

# DRDO MONOGRAPHS

Defence Research & Development Organisation  
Ministry of Defence, Metcalfe House,  
Delhi - 110 054

*A Step Towards  
Knowledge Transformation  
— Tacit to Explicit*

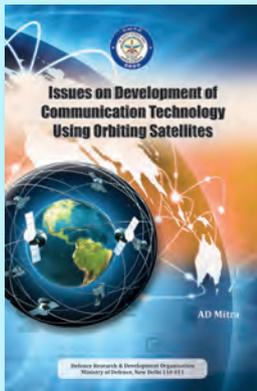


## **Digital Flight Control Systems For Practising Engineers**

**PS Krishnan and KG Narayanan, 2020**

This Monograph is a fascinating account of the journey made by Aeronautical Development Establishment (ADE), Bengaluru from its first analog automatic flight control system for an air launched drone (1974) to sophisticated digital Flight Control System (FCS) for the fly-by-wire supersonic fighter (2001) and to the autonomous low-level cruise platform (2013). A great deal of the technology described is a compilation of the work done by two generations of scientists and engineers at ADE and other co-operating institutions. Monograph would help the future entrants to flight control research and development programmes to adapt themselves to their roles more easily.

**Price: ₹ 2080/\$60/£50**

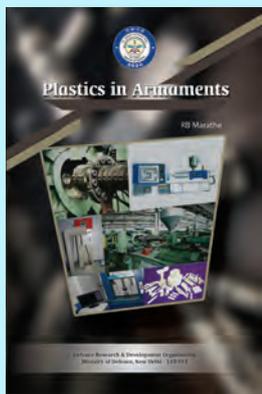


## **Issues on Development of Communication Technology Using Orbiting Satellites**

**AD Mitra, 2020**

This monograph discusses the issues on the development of a communication system based on LEO satellites and provides the background to initiate the developmental effort. Some of the topics covered in this monograph are: orbiting satellites and various types; design issues for antenna for use in the network, typical satellite network and handling of carriers; channel access in LEO satellite system; principles of quadrature sampling; design of modem and its principles; synchronisation aspects in communication networks, and many more. This monograph will serve as a basic reference for students and researchers for understanding of the subject.

**Price: ₹ 1100/\$30/£27**

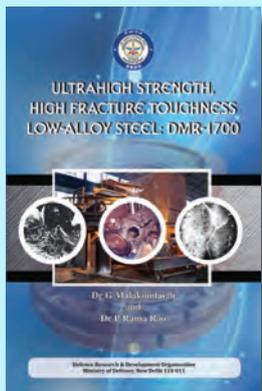


## Plastics in Armaments

RB Marathe, 2020

The monograph presents a perfect blend between the introduction to what really the plastics are, their structure/property relationship, production technologies, quality control & assurance and other topics like testing and shelf life. Various chapters covered deal on varieties of plastics/polymers, structure/property relationships, plastics and their plurality, additives, matrix materials, manufacturing technologies, testing of plastics and components and aspects of quality control/quality assurance. Topics like explosive compatibility, shelf life, failure analysis, selection of plastics and latest trends in plastics are also included in details. The monograph is basically aimed at readership for the Armament scientists and technologists, quality control and assurance personnel, officers and staff ordnance factories.

**Price: ₹ 1380/\$45/£36**



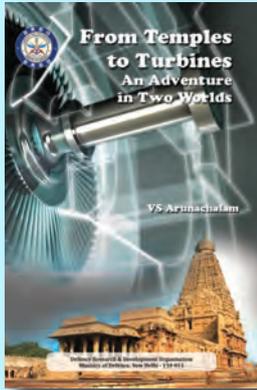
## Ultra-high Strength, High Fracture Toughness

Low-alloy Steel: DMR-1700

Dr G Malakondaiah and Dr P Rama Rao, 2019

This monograph describes the more than three decades of R&D work that led to the research-based development of a new Ultra-high Strength low-alloy steel, designated DMR-1700, its production and its defence applications. Using DMR-1700 steel led to substantial reduction of weight of the base plate for 120 mm long range mortar. Finally, superior ballistic performance of DMR-1700 steel for armour applications has been successfully demonstrated.

**Price: ₹ 1050/\$50/£40**

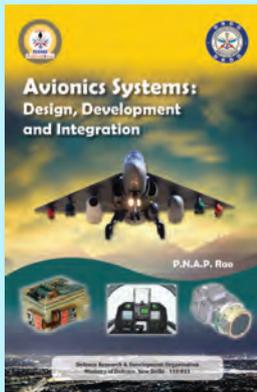


## From Temples to Turbines An Adventure in Two Worlds

Dr VS Arunachalam, 2019

This monograph describes the more than three decades of R&D work that led to the research-based development of a new Ultrahigh Strength low-alloy steel, designated DMR-1700, its production and its defence applications. Using DMR-1700 steel led to substantial reduction of weight of the base plate for 120 mm long range mortar. Finally, superior ballistic performance of DMR-1700 steel for armour applications has been successfully demonstrated.

