

# Book Reviews

## Tactical Missile Design – Second edition

**E.L. Fleeman**

*American Institute of Aeronautics and Astronautics, 1801 Alexander Bell Drive, Suite 500, Reston, VA 20191-4344, USA. 2006. 468pp. + diskette. Illustrated. \$69.95 (AIAA members), \$100.95 (non-members). ISBN 1-56347-782-3.*

This is the second edition of the book which was originally published in 2001 and reviewed in the February 2002 issue of *The Aeronautical Journal*. As such it is a slightly expanded version, but still includes sections on aerodynamics, propulsion, weight, performance, integration, sizing and development. As before, it is aimed at the level of advanced engineering students and young missile engineers, but would still be useful as a handbook for project managers or as an aid for aerospace lecturers.

The new edition has seen considerable expansion in the chapters covering propulsion, weight, integration and sizing. However the general layout has not been much improved; the main contents list is still too full and the chapter introductions and summaries are still too wordy; local contents lists and bullet points would have been much more useful. While the general coverage of the book is extremely comprehensive, it still suffers a little from repetition, which bulks up the text without adding value.

The addition of coloured figures appears to have been done as an afterthought, with all of them sandwiched between chapters 3 and 4. There is neither a list of these figures nor any pointers to them. While they are individually more intelligible than their black and white equivalents embedded in the text, to insert them like this is more likely to annoy than enhance. Once again the use of imperial units throughout is a considerable drawback, making it harder for young British and European engineers to benefit fully from the otherwise excellent worked examples.

As for the first edition the CD-ROM supplied with the book is the redeeming factor. Its contents are surprisingly comprehensive; not only does it contain the whole book in .pdf, but also extensive Powerpoint material, videos in .avi format and Excel spreadsheets. The presentation material is in the form of a tactical missile design course; the videos cover many aspects of missile operation and testing as well as the 'video nasties' of missile launches that went wrong. The spreadsheets cover aerodynamics,

structure, warheads, seekers, sizing and performance aspects; they come with a user guide in Word and a worked example of a typical missile.

Despite the various shortcomings I still think that this book would be very helpful for students, lecturers, and indeed any engineers new to this subject. It would therefore be a useful addition to any missile systems engineering library.

**Alan Roberts, CEng, FRAeS**

## Elements of Propulsion: Gas Turbines and Rockets – Second edition

**J.D. Mattingly**

*American Institute of Aeronautics and Astronautics, 1801 Alexander Bell Drive, Suite 500, Reston, VA 20191-4344, USA. 2006. 867pp. Illustrated. \$79.95 (AIAA members), \$109.95 (non-members). ISBN 1-56347-779-3.*

The first edition of *Elements of Propulsion: Gas Turbine and Rockets* by J.D. Mattingly had established itself as a comprehensive and authoritative text in the field of aerospace propulsion. The book is widely used by undergraduate and postgraduate courses, as well as industry. The second edition is therefore welcome particularly for the material contained within the appendices and the illustrations provided, and step by step worked examples, along with numerous updates.

The foreword, as with the previous edition contains a very substantial historical account by Hans von Ohain. This is followed by an introduction setting in focus many of the important issues concerning the nature of product compromises necessary in the choice of a propulsion system, including the section on aerovehicle design being a team effort and the chief engineer's role. In this context J.D. Mattingly (with W.H. Heiser and D.T. Pratt) have a separate related book on *Aircraft Engine Design* (American Institute of Aeronautics and Astronautics. 2002) which also considers aircraft engine constraints and integration.

The current book will continue to be of value to propulsion engineers. It is rich in illustrative examples, including real engines and continues with a number of useful software programs. It is a particularly good source of information on US propulsion developments and information on current and future conceptual engines.

**Professor Riti Singh, CEng, FRAeS**

## Accelerated Testing: a Practitioner's Guide to Accelerated and Reliability Testing

**B. Dodson and H. Schwab**

*SAE International, 400 Commonwealth Drive, Warrendale, PA, USA. 15096-0001, 2006. 256pp + diskette. Illustrated. \$79.95. ISBN 0-7680-0690-2.*

The first six chapters provide an overview of basic probability and statistics, and of some statistical reliability growth and stress-time acceleration models, but with very little practical guidance on their application. Where this is given it includes information that is incorrect, particularly that highly accelerated life tests (HALT) were developed 'specifically for solid state electronics'. HALT is not a 'model' in the sense implied by this chapter, but an important philosophy of accelerated test which is not explained in the half-page discussion.

Chapter 7 covers environmental stress screening (ESS). It presents ideas that are largely outdated, and again with very little practical guidance. For example, it states that "an optimum level of stress must be applied to the product to force defects into failures", but does not explain how this should be achieved. It wrongly states that applied stresses must not exceed the 'limits' of the product (what limits?). It makes a confusing and erroneous distinction between ESS and burn-in.

Chapter 8 covers test equipment methods and applications. It describes briefly the main stress types, such as thermal, thermal shock, vibration, etc., but again with hardly any practical engineering information or guidance, beyond the statement of the obvious that "considerable effort must be placed on developing and performing these tests so that they are accurate and effective".

A CD is packaged with the book, containing the worked examples of the book, statistical tables, a model for determining optimum burn-in time, military and other standards, and the US Army's reliability growth handbook.

It is a sobering thought that modern engineering products might be tested using the sparse and misleading guidance provided by this book.

**Patrick O'Connor, CEng, MRAeS**

[The reviewer is the author of *Test Engineering* (John Wiley. 2001) and *Practical Reliability Engineering* (John Wiley. 2002)]