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Book Review

Modern Radar Systems. Hamish Meikle, Artech House, Boston, 2001. ISBN 1-58053-294-2. 280 × 210 mm, xvi + 563 pages, 536 figures. Price £82.

The closely printed pages of this important book present a coherent treatment of radar from the system designer's viewpoint. Although focussing on conventional civil air traffic control radar, there is considerable material on marine and military surveillance systems and briefer coverage of trackers. Over the horizon, ground probing and multi-static radar are excluded and continuous wave technology is not discussed in detail.

The many theoretical considerations associated with the various aspects of the system design task to achieve a required overall performance seem well covered. The book would certainly have helped the reviewers when they were design engineers! All factors needed for specification of the transmitter, receiver, detection and data-extraction sub-systems are presented concisely and very clearly, with uniform terminology, backed by all necessary formulae. More worked examples would have increased the reader's confidence of having grasped the right end of the stick. External factors – propagation, scattering and clutter – are also well handled, usefully bringing together a wealth of data from numerous sources, some new to us. There is almost nothing on modern displays and curiously little on the reflecting properties of 'objects'. For Hamish Meikle has gone PC and the only targets are things to be shot down! Nevertheless, the publishers should meet their sales object for this volume.

Although detail design is not covered, page references are cited to apt literature. The antennas chapter, and a long appendix, concentrate on the mathematics of numerous theoretical aperture tapering strategies, primarily for parabolic dishes, and their effects on sidelobes. We prefer Silver's standard text (1949) and would have liked less on weighting and something on omnidirectional antennas for sidelobe cancellation and transponder service. Little is said on the power limitations of such components as polarising irises. The important matter of near-field testing to confirm performance gets no mention.

Stress is laid on the complex nature of many signals. Their illustration by well over 500 waveform and vector diagrams justifies the 'modern' of the title. Based on Maple V® software, on the whole the figures are well-chosen, with many 3-D loci of vectors in the real, imaginary and time planes. Now and then the author gets rather carried away and some figures are confusingly overloaded, reproduced too small and would have benefited from differing line weights, shading or colour. Some formulae, too, have superscripts barely a millimetre high.

The basics of vectors, Fourier and other transforms and similar tools are clearly set out. The statistical basis of the all-important detection process, including Weibull, log-normal and gamma distributions, the Swerling cases and signal integration is excellently presented; even non-mathematicians should follow the arguments.

Errors are few. The presentation is logical, with detailed contents list, index and cross-references making it easy to find one's way around. Usefully, historical techniques are lightly sketched in. Terms are defined, highlighting differences between British and American practice, with a glossary. Deeper descriptions of hardware, with illustrations and a few case studies, would have further rounded the book. This said, we recommend this addition to the Artech House Radar Library to every budding and practising system designer. Although not for novices, students with a good grounding in basic radar theory would also profit from many of the 18 chapters and appendices.

J. N. Briggs, G. A. Hurd and R. J. James

Silver, S. (1949). *Microwave Antenna Theory and Design*. MIT Radiation Laboratory Series, Vol. 12, McGraw-Hill.