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A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in Scientific and technical aerospace reports (STAR) and International aerospace abstracts (IAA).

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.

A world list of books in the English language.

This highly practical resource offers you an in-depth understanding of microwave front end integration and how it is applied in the avionics field. You find detailed guidance on circuit integration, including coverage of component miniaturization, hybrid and monolithic integrated circuits, and 3D design. The book addresses system integration with discussions on the combination of different avionic systems, single antenna design, top/bottom front end combination, and integration of passive and active antenna modules. This first-of-its-kind volume features unique material on novel structures of avionics front end, novel transmission lines, elements, and devices, as well as new strategies for microwave front-end design. Supported with nearly 200 illustrations and more than 160 equations, this book is a valuable professional reference and also serves well as a postgraduate textbook.

This revised edition surveys sophisticated electronic warfare systems with the latest technological advances. New material covers current radar techniques, with the latest in IR techniques, and EW weapons systems and defense equipment. It also includes an introduction to Information Operations and Information Warfare.

This book shows you how to consider AGC, signal thresholding, and range tracking loops from a practical viewpoint.

This book clearly describes all the radar detection and jamming equations you need to design and

analyze search and track radars. It reviews the hardware, theories, and techniques involved in modern EW systems signal processing and discusses present and future trends in EW technology.

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.

Microwave Passive Direction Finding unifies direction finding (DF) theory and brings together into a single source wide-ranging information on the technology of measuring the direction-of-arrival of microwave signals. Throughout the material, there is authoritative information useful to preparing a detailed technical proposal for new business that has been compiled from many years of defense industry presentations, reports, and systems development. Diagrams and photographs of state-of-the-art equipment depict the methods discussed, and equations and charts facilitate a "hands-on" approach to calculating system performance. The book also presents rarely published systems concepts, such as digital preprocessing, supercommutation, and wide RF bandwidth signal detection methods. Specific sections cover evolution and use of monopulse passive DF receiver theory, design of antenna elements for conformal DF coverage, receiver configurations, DF antenna arrays, interferometer DF techniques, computation methods for signal detection, probability of detection, accuracy of DF systems, and signal processing and display methods. More than any book on this technology, Microwave Passive Direction Finding anticipates the questions that arise in the DF design process. The chapters are organized to stand alone, making the book useful as a text/reference for the practicing engineer. At the same time, the material is organized inductively, so that it can be used for a college or seminar text.

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 engi-

neers 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.

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 practical reference shows SAR system designers and remote sensing specialists how to produce higher quality SAR images using data-driven algorithms, and apply powerful new techniques to measure and analyze SAR image content.

This book aims to highlight the strength and state-of-art of some techniques and methods applied to intelligent systems. Rather to cover the variety of techniques and methods available in the literature, which is out of scope of this book, it focuses on those consolidated and applied and on those with high potential of implementation to smart systems. This book has fourteen chapters covering a broad range of topics in communications. The first three chapters are devoted to state-of-art and review papers on planar filters, unmanned aerial vehicles (UAV), negative group delay, nanoclusters, and tunable lights, while the remain chapters cover specific topics such as smart monitoring, V2I, high-speed links, RF and Optical sensors, composite material, metamaterial, energy harvesting, radar, SWIPT, and electromagnetic sources.

Highly respected authors have reunited to update the well known 1981 edition which is still hailed as one of the best in its field. This edition includes recent antenna innovations and applications. It features a succinct treatment of the finite difference, time domain (FDTD) computational technique. It is also the first text to treat physical theory of diffraction (PTD).

Introduction to Adaptive Arrays serves as an introduction to the subject of adaptive sensor systems whose principle purpose is to enhance the detection and reception of certain desired signals. The field of array sensor systems is now a maturing technology. With applications of these systems growing more and more numerous, there is a wealth of widely scattered literature on various aspects of such systems. Unfortunately, few books attempt to provide an integrated treatment of the entire system that gives the reader the perspective to organize the available literature into easily understood parts. Intended for use both as a graduate level textbook and as a reference work for engineers, scientists, and systems analysts, this book provides such an integrated treatment by emphasizing the

principles and techniques that are of fundamental importance in modern adaptive array systems.

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.

Disk contains: MATLAB/SIMULINK programs to be used for the problem exercises.

