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## 58A - CONRAD TESSA

All the expert guidance you need to understand, build, and operate GPS receivers The Second Edition of this acclaimed publication enables readers to understand and apply the complex operation principles of global positioning system (GPS) receivers. Although GPS receivers are widely used in everyday life to aid in positioning and navigation, this is the only text that is devoted to complete coverage of their operation principles. The author, one of the foremost authorities in the GPS field, presents the material from a software receiver viewpoint, an approach that helps readers better understand operation and that reflects the forecasted integration of GPS receivers into such everyday devices as cellular telephones. Concentrating on civilian C/A code, the book provides the tools and information needed to understand and exploit all aspects of receiver technology as well as relevant navigation schemes: Overview of GPS basics and the constellation of satellites that comprise the GPS system Detailed examination of GPS signal structure, acquisition, and tracking Step-by-step presentation of the mathematical formulas for calculating a user's position Demonstration of the use of computer programs to run key equations Instructions for developing hardware to collect digitized data for a software GPS receiver Complete chapter demonstrating a GPS receiver following a signal flow to determine a user's position The Second Edition of this highly acclaimed text has been greatly expanded, including three new chapters: Acquisition of weak signals Tracking of weak signals GPS receiver related subjects Following the author's expert guidance and easy-to-follow style, engineers and scientists learn all that is needed to understand, build, and operate GPS receivers. The book's logical flow from basic concepts to applications makes it an excellent textbook for upper-level undergraduate and graduate students in electrical engineering, wireless communications, and computer science.

Gallium Arsenide IC Applications Handbook is the first text to offer a comprehensive treatment of Gallium Arsenide (GaAs) integrated chip (IC) applications, specifically in microwave systems. The book's coverage of GaAs in microwave monolithic ICs demonstrates why GaAs is being hailed as a material of the future for the various advantages it holds over silicon. This volume provides scientists, physicists, electrical engineers, and technology professionals and managers working on microwave technology with practical information on GaAs applications in radar, electronic warfare, communications, consumer electronics, automotive electronics and traffic control. Includes an executive summary in each volume and chapter Facilitates comprehension with its tutorial writing style Covers key technical issues Emphasizes practical aspects of the technology Contains minimal mathematics Provides

a complete reference list

This text explores the practical realities that arise from the employment of geolocation for electronic warfare in real-world systems, including position of the target, errors in sensor position, orientation, or velocity, and the impact of repeated measurements over time. The problems solved in the book have direct relevance to accurately locating and tracking UAVs, planes, and ships. As a companion volume to the author's previous book *Emitter Detection and Geolocation for Electronic Warfare* (Artech House, 2019), this book goes in depth on real-world complications that include: working within and converting between different coordinate systems, incorporation of prior information about targets, sensor uncertainties, the use of multiple snapshots over time, and estimating the current position and velocity of moving targets. The e-book version described here includes several links to software and videos that can be downloaded from the publicly available Git repository. The book also includes all MATLAB code necessary to develop novel algorithms that allow comparisons to classical techniques and enable you to account for errors in timing, position, velocity, or orientation of the sensors. With its unique and updated coverage of detailed geolocation techniques and data, and easy linkable access to additional software and videos, this is a must-have book for engineers and electronic warfare practitioners who need the best information available on the development or employment of geolocation algorithms. It is also a useful teaching resource for faculty and students in engineering departments covering RF signal processing topics, as well as anyone interested in novel applications of SDR's and UAVs.

This volume includes the proceedings of the 2015 International Conference on Information Technology and Intelligent Transportation Systems (ITITS 2015) which was held in Xi'an on December 12-13, 2015. The conference provided a platform for all professionals and researchers from industry and academia to present and discuss recent advances in the field of Information Technology and Intelligent Transportation Systems. The presented information technologies are connected to intelligent transportation systems including wireless communication, computational technologies, floating car data/floating cellular data, sensing technologies, and video vehicle detection. The articles focusing on intelligent transport systems vary in the technologies applied, from basic management systems to more application systems including topics such as emergency vehicle notification systems, automatic road enforcement, collision avoidance systems and some cooperative systems. The conference hosted 12 invited speakers and over 200 participants. Each paper was under double peer reviewed by at least 3 reviewers. This proceedings are sponsored by Shaanxi Computer Society and co-sponsored by Chang'an Uni-

versity, Xi'an University of Technology, Northwestern Poly-technical University, CAS, Shaanxi Sirui Industries Co., LTD.

