

model for which the conventional PN guidance law was tested. The only additional component is the inclusion of target dynamics, and target acceleration in particular, into the guidance loop. Clearly there is causation between the target dynamics and guidance loop performance, thus the book then presents a rudimentary target motion observer using a Kalman filter: an interesting topic, but yet again given far too little attention. The interested reader would be better to consult Blackman and Popoli(2) for a much more in-depth discussion of target tracking models. Finally, the optimal trajectory control is formed as a non-linear program with initial and terminal constraints whose solution is proposed via the transcription method (although not explained as such in the text).

Overall, this is a frustrating book to read due, in the most part, to the incredible imbalance between chapters. Best exemplified by the ridiculous three pages of chapter 3, this book leaves the reader with more questions than answers as most of the concepts and techniques are introduced without context and to wildly varying levels of technical depth.

With a little more work, this book could have found a valuable place as both an introductory text and teaching aid – an opportunity missed.

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## REFERENCES

1. ZARCHAN, P. *Tactical and Strategic Missile Guidance*, American Institute of Aeronautics and Astronautics, 2002.
2. BLACKMAN, S.S. and POPOLI, R. *Design and Analysis of Modern Tracking Systems*, Artech House, 1999.



## Polymer Composites in the Aerospace Industry – second edition

**Edited by P. E. Irving  
and C. Soutis**

Woodhead Publishing, Elsevier,  
The Boulevard, Langford Lane, Kidlington,  
Oxford OX5 1GB, UK. 2020. xiv; 673 pp.  
Illustrated. £255. ISBN 978-0-08-102679-3.

The aerospace industry is arguably one of the biggest users of polymer composite materials due to their excellent durability and high stiffness-to-weight and strength-to-weight ratios. Safe and weight-efficient design of composite structures requires that engineers working with composites have an in-depth understanding of their mechanical properties and long-term performance, and this 673-page book undoubtedly provides a wealth of knowledge on the topic.

The revised second edition of the book summarises the latest research and developments in the design, manufacture and performance of composite components for aerospace structures. The 19 contributions

from leading experts in the field are grouped into three parts.

Part 1 focuses on the design and manufacture of composite components for aerospace structures, starting with the contribution from one of the co-editors, in which the engineering requirements that the aerospace industry places on composite materials are discussed. In other contributions within this part, modelling of woven composites that constitute an important class of high-performance composite materials is examined and manufacturing processes for aerospace composite structures are discussed. The effect of manufacturing defects on the performance of aerospace composites is also highlighted.

Part 2 examines various performance aspects of aerospace composite structures such as buckling and compressive strength, post-buckling behaviour, stiffness and strength, fracture behaviour, effects of temperature and moisture, fatigue, impact and post-impact strength and fatigue, bolted joints, crashworthiness, blast resistance, repair, non-destructive testing and structural health monitoring.

In part 3, the effects of lightning strike and issues related to certification and airworthiness of polymer composite aircraft structures are examined.

Each contribution is generously illustrated with figures, tables and diagrams, some of which are printed in colour, with extensive references and sources of further information and advice. The book provides a valuable reference resource for engineers, scientists and designers working in the development of composite components in the aerospace

industry and will undoubtedly help them develop better understanding of the latest research advances in the field.

**Professor Maria Kashtalyan**  
**University of Aberdeen**