Price: ₹ 800/\$25/£24



## Avionics Systems: Design, Developments and Integration

PNAP Rao, 2019

This monograph deals with the subject of avionics systems of both fighter aircraft and civil aircraft. Modern integrated avionics systems implement various complex functionalities of the aircraft and have interfaces with all the other systems on board the aircraft. This makes the design and development of avionics systems a complex process. This monograph covers all these aspects in detail. Subjects covered include: Avionics System Functionalities, Subsystems, System Design, Speciality Engineering topics, Integration, Testing and Certification of Avionics Systems, and many more. It also covers lessons learnt based on the experience of the author in the Indian Light Combat Aircraft (LCA)-Tejas Program.

Price: ₹ 1260/\$33/£30

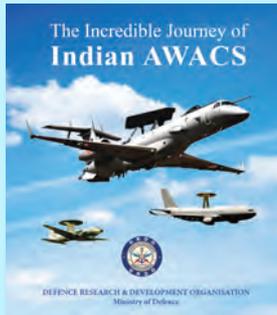


## विस्फोटकों में रासायनिक विषाक्तता: परिमाण, प्रभाव मूल्यांकन एवं सुरक्षा

डॉ त्रिभुवननाथ उपाध्याय, 2019

उच्च ऊर्जा पदार्थों का उपयोग विस्फोटकों के रूप में किया जाता है। सेना और सिविल क्षेत्रों में इनका उपयोग समान रूप से होता है। इनका उत्पादन, भंडारण, देखरेख तथा उपयोग संकट पैदा करता है। इसलिए इन कार्यों में सावधानी बरतने की आवश्यकता होती है। प्रस्तुत मोनोग्राफ में विभिन्न उच्च ऊर्जा पदार्थों का विस्फोटकों के रूप में उपयोग, उनकी विशाक्तता, विशाक्तता परिमाण, मानव शरीर पर पड़ने वाले प्रभावों के मूल्यांकन, उनके द्वारा पर्यावरण पर पड़ने वाले प्रभावों के मूल्यांकन तथा इनसे बचाव के लिए उपयोग में आने वाले विभिन्न सुरक्षात्मक यंत्रोपकरणों के विशय में विस्तार से वर्णन किया गया है। इसके लेखन का मूल उद्देश्य इस विशय के प्रति जागरूकता उत्पन्न करना है। यह मोनोग्राफ इस क्षेत्र में षोध कार्य करने वाले वैज्ञानिकों, लेखकों, विद्यार्थियों तथा अन्य ज्ञान जिज्ञासुओं के लिए उपयोगी सिद्ध होगा।

**Price: ₹ 950/\$27/£25**

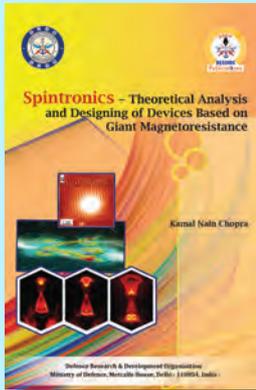


## The Incredible Journey of Indian AWACS

Dr K Ramchand; Dr S Krishnasamy and Dr BR Srikanth, 2019

This monograph chronicles the enthusiasm and excitement of the relentless pursuit, which ultimately resulted in India's entry into the exclusive league of nations with a capability to design, develop, and fly the Indian Airborne Early Warning & Control (AEW&C) system. Every chapter mirrors the innumerable hurdles, which were conquered, with key personalities recounting their experience in employing unique skills to achieve the desired results. It chronicles the extraordinary feats of science and engineering in evolving an airborne force-multiplier. It is filled with expressive personal anecdotes about every facet of the project. The high risks endured and decisions involved over three decades, to roll out an advanced eye-in-the-sky have been detailed.

**Price: ₹ 1100/\$31/£24**

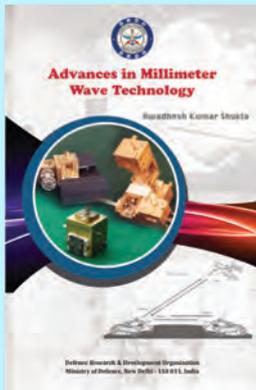


## **Spintronics - Theoretical Analysis and Designing of Devices Based on Giant Magnetoresistance**

**Kamal Nain Chopra, 2019**

This monograph covers basic principles of generation of carrier spin polarisation, spin dynamics, and spin-polarised transport. Various concepts discussed include spin transfer, torque, spin-pumping force and spin currents, tunneling anisotropic magnetoresistance, and tunnel magnetoresistance in semiconductor magnetic tunnel junction, spin-dependent magnetoresistance in all-semiconductor heterostructure, and magnetic-induced and current-induced switching. Applications of spintronics in various fields including research and quantum computers, and the fabrication of spintronics devices have also been described.