This handbook is designed to aid electronic warfare and radar systems engineers in making general estimations regarding capabilities of systems. It is not intended as a detailed designer's guide, due to space limitations. Portions of the handbook and future changes will be posted on an internet link.

A practical guide to the principles of radio communications for both civilian and military applications. In this book, the author covers both the civilian and military uses of technology, focusing particularly on the applications of radio propagation and prediction. Divided into two parts, the author introduces the basic theory of radio prediction before providing a step-by-step explanation of how this theory can be translated into real-life applications. In addition, the book presents up-to-date systems and methods to illustrate how these applications work in practice. This includes systems working in the HF bands and SHF. Furthermore, the author examines the performance of these systems, and also the effects of noise, interference and deliberate jamming, as well as the performance of jamming, detection and intercept systems. Particular attention is paid to the problems caused by Radio Controlled Improvised Explosive Devices (RCIEDs). Key Features: A practical handbook on the topic of radio communications and propagation. Written by an expert in both the civilian and military applications of the technology. Focuses on methods such as radio and radar jamming, and radio-controlled improvised explosive devices (IEDs). Contains problems and solutions to clarify key topics.

Annotation "This book by the author of Digital Techniques for Wideband Receivers will be like no other one on your book shelf as the definitive word on electronic warfare (EW) receiver design and performance. Whether you are an EW scientist involved in the test and evaluation of EW receivers or a designer of RWR's and other EW-related receivers, Microwave Receivers with Electronic Warfare Applications is a handy reference through which you can perfect your technical art. Lucidly written, this book is a treatise on EW receivers that is relevant to you if you are just looking for a top-level insight into EW receivers or need to know the intricate details of cause and effect behavior in EW receiver theory and design. Regardless of your need, be it for just the "quick and dirty" overview of each EW receiver type or for the exquisite technical details, this book will fill up the cup. I highly recommend you have this book along with Tsui's Digital Techniques for Wideband Receivers as a two-volume set. Introduction Characteristics of Microwave Receivers Parameters Measured by EW Receivers Crystal Video Receivers Superheterodyne and Homodyne Receivers Instantaneous Frequency Measurement (IFM) Receivers Channelized Receivers Compressive (Microscan) Receivers Bragg Cell Receivers (Optical Processors) Hybrid and Cueing Receivers Extremely High Frequency (EHF) Receivers Measurements of EW Receivers Appendix.

Provides a comprehensive introduction to microwave receivers stressing both the general characteristics of microwave devices and the uses of particular systems. Covers receiver definition and performance and discusses the important area of receiver systems. Emphasizes the necessity of designing microwave receiver systems to receive hostile communications during electronic warfare. Material has been collected from technical articles, specialists in the field, and the author's own experience. Written at a level appropriate for advanced undergraduates and first-year graduate students.

This edition features a wealth of new material on urban warfare, including a computer simulation of EW architecture alternatives for land-based forces based on urban constraints. It also includes an expanded section on time-hopped spread spectrum communi-

cations, more details on modern communication system technologies such as CDMA and OFDM, and an in-depth discussion on sources of urban noise. This practical resource is focused on showing the reader how to design and build jammers specifically targeted at spread spectrum, anti-jam communications. Moreover, it gives assistance in evaluating the expected performance of jamming systems against modern communications systems, and discover the best waveform to use to counter communication systems designed to be effective in jamming environments. While mathematical derivations in general are avoided, the book presents error rate performance equations for most modern digital anti-jam communication systems.

