

## Reviews

*Geometry of Navigation*. Roy Williams. 1998. Horwood Publishing Ltd. Chichester. 134 pages. £20 Hardback. ISBN: 1-898563-46-2.

'The unwillingness or inability of navigators to adopt mathematical solutions to their problems and the unwillingness of mathematicians to identify the mathematical nature of navigators' problems are recurring themes throughout the history of navigational science.' Thus wrote J. E. D. Williams in his book *From Sails to Satellites*. It is a theme taken up by Dr Roy Williams who, as a master mariner with command experience and a post-graduate mathematician, is uniquely qualified to bridge the divide which J. E. D. Williams identified.

Over many years, Roy Williams has worked to improve the less than rigorous mathematical basis of many practical navigational methods. Much of his work has been reported, from time to time, in this *Journal*. It is good to see it now consolidated in one volume together with additional, previously unpublished, material.

This book is timely because many of the methods which were intractable before the advent of modern computers can now be treated as a matter of routine so that there is no need to continue to use simplified approximations. Roy Williams's analysis, in terms of the geometry of differentials and the methods of the calculus, assumes the study of mathematics at University level, but he sets out his results in the form of 'computational procedures' which can be followed by non-specialists. A minor criticism is that the reviewer would have liked to have seen some comparison of the procedures recommended by the author with other published methods. For example, in the case of rhumb line navigation, it would have been of interest to see a discussion of the advantages and limitations of the recommended procedures as compared with suggestions made in papers in this *Journal* by J. E. D. Williams (3, 133), Kitt Carlton Wippert (45, 292) and G. G. Bennett (49, 112 and 278).

The subjects covered include navigational surfaces and chart projections, rhumb line and geodesic navigation on the sphere and the spheroid, navigation along elliptical paths, and position fixing from astronomical and satellite data. There is a useful list of references.

In summary, Roy Williams has undertaken a difficult, but much needed, task in applying modern mathematical methods to both old and new navigational problems. He has met this challenge with considerable success in this well produced and clearly presented book.

J. Kemp

*Positioning Systems in Intelligent Transportation Systems (ITS)*. By Chris Drane and Chris Rizos. Artech House, 1998. 350 pages, £65 Hardback. ISBN: 0-89006-536-5.

There were three things that irritated me about this book: the style, the index and the lack of comment about the ITS work done in Europe.

The first thought that occurs when reading this book is the rather staccato style of the

writing. Like an obscure novel, you have to keep going back to make sure that you have understood the context of a sentence.

When first browsing through it, or just trying to use the book as a source of reference, one soon finds that the index is frustratingly incomplete. For example, several positioning systems – Loran and Omega for instance – are mentioned several times in the text, but only an unimportant reference is listed.

It really is a book for the USA, as 80 percent of the references are to US publications – very few to European systems or publications. The lack of discussion of European Community initiatives is likely to irritate European readers; for example, the only footnote to recent UK work relates to a paper published at the 1990 RIN conference at Warwick. I am sure that this does not reflect the true state of development of Intelligent Transport Systems in Europe.

The Australian authors say that they are trying to be even-handed with respect to GPS and other positioning systems. However, the bulk of the book is about GPS and most illustrations are to GPS-related products. Non-GPS/GLONASS satellite positioning systems are hardly discussed, while the only other wide area positioning system mentioned in detail is the Australian-developed Quiktrak. Nonetheless, there is a detailed look at some aspects of location deduced from cellular communications technology, which will become of increasing interest as the US FCC requirement deadline for the accurate location of alarm calls draws closer.

The book contains a degree of mathematical explanation of the techniques used. This detail sometimes gets in the way of understanding the topic. It is a book for a system engineer rather than a system designer.

Two chapters towards the end of the book, on the role and applications of positioning in ITS, would be useful to managers and marketeers examining this new industry, while the last chapter looks to the future and suggests that a separate field of study will combine all types of technology into ‘position system engineering’. What a good idea for an Institute, or is there one already?

A. Scorer

*Vehicle Location and Navigation Systems.* By Yilin Zhao. Artech House, 1997. 345 pages, £65 Hardback. ISBN: 0-89006-861-5.

This book contains a clear explanation of most locational techniques used in automatic vehicle location and in-vehicle navigation systems for those who use such technology as part of their business or who have an interest in the field.

It is probably inevitable that, as the author is American, the examples are mainly drawn from the United States, while some excellent UK positional systems are ignored. However, it is a very readable book: it simply bowls along in a conversational style, unlike many text books.

There are copious references to other published papers at the end of each chapter, the record being held by Chapter 8 on Wireless Communication, with 47 references out of the total of over 300. Many of these refer to papers published by the RIN, so the author has obviously done his research well. The number of mathematical formulae are kept to a minimum for ease of reading, but the generous number of references provide the reader with access to more detailed information if required.

I would echo the Foreword to the book – it makes ideal reading for anyone wishing to familiarise themselves with some of the principles of AVL systems, but would be

equally informative to the technically aware who want to understand more about certain other specific operational principles.

The few errors that I detected are probably due to the fast-changing nature of the AVL and in-vehicle navigation business rather than a failure of research. In spite of the US bias, a useful book for the manager.

A. Scorer