**Price: ₹ 1040/\$28/£26**

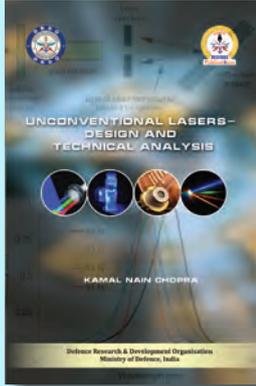


## **Advances in Millimeter Wave Technology**

**Awadhesh Kumar Shukla, 2019**

This monograph explores the design and implementation of millimeter (mm) wave active/passive circuits and systems using waveguide/MMIC (Monolithic Microwave Integrated Circuit) and planar waveguide technology. It covers frequency bands, unique mm wave applications in communication, mm wave devices and circuits, generating devices, e.g., IMPATT oscillators and Gunn oscillators, etc. Receiver components, mm wave transceiver configurations and development of mm wave systems technology useful for defence services are presented. It also discusses future trends and technology challenges which enlighten about exploitation and challenges of millimeter wave frequency spectrum in futuristic military applications.

**Price: ₹ 1340/\$32/£29**

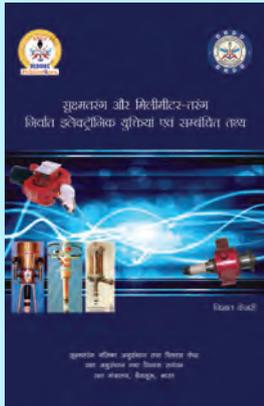


## Unconventional Lasers: Design and Technical Analysis

Kamal Nain Chopra, 2018

In this monograph, nearly all types of unconventional lasers including x-ray free-electron lasers, GaSb-based type-I diode lasers, photonic crystal-based lasers, phase conjugated lasers, quantum cascade lasers, and diode pumped fiber lasers, have been covered. These lasers have many useful applications in various fields like industry, surgery, biology, and novel imaging techniques, apart from their usage in practical research applications in most of the scientific and engineering topics. Technical analysis of the theoretical aspects of lasers with modeling and designing considerations for maximising efficiency of these lasers are discussed.

Price: ₹ 1000/\$31/£22

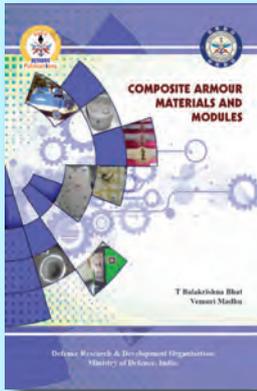


## सूक्ष्मतरंग और मिलीमीटर-तरंग निर्वात इलेक्ट्रॉनिक युक्तियां एवं सम्बंधित तथ्य

विशाल केशरी, 2018

इस पुस्तक में सूक्ष्मतरंग और मिलीमीटर-तरंग निर्वात इलेक्ट्रॉनिक युक्तियों से सम्बंधित कुछ तथ्यों को उजागर किया गया है। सम्पूर्ण पुस्तक को कुल पांच अध्यायों में वर्गीकृत किया गया है। प्रथम अध्याय में सूक्ष्मतरंग नलिकाओं और इनके उप-संयोजकों और इनके उपयोगों पर चर्चा की गई है। द्वितीय अध्याय में टोस-अवस्था के षक्तिप्रवर्धक और छोटी चल-तरंग नलिका के प्रवर्धन योग पर बने सूक्ष्मतरंग-षक्ति-प्रतिरूपक पर चर्चा की गई है। तृतीय अध्याय में पारंपरिक सूक्ष्मतरंग नलिकाओं से अलग नई पीढ़ी की जाइरो नलिकाओं को स्थान दिया गया है। इस अध्याय में जाइरो-युक्तियों का भारत में विकास प्रस्तुत किया गया है। चतुर्थ अध्याय में जाइरो श्रेणी के साइक्लोट्रॉन रिजोनेन्स मेजर पर चर्चा की गई है। इसमें दो जाइरो स्त्रोतों: जाइरो-पिनियोट्रॉन और जाइरोट्रॉन की एक दूसरे से तुलना की गई है। पंचम अध्याय में जाइरो श्रेणी के एक प्रवर्धक—जाइरो चल-तरंग नलिका के प्रसंग में चर्चा की गई है।

