He analyzes several analog waveforms, including the linear frequency modulation pulse and stepped frequency waveforms, as well as unmodulated pulse-train, binary, polyphase, and frequency codes. The book explores radar target detection and pulse integration, emphasizing the constant false alarm rate. It also covers the stretch processor, the moving target indicator, radar Doppler processing, beamforming, and adaptive array processing. Using configurable MATLAB code, this book demonstrates how to apply signal processing to radar applications. It includes many examples and problems to illustrate the practical application of the theory.

Radar Data Processing: Introduction and tracking A systematic introduction to the theory, development and latest research results of radar data processing technology- Presents both classical theory and development methods of radar data processing- Provides state-of-the-art research results, including data processing for modern style radars, and tracking performance evaluation theory- Includes coverage of performance evaluation, registration algorithm for Radar network, data processing of passive radar, pulse Doppler radar, and phased array radar- Has applications for those engaged in information engineering, radar engineering, electronic countermeasures, infrared techniques, sonar techniques, and military command.

Fundamentals of Radar Signal Processing

Discrete Wavelet Analysis with Applications in Radar Data Processing A real-world guide to practical applications of groundpenetrating radar (GPR) The nondestructive nature of ground penetrating radar makes itan important and popular method of subsurface imaging, but it is ahighly specialized field, requiring a deep understanding of theunderlying science for successful application. Introduction toGround Penetrating Radar: Inverse Scattering and DataProcessing provides experienced professionals with thebackground they need to ensure precise data collection andanalysis. Written to build upon

the information presented in more generalintroductory volumes, the book discusses the fundamentalmathematical, physical, and engineering principles upon which GPRis built. Real-world examples and field data provide readers anaccurate view of day-to-day GPR use. Topics include: 2D scattering for dielectric and magnetic targets 3D scattering equations and migration algorithms Host medium characterization and diffraction tomography Time and frequency steps in GPR data sampling The Born approximation and the singular valuedecomposition The six appendices contain the mathematical proofs of allexamples discussed throughout the book. Introduction to GroundPenetrating Radar: Inverse Scattering and Data Processing is acomprehensive resource that will prove invaluable in the field.

Signal Processing Algorithms for Communication and Radar Systems A guide to the ways in which radar is used to address practical problems in meteorology, hydrology, and the environmental sciences, this book supplies sufficient theory to explain how radars function. The emphasis is on the characteristics of the data obtained from radar and how this data can aid an understanding of specific real life applications. Applications include the accurate forecasting of rainfall and other severe weather, the use of radar data as an input for forecasting models, the understanding of the problems of airborne pollution, and how to specify and install radar systems at remote sites.

MIMO Radar Signal Processing With their images practically ubiquitious 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

High Frequency Over-the-Horizon Radar This exciting new 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. The book covers applications ranging from industrial, consumer space to emerging automotive applications. The book presents several human-machine interface (HMI) applications, such as gesture recognition and sensing, human activity classification, air-writing, material classification, vital sensing, people sensing, people counting, people localization and in-cabin automotive occupancy and smart trunk

opening. The underpinnings of deep learning are explored, outlining the history of neural networks and the optimization algorithms to train them. Modern deep convolutional neural network (DCNN), popular DCNN architectures for computer vision and their features are also introduced. The book presents other deep learning architectures, such as long-short term memory (LSTM), auto-encoders, variational auto-encoders (VAE), and generative adversarial networks (GAN). The application of human activity recognition as well as the application of air-writing using a network of short-range radars are outlined. This book demonstrates and highlights how deep learning is enabling several advanced industrial, consumer and in-cabin applications of short-range radars, which weren't otherwise possible. It illustrates various advanced applications, their respective challenges, and how they are been addressed using different deep learning architectures and algorithms.

*High Spatial Resolution Remote Sensing Ground-penetrating radar (GPR) is a rapidly developing field that has seen tremendous progress over the past 15 years. The development of GPR spans aspects of geophysical science, technology, and a wide range of scientific and engineering applications. It is the breadth of applications that has made GPR such a valuable tool in the geophysical consulting and geotechnical engineering industries, has lead to its rapid development, and inspired new areas of research in academia. The topic of GPR has gone from not even being mentioned in geophysical texts ten years ago to being the focus of hundreds of research papers and special issues of journals dedicated to the topic. The explosion of primary literature devoted to GPR technology, theory and applications, has lead to a strong demand for an up-to-date synthesis and overview of this rapidly developing field. Because there are specifics in the utilization of GPR for different applications, a review of the current state of development of the applications along with the fundamental theory is required. This book will provide sufficient detail to allow both practitioners and newcomers to the area of GPR to use it as a handbook and primary research reference. *Review of GPR theory and applications by leaders in the field *Up-to-date information and references *Effective handbook and primary research reference for both experienced practitioners and newcomers*

Signal Processing and Networking for Big Data Applications This cutting-edge book is a clear and thorough exposition of signal-processing fundamentals for communications and major sensing systems. Based on the authorOCOs earlier book in this area, this revised and expanded resource offers you expert guidance in the detection of optical, acoustic and radio-frequency signals in noise. It covers digital filtering and parameter estimation, and helps you with problems associated with radar system design, including search, tracking and measurement ambiguity."