The book presents principles of operation of radar and radionavigation systems. The group of radar systems includes: primary and secondary radiolocations, bistatic and multistatic systems. They are illustrated with relevant examples of calculation and applications. The issues of increasing the range of the radar systems are presented together with the matched filtering of the used signals. Other discussed issues are methods for eliminating interfering signals and researching methods of 3D space. Various methods of the monopulse radiolocation are presented in Chapter 12. In Chapters 13–18 terrestrial and satellite radionavigation systems are under discussion. The terrestrial systems are: Loran C, Decca Navigator and Omega. The TRANSIT is an example of a hyperbolic satellite system. The stadiometric systems GPS, GLONASS, GALILEO, BeiDou, IRNSS and QZSS are discussed together with differential systems augmentating of them. The ILS, MLS and TLS supporting the landing of aircrafts are discussed in Chapter 17. The prospects for replacing of them with satellite systems augmentated by appropriate reference ground-based stations (GBAS) are also analyzed. Various beacons and ranging devices used in aviation are described in the Chapter 18. This book is intended primarily for students and engineers interested in radar, radionavigation and aerospace engineering.

We have investigated biological inspired RF direction finding techniques with the goal to learn and utilize the amazing acoustic direction finding capabilities of human and achieve compact, high performance and low-cost RF direction finding devices. Our initial simulation and experimental results are very encouraging. Through the 9-month STIR program "Human Ears Inspired Microwave Passive Direction Finding", prototype direction finding systems including antennas, human head like low-pass scatter and digital receiver have been successfully designed and built. Several biological inspired hardware configurations (i.e., head-like scatters of various properties, omni-directional antennas) and preliminary algorithms have been theoretically and experimentally tested. The effectiveness of the novel human head-like scatter has been clearly demonstrated. In addition, we have performed initial investigation of single antenna direction finding for broadband RF signals. The most important goal of the STIR program, which is to develop an experimental test bed so that it can be used in the near future to study and develop novel RF direction finding techniques inspired by the amazing human auditory system, has been achieved.

An introduction for readers with a general technical background to the design and operation of active electronic countermeasure jamming systems intended to negate the effectiveness of radar systems used by the bad guys. Presents both technical and practical aspects of the hardware and software needs

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 dia-

grams 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.

The leading text and reference on radar cross section (RCS) theory and applications, this work presents a comparison of two radar signal strengths. One is the strength of the radar beam sweeping over a target, the other is the strength of the reflected echo sensed by the receiver. This book shows how the RCS "gauge" can be predicted for theoretical objects.

This authoritative new resource provides an overview and introduction to working with RF, microwave, and high frequency components. From transmission lines, antennas, millimeter waves, ferrites, hybrids, power dividers and filters, this book focuses on practical, time-to-market issues to help with projects in the field. Keeping mathematics to a minimum, this comprehensive volume is packed with over 700 illustrations that help clarify key concepts. The reader will gain an in-depth understanding of the special characteristics exploited in microwave and high frequency design. The book is also used in industrial training courses.

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.

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. Written by a prominent expert in the field, this authoritative resource considers radar parameters and how they affect ESM systems. It describes the ESM environment, including types of radar, pulse density, the latest radar developments and how they will be seen by ESM systems. Different types of ESM systems are described, with methods of calculation of Direction of Arrival (DOA) of pulses. Conventional wisdom about RF scan strategies for narrow-band receivers will be challenged and new methods (proven to be effective in trials) will be proposed. The book describes ESM Antenna separation, which plays a significant part in the generation of DOA errors, with examples of the effects for different situations. The book will explain the common phenomena seen in ESM systems with many examples of how to recognize issues in the ESM data and solutions for their mitigation. Techniques for visualizing ESM data and how to set up ESM trials will be given, including the simulation of the electromagnetic environment. The book also presents detailed calculations for generating emitter beam-shapes for use in simulations of pulse trains and the calculation of detection range will be useful for data analysts, trials engineers and system assessors, which are not published elsewhere. The identification of radars by ESM systems is considered in detail with ideas presented on how to generate an effective radar library.

In the high frequency world, the passive technologies required to realize RF and microwave functionality present distinctive challenges. SAW filters, dielectric resonators, MEMS, and waveguide do not have counterparts in the low frequency or digital environment. Even when conventional lumped components can be used in high frequency applications, their behavior does not resemble that observed at lower frequencies. RF and Microwave Passive and Active Technologies provides detailed information about a wide range of component technologies used in modern RF and microwave systems. Updated chapters include new material on such technologies as MEMS, device packaging, surface acoustic wave (SAW) filters, bipolar junction and heterojunction transistors, and high mobility electron transistors (HMETs). The book also features a completely rewritten section on wide bandgap transistors.

Operating principles - Performance definition - Direction-finding error sources - System level descriptions - Representative operational small-aperture - Passive geolocation - Subsystem considerations - Calibration and test of direction-finding systems.