Price : ₹ 330/\$16/£ 17

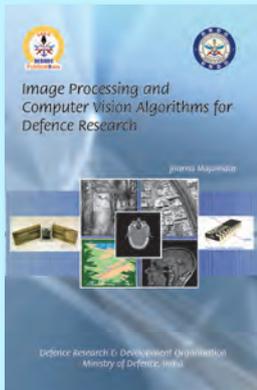


## Composite Armour Materials and Modules

T Balakrishna Bhat and Vemuri Madhu, 2017

This monograph describes an overview of the general principles of armour design, ballistic testing standards for composites, an introduction into ceramic and polymer materials, their processing and design concepts related to their use in developing practical armour systems. Chapters have been devoted specific to design of armours against small, medium, and large calibre threats. Material responses to high strain rate loading conditions and their utility in simulations have been discussed.

Price: ₹ 1000/\$20/£17

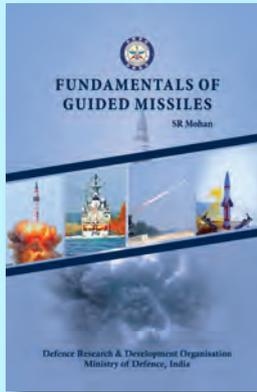


## Image Processing and Computer Vision Algorithms for Defence Research

Jharna Majumdar, 2017

This monograph covers the basic theories and concepts of digital image processing coupled to variety of algorithms to process, analyse, and interpret imagery. It elaborates on image enhancement techniques, histogram equalisation and adaptive enhancement, spatial filters, image restoration and adaptive filters, edge and line detection techniques, and image segmentation. Various quality metrics for image processing algorithms are also provided along with hardware implementation of image processing algorithms.

Price: ₹ 1400/\$38/£29

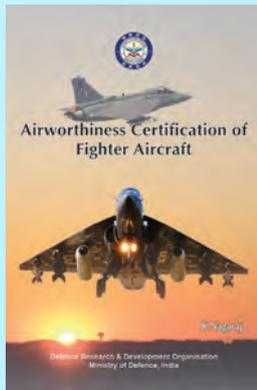


## Fundamentals of Guided Missiles

SR Mohan, 2016

This publication is intended to provide an understanding of the different parts and their interaction in making up a Guided Missile system. The chapters cover subjects like Aerodynamics, Control engineering, Propulsion, Flight Control, Missile Kinematics, Radar, Infrared, Guidance and Warheads starting from basics to a reasonable depth, so that the engineers/scientists can take part in meaningful technical discussions on Guided Missile systems.

**Price: ₹ 1000/\$90/£64**



## Airworthiness Certification of Fighter Aircraft

K Nagaraj, 2015

This monograph fills a very important niche in the broad spectrum of activities between design/development and release to service of a military fighter aircraft. The book is the outcome of decades of hands-on experience of the author in the design evaluation of the aircraft and its systems for safety and performance parameters, and in implementing the process of airworthiness certification of a variety of fighter aircraft, engines, systems, software and hardware. It gives the casual reader a glimpse of airworthiness certification activities, and to the practitioner, a detailed exposure to this complex subject.

**Price: ₹ 550/\$60/£40**

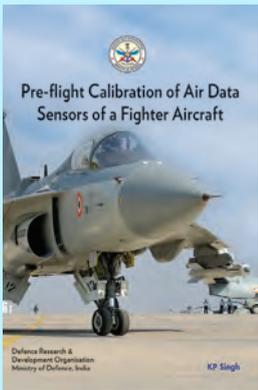


## **Investment Casting: A Treasure Trove**

**AM Sriramamurthy, 2015**

This monograph attempts to provide a comprehensive description of this highly specialised technology developed indigenously in Defence Metallurgical Research Laboratory (DMRL), through the research efforts of numerous scientists over a period of three decades. The monograph also covers some of the innovations that led to the indigenous design and fabrication of major/critical tools and equipments, thus making the technologies developed comprehensive and helping achieve a high level of self-reliance.

**Price: ₹ 1300/\$60/£40**

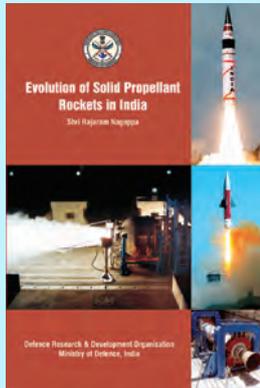


## **Pre-flight Calibration of Airdata Sensors of a Fighter Aircraft**

**KP Singh, 2014**

This monograph presents the latest tools and methods for pre-flight calibration of air data sensors of a fighter aircraft. A generic aircraft designed and developed at Aeronautical Development Agency (ADA), Bengaluru is used as a typical case in the study. Though the procedure highlighted here is for a generic fighter aircraft of ADA, it is highly applicable and adaptable for any fighter aircraft programme and will serve as a future guideline for engineers and scientists.