Polarimetric Radar Imaging

Calibration and Data Processing Techniques for Ground Penetrating Radar Systems with Applications in Dispersive Ground This unique text helps make sense of big data using signal processing techniques, in applications including machine learning, networking, and energy systems.

Ground Penetrating Radar Theory and Applications A systematic introduction to the theory, development and latest research results of radar data processing technology • Presents both classical theory and development methods of radar data processing • Provides state-of-the-art research

results, including data processing for modern style radars, and tracking performance evaluation theory • Includes coverage of performance evaluation, registration algorithm for Radar network, data processing of passive radar, pulse Doppler radar, and phased array radar • Has applications for those engaged in information engineering, radar engineering, electronic countermeasures, infrared techniques, sonar techniques, and military command

Time-Frequency Signal Analysis with Applications Electronics and Instrumentation, Volume 35: Modulation, Resolution and Signal Processing in Radar, Sonar and Related Systems presents the practical limitations and potentialities of advanced modulation systems. This book discusses the concepts and techniques in the radar context, but they are equally essential to sonar and to a wide range of signaling and data-processing applications, including seismology, radio astronomy, and band-spread communications. Organized into 15 chapters, this volume begins with an overview of the principal developments sought in pulse radar. This text then provides a discussion and analysis of a wide range of various modulation systems. Other chapters consider the intrinsic Doppler resolving power of a radar system. This book discusses as well the power illuminating a radar or sonar target that may be comprised of one or more discrete pulses. The final chapter deals with the transmitter-modulator circuits and valves. This book is a valuable resource for electronic engineers and scientists.

Radar Data Processing: Advanced topics and applications The first book to present a systematic and coherent picture of MIMO radars Due to its potential to improve target detection and discrimination capability, Multiple-Input and Multiple-Output (MIMO) radar has generated significant attention and widespread interest in academia, industry, government labs, and funding agencies. This important new work fills the need for a comprehensive treatment of this emerging field. Edited and authored by leading researchers in the field of MIMO radar research, this book introduces recent developments in the area of MIMO radar to stimulate new concepts, theories, and applications of the topic, and to foster further cross-fertilization of ideas with MIMO communications. Topical coverage includes: Adaptive MIMO radar Beampattern analysis and optimization for MIMO radar MIMO radar for target detection, parameter estimation, tracking,association, and recognition MIMO radar prototypes and measurements Space-time codes for MIMO radar Statistical MIMO radar Waveform design for MIMO radar Written in an easy-to-follow tutorial style, MIMO Radar Signal Processing serves as an excellent course book for graduate students and a valuable reference for researchers in academia and industry.

Radar Data Processing with Applications High spatial resolution data including those from satellite, manned aircraft, and unmanned aerial vehicle (UAV) platforms provide a novel data source for addressing environmental questions with an unprecedented level of detail. To effectively utilize information contained in high spatial resolution imagery, some key questions must be addressed, including: (1) what are the challenges of using new sensors and new platforms? (2) what are the cutting-edge methods for fine-level information extraction from high spatial resolution images? and (3) how can high spatial resolution data improve the quantification and characterization of physical-environmental or human patterns and processes? The chapters in this book provide a snapshot of cutting-edge high spatial resolution remote sensing image collection, preprocessing, processing, and

applications. This book intents to provide a useful benchmark for the high spatial resolution remote sensing community and inspire more studies that would address important scientific and technical challenges in use of high spatial remote sensing.

Topics in Radar Signal Processing The subject of this book is theory, principles and methods used in radar algorithm development with a special focus on automotive radar signal processing. In the automotive industry, autonomous driving is currently a hot topic that leads to numerous applications for both safety and driving comfort. It is estimated that full autonomous driving will be realized in the next twenty to thirty years and one of the enabling technologies is radar sensing. This book presents both detection and tracking topics specifically for automotive radar processing. It provides illustrations, figures and tables for the reader to quickly grasp the concepts and start working on practical solutions. The complete and comprehensive coverage of the topic provides both professionals and newcomers with all the essential methods and tools required to successfully implement and evaluate automotive radar processing algorithms.