The third book in the bestselling Artech House EW 100 series is dedicated entirely to the practical aspects of electronic warfare against enemy communication. From communications math (mainly simple dB formulas), receiving systems, and signals, to communications emitter location, intercept, and jamming, this comprehensive volume covers all the key topics in the field.

This fully revised and updated third edition of Digital Techniques for Wideband Receivers offers a comprehensive design guide for digital processing work with today's complex receiver systems. Digital Techniques for Wideband Receivers is widely recognised as the definitive reference and training text on digital signal processing techniques in radio receivers used for Electronic Warfare applications. This third edition of Digital Techniques for Wideband Receivers has been fully revised and modernised to bring the reader up-to-date with the latest modern techniques including; wideband electronic warfare receivers, the detection of FM and BPSK radar signals, analog-to-information, time-reversal filter and an encoder example. From fundamental concepts and procedures to recent technology advances in digital receivers, readers will receive practical solutions to important wideband receiver problems. With the addition of brand new material, (including four entirely new chapters) this new book has been updated with many of the latest concepts to help users design receivers that are relevant for today's electronic warfare systems.

Modern electronic warfare systems are directed against an ever increasing variety of electronic systems. It is necessary to intercept certain signals so that countermeasures or analysis can be accomplished. To accomplish the intercept, receiving systems with as high a probability of intercept as possible are required. This study examines factors causing probability of intercept to decrease and the methods that may be used to combat those factors. Receiving systems having unity probability of intercept are examined. Systems examined are the IFM, acoustooptic and two-tuple type receiver. The effects of external and internal noise, receiver and antenna scan factors, signal density, signal processors, display systems and bandwidth are factors limiting probability of intercept that are examined. One concludes that through proper design, systems can be achieved with unity intercept probability.

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 quick-

ly and easily.

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.

In answer to great demand, Artech House is proud to bring professionals a newly revised and updated edition of the bestselling book *Introduction to Modern EW Systems*. The Second Edition has been greatly expanded to include a wealth of new material, from remote piloted airborne systems, directed energy weapons, and non-cooperative air surveillance...to EW radar band sensor next generation architectures, real-time data links, and smart jamming. This authoritative resource provides engineers and students with the latest electronic warfare (EW) techniques and technologies related to on-board military platforms. Practitioners gain expert design guidance on technologies and equipment used to detect and identify emitter threats, offering an advantage in the never-ending chess game between sensor guided weapons and EW systems. This unique book provides deeper insight into EW systems principles of operation and their mathematical descriptions, arming professionals with better knowledge for their specific design applications. Moreover, readers get practical information on how to counter modern communications data links which provide connectivity and command flow among the armed forces in the battlefield. Taking a sufficiently broad perspective, this comprehensive volume offers a panoramic view of the various physical domains RF, Infrared, and electronics that are present in modern electronic warfare systems. This in-depth book is supported with over 340 illustrations and more than 450 equations.

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. Readers learn how to calculate the distance over which a satellite can view as a function of its orbital parameters, how long the satellite can see that point, and the frequency shift in signals received by the satellite or an Earth based receiver. EW applications of orbit mechanics, satellite links, radio propagation and link vulnerability. Written by an expert in the field, this book is useful

for technical and non-technical professionals.

Information warfare is emerging as the new war fighting paradigm of the U.S. and many of its allies. This book is the first in the field to address communication electronic warfare (EW) systems in the context of information warfare. Authored by a recognized leading authority, the book includes a unique formulation of EW system performance and presents results of system simulations that have not appeared previously in any related literature. Essential reading for EW engineers and researchers working in defense, aerospace, and military capacities, the book explores the properties of information, the properties of information communication means, information theory, EW system architectures, and two operational simulations, one in Northeast Asia and the other in urban terrain.