**Price: ₹ 325/\$35/£25**

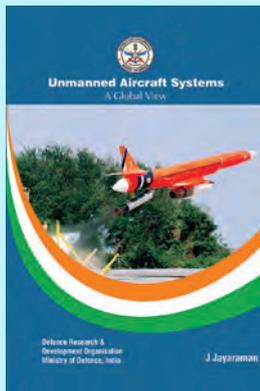


## Evolution of Solid Propellant Rockets in India

Rajaram Nagappa, 2014

Propulsion forms a major subsystem of the space launch vehicles and missiles, and today, India boasts of a significant capability and capacity in this discipline. The solid propellant rocket technology in India is essentially home-grown and has found wide application and adaptation in sounding rockets, launch vehicles, and ballistic missiles. This book highlights the development of solid propellant rockets and the main solid rocket subsystems used in the space programme and ballistic missiles with emphasis on the indigenous nature of development.

**Price: ₹ 330/\$37/£25**

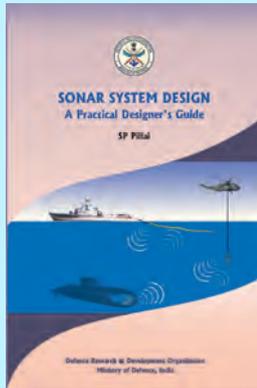


## Unmanned Aircraft Systems: A Global View

J Jayaraman, 2014

This monograph provides a bird's-eye view of the complex technology of Unmanned Aerial Vehicles (UAVs). It is targeted towards a wider audience that includes, beginners who need an introduction to the subject; practicing specialist engineers who need to learn about other disciplines; and programme managers, bureaucrats, planners and policy makers who would like to get a holistic picture of the UAV technology. It provides an approach to the system engineering methodology for the initial sizing of an UAV.

**Price: ₹ 700/\$50/£45**

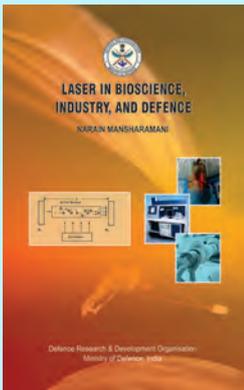


## Sonar System Design: A Practical Designer's Guide

SP Pillai, 2013

The monograph is a practical designer's guide that is carefully structured to cover various aspects of sonar design. It includes signal design, spatial and temporal processing, parameter estimation, normalisation and data fusion, optimum estimator, various normalisation schemes, and applications of under water acoustic.

**Price: ₹ 270/\$35/£25**

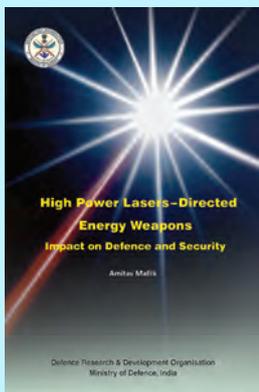


## Laser in Bioscience, Industry, and Defence

Narain Mansharamani, 2012

Laser basics, laser beam propagation, and most important cost-effective laser applications in bioscience, industry, and defence are the contents of this monograph. Its use in bioscience for painless refractive and general surgery as well as its future applications in preventing infectious and virus diseases is discussed. In industry, it covers marking, cladding, ultraviolet lithography, and diamond processing. In defence, it covers the use of laser in underwater application and uranium enrichment with efficient infrared lasers and possible clean energy by controlled nuclear fusion.

**Price: ₹ 300/\$30/£20**

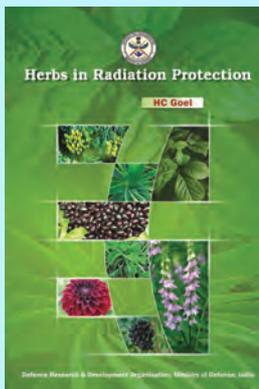


## High Power Lasers – Directed Energy Weapons Impact on Defence and Security

Amitav Mallik, 2012

High Power Laser (HPL) has emerged as one of the very promising technologies that will have major impact on defence and security in the future. The DEW with its unique features is clearly the new generation weapon that will transform the concepts of defence and deterrence. This monograph presents a comprehensive overview of this complex subject.