Radar Micro-Doppler Signatures This book 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. Topics covered include; bistatic/multistatic micro-Doppler signatures, decomposition of micro-Doppler signatures, through-wall radar micro-Doppler signatures and ultrasound micro-Doppler signature studies. Real world applications discussed include: detection, tracking and discrimination of targets with movements; analysis and identifying human movement; analysis and identifying helicopters; detection and tracking small boats in sea; analysis of wind turbines. --

Radar Rainfall Data MOP 139 provides a flexible framework and practical guidance in the development, analysis and use of radar rainfall data sets.

Radar Data Processing With Applications In this study, the recent mathematical theory of wavelets was introduced to the engineering problems of designing radar systems, radar processors, and radar algorithms. The goal was to make radars more efficient or more effective by the use of wavelets. To understand why particular possible applications of wavelets to radars were examined, it is necessary to understand some background information on both radars and wavelets theory.

Seismic Data Interpretation using Digital Image Processing 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.

Space Based Radar Radar has been an important topic since its introduction, in a military context, during World War II. Due to advances in technology, it has been necessary to refine the algorithms employed within the signal processing architecture. Hence, this book provides a series of chapters examining some topics in modern radar signal processing. These include synthetic aperture radar, multiple-input multiple-output radar, as well as a series of chapters examining other key issues relevant to the central theme of the book.

Radar Data Processing: Advanced topics and applications An authoritative text covering the key topics, concepts and analytical tools needed to understand modern communication and radar systems. With numerous examples, exercises and computational results, it is an invaluable resource for graduate students in electrical and computer engineering, and practitioners in communications and radar engineering.

Knowledge Based Radar Detection, Tracking and Classification Radar Signal Processing and Its Applications brings together in one place important contributions and up-to-date research results in this fast-moving area. In twelve selected chapters, it describes the latest advances in architectures, design methods, and applications of radar signal processing. The contributors to this work were selected from the leading researchers and practitioners in the field. This work, originally published as Volume 14, Numbers 1-3 of the journal, Multidimensional Systems and Signal Processing, will be valuable to anyone working or researching in the field of radar signal processing. It serves as an excellent reference, providing insight into some of the most challenging issues being examined today.

Applications of Weather Radar Systems The set comprises: Volume 1: Novel Radar Techniques and Applications Volume 2: Novel Radar Techniques and

Applications

Radar Signal Analysis and Processing Using MATLAB 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 Signal Processing and Its Applications The First Comprehensive Guide to the Principles, Design Methods, and Applications of Space Based Radar Turn to Space Based Radar for authoritative information on the latest developments in Space Based Radar (SBR), covering fundamental principles, cutting-edge design methods, and several new applications. This SBR guide focuses on clutter and target data generation from an SBR platform, and on Space Time Adaptive Processing (STAP) to enhance the target detection and the clutter cancellation capabilities of the radar system. Designed to save you hours of research time and effort, this one-stop resource explores the full range of SBR topics, including SBR footprint and range foldover phenomenonDoppler shift that accounts for Earth's rotationterrain modelingSTAP algorithms for enhanced target detectionand much more. Packed with over 250 full-color illustrations, Space Based Radar features: Complete coverage of the technical issues associated with SBR and their impact on system performance A CD containing all of the book's illustrations, equations, and samples; plus more than 250 PowerPoint slides for self-study or lectures Inside This Pioneering SBR Sourcebook • Introducing Space Based Radar • The Conics • Two Body Orbital Motion and Kepler's Laws • SBR Kinematics • Space Time Adaptive Processing for Space Based Radar • Performance Analysis Using Cramer-Rao Bounds • Waveform Diversity

*Optical Data Processing 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.*

Digital Signal Processing Techniques and Applications in Radar Image Processing "The culmination of more than twenty years of research, this authoritative resource provides you with a practical understanding of time-frequency signal analysis. The book offers in-depth coverage of critical concepts and principles, along with discussions on key applications in a wide range of signal processing areas, from communications and optics to radar and biomedicine. Supported with over 140 illustrations and more than 1,700 equations, this detailed reference explores the topics you need to understand for your work in the field, such as Fourier analysis, linear time frequency representations, quadratic time-frequency distributions, higher order time-frequency representations, and analysis of non-stationary noisy signals. This unique book also serves as an excellent text for courses in this area, featuring numerous examples and problems at the end of each chapter. "