This book presents a comprehensive set of radar and electronic warfare principles including many of the latest applications in a clear and consistent manner. Following on from the 3rd edition of this book (2004) *Radar and Electronic Warfare Principles for the Non-specialist*, 4th Edition, remains true to the traditional strength of the book, providing radar principles for the non-specialist, and also now introducing EW principles. All radar-related material has been reviewed, revised and enhanced as necessary. New to this edition: Significant revisions to; target signal-to-noise ratio, target detection theory, array antennas, radar measurements and tracking, and target signatures The addition of new EW-related material addressing electronic support (ES), electronic attack (EA), and electronic protection (EP) The advanced radar concepts chapter has been revised, including the addition of a section on modern multi-function, -mode, -mission radar systems. Most of the chapters are stand-alone allowing the reader to be selective and still benefit from the content. Exercises at the end of each chapter are provided to reinforce the concepts presented and illustrate their applications, making this book ideal for academic learning, training courses or self-study. Topics covered include: electromagnetic propagation, target detection, antennas, measurements and tracking, radar cross section and system applications. By reading this book, you should expect to be able to conduct a respectable, first-order radar system design or analysis and perform a first-order EW system design or analysis. This book will also provide you with the skills to critique the designs or analysis of others.

Radio communications plays an increasingly critical and growing role in today's electronic battlefield. Because more and more radio signals are deployed in electronic warfare (EW) situations, determining which ones are friendly and which are enemy has become more difficult and crucial. This book arms defense systems designers and operators with the full array of traditional search mechanisms and advanced high-resolution techniques for targeting radio signals deployed in electronic warfare. An invaluable technical reference, the book helps professionals fully understand the tradeoffs involved in designing EW target acquisition systems with less time and effort. Moreover, practitioners learn how to establish optimum methods for acquiring communication targets for exploitation or countermeasures. The book also serves as an excellent text for graduate courses in electronic warfare.

This is a reference work for EW engineers which is also intended for university use in advanced undergraduate or graduate-level courses in EW, radar, and aerospace systems. This text reviews the fundamental concepts and physical principles underlying EW receiving systems design analysis, and performance evaluation. The main discussion focuses on radar signals in military applications.

Focusing mainly on the engineering aspects of communications electronic warfare (EW) systems, this thoroughly updated and re-

vised edition of a popular Artech House book offers you a current and complete introduction to the subject. The second edition adds a wealth of new material, including expanded treatments of two critical areas RF noise and the effects of signal fading. Moreover, now you find a complete chapter on the important topic of jamming performance over fading channels. Supported with over 700 equations, this authoritative resource details the components, systems, and operations of electronic warfare systems dedicated to protecting and attacking military communications networks. You are provided with a complete understanding of how modern direction finders for communication signals work, along with their limitations. The book also helps you acquire a working knowledge of hyperbolic emitter location technologies, and shows you how to measure performance, defining the basic operations necessary for communication EW systems. You are provided with a technique for geolocation of low probability of intercept/anti-jam targets. Use this book to identify state-of-the-art EW technology, understand basic EW processes, and gain insight into the future direction of these systems.

This book constitutes the joint refereed proceedings of the 18th International Conference on Next Generation Wired/Wireless Advanced Networks and Systems, NEW2AN 2018, the 11th Conference on Internet of Things and Smart Spaces, ruSMART 2018. The 64 revised full papers presented were carefully reviewed and selected from 186 submissions. The papers of NEW2AN focus on advanced wireless networking and applications; lower-layer communication enablers; novel and innovative approaches to performance and efficiency analysis of ad-hoc and machine-type systems; employed game-theoretical formulations, Markov chain models, and advanced queuing theory; grapheme and other emerging material, photonics and optics; generation and processing of signals; and business aspects. The ruSMART papers deal with fully-customized applications and services.

This comprehensive resource provides the latest information on digitization and reconstruction (D&R) of analog signals in digital radios. Readers learn how to conduct comprehensive analysis, concisely describe the major signal processing procedures carried out in the radios, and demonstrate the dependence of these procedures on the quality of D&R. The book presents and analyzes the most promising and theoretically sound ways to improve the characteristics of D&R circuits and illustrate the influence of these improvements on the capabilities of digital radios. The book is intended to bridge the gap that exists between theorists and practical engineers developing D&R techniques by introducing new signal transmission and reception methods that can effectively utilize the unique capabilities offered by novel digitization and reconstruction techniques.