**Price: ₹ 270/\$35/£25**



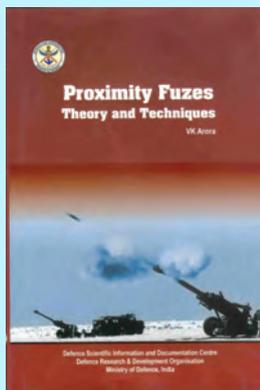
## Herbs in Radiation Protection

HC Goel, 2011

This monograph provides an overview on radiation biology and radiation protection. Part I describes the basic concepts about radiation, their interaction with matter and especially biomolecules, mechanism of radiation injuries. Part II describes radio-protective and radio-therapeutic attributes of different plants. A list of important phytochemicals available and chemical constituents of each plant is included. The application of each plant for treating various ailments described in 'Charak Samhita' and scientific literature is enumerated.

**Price: ₹ 450/\$55/£40**





## Proximity Fuzes: Theory and Techniques

VK Arora, 2010

This monograph provides an overview of proximity fuzes covering theoretical, experimental, and engineering aspects of RF Doppler proximity fuzes. In-depth analysis and design of crucial subsystem of proximity fuzes are given special importance. It covers advances based on microwave FM/CW systems and laser proximity fuzes. The instrumentation aspects of proximity fuzes are given due attention. The book also covers ECM and ECCM of proximity fuzes.

**Price: ₹ 300/\$45/£30**

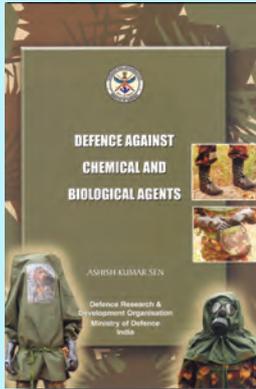


## Bioactive Glasses for Implant Applications

V Rajendran & SK Bhandari, 2010

This monograph provides an overview of the principle, development and practice of bioactive glasses for biomedical applications. It deals with the structure and properties of biomaterials, various methods used for the synthesis of bioactive glasses, and characterisation techniques along with optimisation studies. It also provides different applications of bioactive glasses and glass ceramics with practical illustrative applications in various disciplines of surgery.

**Price: ₹ 260/\$35/£25**

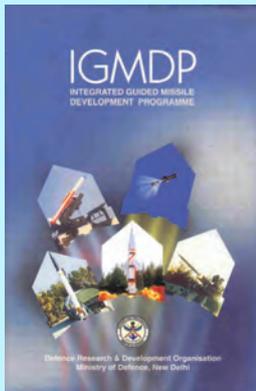


## Defence Against Chemical and Biological Agents

AK Sen, 2009

This book is aimed at creating general awareness of the effect of chemical and biological warfare and various means of protection. It consists of nine chapters and the vast list of topics include: chemical warfare agents, their classes, physiological effect on human beings, pretreatment and therapy, potential biological warfare agents, the disease they produce and delivery, different techniques of decontamination systems, protection, detectors used in battlefield to warn soldiers in the battlefield, as well as civilians of an impending attack, and test methods for protection clothing.

Price: ₹ 220/\$28/£20

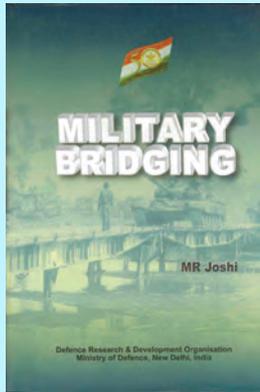


## Integrated Guided Missile Development Programme

DRDO, 2008

This book chronicles the genesis, progress and current status of development of the state-of-the-art guided missiles under the Integrated Guided Missile Development Programme (IGMDP). It emphasises the need for realistic assessment of the technical expertise, manpower, cost, and time and the gains accrued to the country.

Price: ₹ 670/\$100/£50

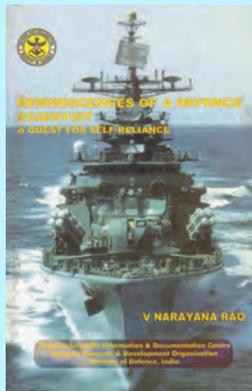


## **Military Bridging**

**MR Joshi, 2008**

This monograph covers the gap that has somehow crept in over the years between the acquisition of different types of combat engineer equipment and availability of comprehensive reference material that can establish a relationship between different equipment. This book intends to help the user in selection process of equipment for bridging in a non-traditional manner.

