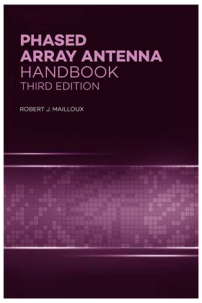

Phased Array Antenna Handbook – Third edition

R. J. Mailloux

Artech House, 16 Sussex Street, London, SW1V 4RW, UK. 2018. xvii; 530pp. Illustrated. £135 ISBN 978-1-63081-029-0.

The field of phased array antennas has evolved greatly since the publication of the First edition of the book in 1994. This is an exciting field which finds numerous applications in communication and radar technology. Large antenna arrays with electronically scanned beams and additionally with multiple beams and beamfoming capability are very appealing for the new 5G communication systems. Although the development of such systems is very challenging both from analysis and fabrication point of view, recent advances in computational electromagnetics, beam synthesis algorithms and fabrication technologies including additive manufacturing and 3D printing have been able to speed up analysis and reduce the time to market and manufacturing costs of large antenna arrays leading to numerous advances in the field.

The book is a comprehensive and coherent presentation of the fundamental concepts and design challenges of phased array antennas and it is a valuable tool for both design engineers and academics and graduate students in the field. The material is divided into nine chapters which are clearly presented and ordered in a progressive manner from more general concepts and challenges to specialised topics.

Chapters 1 and 2 are introductory chapters presenting fundamental characteristics of array antennas. Chapter 1 provides system analysis and figures of merit such as directivity, beamwidth, gain and noise temperature, bandwidth and grating lobes. Chapter 2 focuses on radiation pattern characteristics and introduces the effect of element mutual coupling and the concept of thinned arrays.

The following two chapters deal with pattern synthesis methods. Chapter 3 focuses on the more 'conventional' array topologies of linear and planar arrays while Chapter 4 focuses on nonplanar and conformal arrays. Well-known methods such as the Fourier transform method, the Woodward and the Dolph–Chebyshev synthesis are presented in Chapter 3 and also modern methods such as the ones based on convex optimisation and alternate projections. In addition, the theory of adaptive arrays and sidelobe cancelers is provided. Chapter 4 addresses circular and cylindrical arrays and phase mode excitation and briefly spherical and truncated conical arrays.

Having addressed the topic of pattern synthesis, Chapter 5 proceeds to present the different elements used in phased arrays from dipoles and monopoles to patch and slot antennas. Special attention is given to

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broadband elements such as flared notch, tapered slot, Vivaldi type and capacitively coupled dipole elements making reference to traditional as well as to more recent designs providing an excellent starting point to the antenna designer.

The following chapters deal with more specialised topics of phased array antenna technology. Chapter 6 deals with mutual impedance effects due to element coupling and the problem of scan blindness. Chapter 7 addresses error effects such as amplitude and phase excitation errors and quantisation on the performance of the array in terms of sidelobe levels, beam pointing error and directivity variation. Chapter 8 presents multiple beam antennas including lens and reflector systems and reflect arrays. Finally, Chapter 9 addresses specialised arrays such as arrays for limited field of view and wideband arrays and addresses the complexity of the control and feed systems of the arrays.

Robert J. Mailloux is a world known authority in phased array technology and this book is without doubt an invaluable addition to the library of everyone working in the field.

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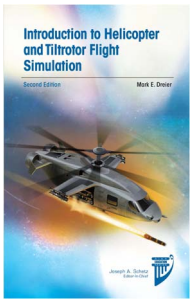

Introduction to Helicopter and Tiltrotor Flight Simulation – Second edition

M. E. Dreier

American Institute of Aeronautics and Astronautics, Reston, VA. 2018. Distributed by Transatlantic Publishers Group, 97 Greenham Road, London N10 1LN, UK. xxiv; 741pp, Illustrated. £107. (20% discount available to RAeS members on request; email: mark.chaloner@tpgltd.co.uk). ISBN 978-1-62410-513-5.

This is one of the renowned series of books published by the AIAA and is a revised edition. It is a large tome consisting of 740 pages and is hardback. There is also a considerable amount of supporting materials available from the AIAA web site. Full details of access are available from the book.

The quantity of material is a testament to the difficulties arising from rotary wing aircraft study. There are many topics to be examined but the crunch point is always the close interaction between these disciplines.

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