This revised and expanded second edition brings you to the cutting edge with new chapters on LPI radar design, including over-the-horizon radar, random noise radar, and netted LPI radar. You also discover critical LPI detection techniques, parameter extraction signal processing techniques, and anti-radiation missile design strategies to counter LPI radar.

This popular series of tutorials, featured over a period of years in the Journal of Electronic Defense, is now available in a single volume. Organized into chapters with new introductory and supplementary material from the author, you get clear, concise and well-illustrated examinations of critical topics such as antenna parameters, receiver sensitivity, processing tasks, and search strategies, LPI signals, jamming, communication links, and simulation. The chapters define key terms and explain how and why particular technologies are relevant to electronic defense. Detailed charts, diagrams and formulas give you the practical knowledge you need to apply specific techniques in the field.

Over 3.400 total pages ... Includes: Electronic Warfare and Radar Systems Engineering Handbook, 2013, 455 pages Electronic Warfare and Radar Systems Engineering Handbook, 2012, 399 pages Electronic Warfare and Radar Systems Engineering Handbook, 1999, 287 pages Electronic Warfare and Radar Systems Engineering Handbook, 1997, 602 pages Electronic Warfare Fundamentals, 2000, 351 pages Radar Fundamentals Student Guide Volume II, no date, 355 pages Principles of Naval Weapons Systems, no date, 351 pages Electronic Warfare, U.S. Marine Corps, 2002, 73 pages Marine Corps Warfighting Publication (MCWP) 6-22, Communications and Information Systems, 1999, 146 pages Marine Corps Warfighting Publication (MCWP) 6-22D, Field Antenna Handbook, 1999, 146 pages, 192 pages Plan / Design / Layout Of Satellite Communication Systems, 1994, 169 pages

This comprehensive sourcebook thoroughly explores the state-of-the-art in communications receivers, providing detailed practical guidance for constructing an actual high dynamic range receiver from system design to packaging. You also find clear explanations of the technical underpinnings that you need to understand for your work in the field. This cutting-edge reference presents the latest information on modern superheterodyne receivers, dynamic range, mixers, oscillators, complex coherent synthesizers, automatic gain control, DSP and software radios. You find in-depth discussions on system design, including coverage of all pertinent data and tools. Moreover, the book offers you a solid understanding of packaging and mechanical considerations, as well as a look at tomorrow's receiver technology, including new Bragg-cell applications for ultra-wideband electronic warfare receivers. This one-stop resource is packed with over 300 illustrations that support critical topics throughout."

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.

EW 101 has been a popular column in the Journal of Electronic Defense for a number of years. This compilation of tutorial articles from JED provides introductory level electronic warfare instruction for students of the discipline.

This book is a current, comprehensive design guide for your digital processing work with today's complex receiver systems. This book brings you up-to-date with the latest information on wideband electronic warfare receivers, the ADC testing procedure, frequency channelization and decoding schemes, and the operation of monobit receivers.

An introduction to the subject for non-specialists: engineers, technicians, pilots, and aerospace industry marketing, public relations, and customer support personnel. Also a reference for specialists in the field. The completely rewritten and revised Second Edition updates the original published by the Hughes Aircraft Company.

The air campaign mounted against North Vietnam was the first time that an integrated air defense system based around radar--

controlled guns and surface-to-air missiles had been encountered. Proponents of surface-to-air missiles had claimed that their lethality would drive manned aircraft from the battlefield. At first, the U.S. Air Force was hard-pressed to neutralize North Vietnam's radar-controlled defenses, but did prevail. Electronic countermeasures support for the air war against North Vietnam included stand-off jamming, Wild Weasel operations, the use of self protection pods, and the employment of chaff. Using all these techniques, Linebacker II saw the B-52s of Strategic Air Command facing the most effective air defense system the Soviet Union could provide. The B-52s won; the much-heralded surface-to-air missiles were scoring a lower kill rate than German defenses in World War Two. This campaign laid the foundations for the technology used by the USAF to neutralize enemy defenses ever since.