**Price: ₹ 385/\$60/£30**

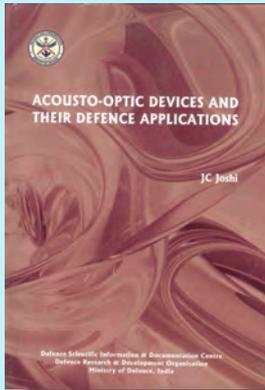


## **Reminiscences of a Defence Scientist: A Quest for Self-reliance**

**V Narayana Rao, 2007**

This monograph provides an author's insight into one of the key defence technologies, viz., electronic warfare. He starts from early reminiscences of his education in India and UK, and his experience as a lecturer, then as Director of NPOL, Kochi and finally as Director, DLRL, Hyderabad. All through the book, he narrates his efforts as a team leader in the development and progression of various high-tech systems and achieving self-sufficiency for the Indian Armed Forces.

**Price: ₹ 375/\$55/£30**

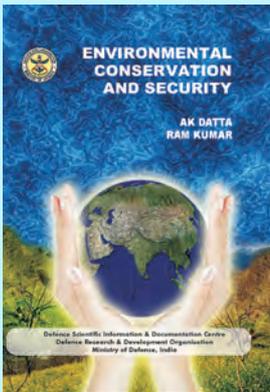


## Acousto-optics Devices and their Defence Applications

JC Joshi, 2007

The book presents theory, fabrication, characterisation techniques, and applications of the acousto-optic devices. It is written with a view to help a beginner who wants to enter in this field, but is not aware where to start and search in the vast available literature. The applications of acousto-optic which have direct relevance with the defence equipment technology devices have also been given in detail.

**Price: ₹ 410/\$60/£30**

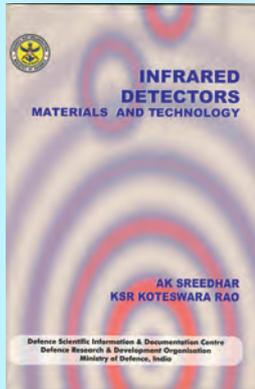


## Environmental Conservation and Security

AK Datta & Ram Kumar, 2006

The book presents collection, collation, and analysis of a broad range of environment-related issues concerning the global community with special emphasis on topics like environmental security, international environmental standards, remediation of contaminated sites, and important international environmental agreements.

**Price: ₹ 500/\$35/£20**

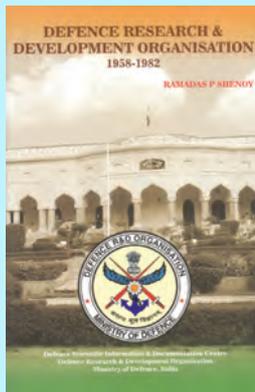


## **Infrared Detectors: Materials and Technology**

**AK Sreedhar & KSR Koteswara Rao, 2006**

This monograph deals with the physics and technology of infrared detectors with special focus on defence applications. New material technologies like MBE, laser ablation, and MOCVD used to fabricate detector structures are also discussed. Special subsystems such as cooling devices, which are an integral part of infrared sensor are explained.

**Price: ₹ 300/\$30/£15**

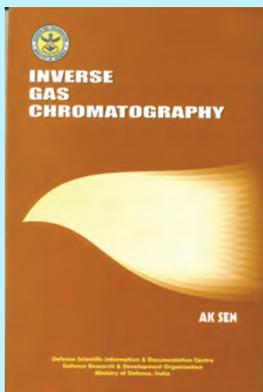


## **Defence Research & Development Organisation 1958-1982**

**Ramadas P Shenoy, 2005**

This book is an authentic description of development of Defence R&D in India. It traces the origin of military research, its need under British rule in India in early 20th century, the R&D done during two world wars, the independent India, and defence strategy at that time. It describes the inception of Defence Research Organisation, appointment of first Scientific Adviser; and evolution of separate Defence Research and Development Organisation catering to the needs of Armed Forces in India. It also highlights the development of labs, R&D activities and technological progress attained till 1982.

**Price: ₹ 500/\$30/£20**



## Inverse Gas Chromatography

AK Sen, 2005

Inverse gas chromatography is a useful technique for characterising solid materials including polymers, copolymers, polymer blends, carbon, silica, pharmaceutical powders, cellulosic materials, etc. The technique involves creating within a column, a stationary phase of the solid material of interest and determining its physico-chemical properties.

**Price: ₹ 400/\$26/£16**

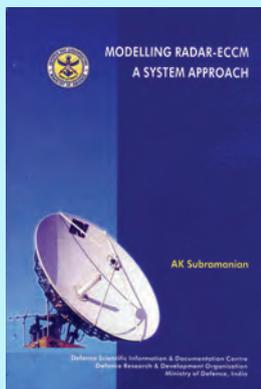


## Microwave Circuits and Components

GP Srivastava, 2004

In this book, an attempt has been made to clarify the fundamental concepts on microwaves. It lays emphasis on transmission lines, scattering matrix and network modelling. Smith chart and its application in microwave circuits has been discussed. The essential features of computer-aided design (CAD) of microwave circuits have been described. Some packages of CAD have also been explained.

**Price: ₹ 700/\$50/£30**

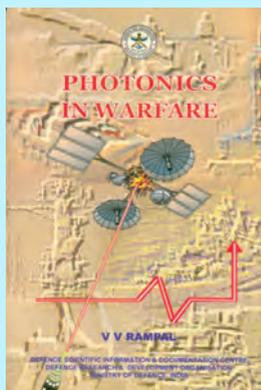


## Modelling Radar ECCM: A System Approach

AK Subramanian, 2003

This monograph presents material devoted to the art of radar electronic counter countermeasure (ECCM). Modern electronic warfare encounters are very devastating and are terminal in deciding the course of a major conflict. The book uses modelling and simulation tools for radar ECCM and gives various factors to be considered for countering ECM threats.

Price: ₹ 180/\$12/£8

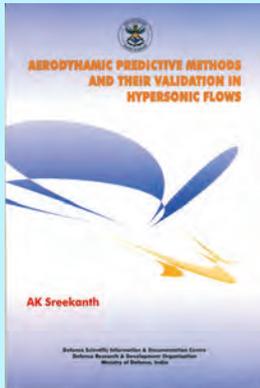


## Photonics in Warfare

V V Ramesh, 2002

The challenges and opportunities provided by photonic technology in future wars cannot be overlooked. This book presents an integrated view of the present and potential applications of optical radiation, including infrared, in a war scenario. It is intended to serve as a treatise on the development of photonics-based weapons and instrumentation. The book serves as source book to researchers in scientific laboratories, training institutions and other organisations.

Price: ₹ 450/\$30/£20

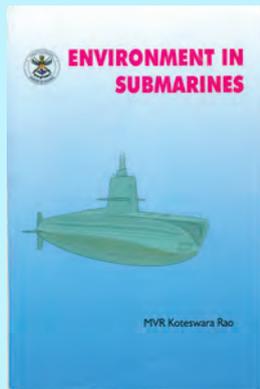


## **Aerodynamic Predictive Methods and their Validation in Hypersonic Flows**

**AK Sreekanth, 2002**

This monograph presents a summary of engineering methods most commonly employed for preliminary aerodynamic analysis of bodies travelling at hypersonic speeds. The work is divided into three parts: Part I deals with predictive methodology, Part II covers validation of predictive methods, and Part III covers the aerodynamics of rarefied gases.

**Price: ₹ 400/\$25/£15**

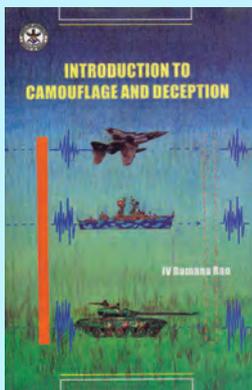


## **Environment in Submarines**

**MVR Koteswara Rao, 2001**

The monograph on Environment in Submarines is the first of its kind in the field of environmental sciences relating to closed spaces. The author has pictured the actual conditions prevailing in the submarine and also dealt with a variety of problems faced by its inhabitants, besides offering solutions to ensure a safer environment. This monograph serves as a source book for scientists, naval personnel and marine engineers.

**Price: ₹ 200/\$13/£10**

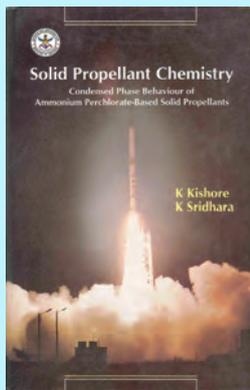


## **Introduction to Camouflage and Deception**

**JV Ramana Rao, 1999**

Camouflage and deception is a military science subject mainly of classified nature. The book covers the subject comprehensively, starting from its historical development and moving to discussions on camouflage in nature visual, infrared and microwave region. The state-of-the-art in stealth technology and the contribution of DRDO in this area are also outlined.

**Price: ₹ 400/\$30/£17**



## **Solid Propellant Chemistry: Condensed Phase Behaviour of Ammonium Perchlorate-based Solid Propellants**

**K Kishore & K Sridhara, 1999**

This book is first of its kind on condensed-phase chemistry of composite solid propellants in detail – vital for understanding the key phenomena like burning-rate modulation, ageing, extinction, intermittent and plateau burning, etc. Besides, it describes the subtle role of binders, oxidisers and catalysts. Latest developments in high-energy binders and oxidisers have also been presented.

**Price: ₹ 300/\$20/£12**





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