Worldwide growth of space communications has caused a rapid increase in the number of satellites operating in geostationary orbits, causing overcrowded orbits. This practical resource is designed to help professionals overcome this problem. This timely book provides a solid understanding of the use of radio interferometers for tracking and monitoring satellites in overcrowded environments. Practitioners learn the fundamentals of radio interferometer hardware, including antennas, receiving equipment, signal processing and phase detection, and measurement accuracies. This in-depth volume describes the nature of the targets to be tracked by the interferometer, helping to clarify the movement of target satellites and what specific information has to be caught by the interferometer. Additionally, engineers find details on applications to practical cases of satellite tracking, covering different types of interferometers, recent technical developments, orbital monitoring and safety control.

This book provides readers a thorough understanding of the applicability of new-generation silicon-germanium (SiGe) electronic subsystems for electronic warfare and defensive countermeasures in military contexts. It explains in detail the theoretical and technical background, and addresses all aspects of the integration of SiGe as an enabling technology for maritime, land, and airborne / spaceborne electronic warfare, including research, design, development, and implementation. The coverage is supported by mathematical derivations, informative illustrations, practical examples, and case studies. While SiGe technology provides speed, performance, and price advantages in many markets, to date only limited information has been available on its use in electronic warfare systems, especially in developing nations. Addressing that need, this book offers essential engineering guidelines that especially focus on the speed and reliability of current-generation SiGe circuits and highlight emerging innovations that help to ensure the sustainable long-term integration of SiGe into electronic warfare systems.

Receivers systems are considered the core of electronic warfare (EW) intercept systems. Without them, the fundamental purpose

of such systems is null and void. This book considers the major elements that make up receiver systems and the receivers that go in them. This resource provides system design engineers with techniques for design and development of EW receivers for modern modulations (spread spectrum) in addition to receivers for older, common modulation formats. Each major module in these receivers is considered in detail. Design information is included as well as performance tradeoffs of various components. Major factors that influence the functioning of the modules are identified and discussed. Key performance parameters are identified as well, and approaches to achieving design goals are considered. Antennas systems play a critical role in modern electronic warfare communications and radar. Today's EW engineers need to have a solid understanding of the design principles of this technology and how antenna systems are used in the field. This comprehensive book serves as a one-stop resource for practical EW antenna system know-how. Supported with over 700 illustrations and nearly 1,700 equations, this authoritative reference offers professionals detailed explanations of all the important foundations and aspects of this technology. Moreover, engineers get an in-depth treatment of a wide range of antenna system applications. The book presents the key characteristics of each type of antenna, including dipoles, monopoles, loops, arrays, horns, and patches. Practitioners also find valuable discussions on the limitations of antennas system performance in EW applications.

This enhanced and fully revised 4th Edition of Radar and Electronic Warfare Principles for the Non-specialist presents a comprehensive set of radar and electronic warfare principles including many of the latest applications with the addition of new EW principles. Written by a prominent expert in the field, this authoritative new resource presents anti-ship missile (ASM) electronic protection (EP) techniques designed to enhance accurate target classification currently being developed by personnel from the People's Republic of China and other nations. This book provides a comprehensive introduction to modern electronic warfare (EW) in an era of information warfare (IW). It explores the capabilities of coherent radar and digital signal processing to rapidly and accurately classify targets. Both naval and air electronic EW are covered in this resource. This book gives insight into modern EW as an information battle and includes guidance on properly testing the effectiveness of electronic attack (EA) systems. Pulsed Doppler radar basics including, electromagnetic pulse, dynamic range, gain control, and Doppler effects are presented. A summary of the ASM sensor and EA model is provided and readers find coverage of the radar range equation, burn through, and the range Doppler map and imaging. Special topic-extended target classifications including, false, decoys, and chaff are explained. Special topic ASM EP waveforms and multiple receiver EP are also covered. This book explores features of algorithms to optimize combining multiple parameters and systems. Moreover, it explains several algorithms proposed by PRC personnel to implement optimal two-channel processing that mitigates cover noise EA.