could have been and some core literature is missed. There is perhaps too much a sense of contentment about the 'success' of turbulence models; personally I would like to see the entire subject being treated a little more critically. Despite these quibbles, I believe that the book has done a very good job in leading engineers to master the practical tools and skills based on solid fundamental understanding. Students, and even experienced researchers, whose interest is in the theoretical side would also find something useful and interesting in this book.

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Introduction to Flight Testing and Applied Aerodynamics

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American Institute of Aeronautics and Astronautics, 1801 Alexander Bell Drive, Suite 500, Reston, VA 20191-4344, USA. 2011. Distributed by Transatlantic Publishers Group, Unit 242, 235 Earls Court Road, London, SW5 9FE, UK (Tel: 020-7373 2515; e-mail:-richard@tpgltd.co.uk). 133pp. Illustrated. £38.50. [10% discount available to RAeS members on request]. ISBN 978-1-60086-827-6.

The author's declared aim in this book is "to introduce students to the real world of measuring and predicting airplane performance". It is based on a practical course using light aircraft that he has run over many years at Pennsylvania State University. Dr McCormick is the Boeing Professor Emeritus at Penn State.

This is a slim book of 8 chapters (covering less than 100 pages), 4 appendices and a short list of references. It is highly distilled. Working from fundamentals, the author has woven together theories which the student can use to predict the aircraft's performance and behaviour, and which can be compared with measurements taken from the aircraft in flight. Each piece of theory covered is subsequently applied. The Cessna 172R is used as the example aircraft throughout this book.

In Chapter 1, after introducing the nature of the standard atmosphere and Bernoulli's theorem, the author gives a succinct introduction to vorticity. Airspeed calibration is introduced in Chapter 2. In Chapter 3 the author demonstrates a numerical calculation of speed and distance through the takeoff after introducing each key factor, including the estimation of propeller characteristics from generalised data and measurements of the actual propeller made with a ruler and protractor. Chapter 4 looks at power required and trim and Chapter 5 rate of climb, time to climb and ceilings.

Chapter 6, on stall, approach and landing, contains a highly concentrated introduction to lifting-line analysis of the wing showing how it handles twist and the deployment of flaps. Application of the model to the onset of stall and prediction of the wing's maximum lift coefficient is shown. Chapter 7 covers cruise rate of fuel burn and range and the range-payload curve is derived.

Chapter 8 gives a very succinct introduction to static and dynamic stability and control. It only addresses longitudinal stability, but, rather than giving a more general introduction across all the degrees of freedom, the author has chosen to take a deeper look at the available analyses. He uses these to calculate the Cessna's phugoid.

The bibliography is very short. The first reference is the author's own textbook, *Aerodynamics, Aeronautics and Flight Mechanics* (2nd edition very favourably reviewed here in 1996) to which this text is indeed a good introduction.

Relegation of notes on the flight test procedures to an appendix emphasises the book's concentration on showing how predictions can be made from fundamental

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theory, dimensional measurements and generalised data. The chapter ending questions and answers provided helpfully complement the text.

I had trouble with this book when first picking it up, because, from the cover, the title and even the Preface, I expected something different. The blurb indicates it is aimed at 'students, homebuilders, pilots and engineers'. There are other books with similar titles and aimed at a general audience. Typically in these the emphasis is on the aircraft and flying it; gathering data and reducing it to create or replicate the operating handbook. Typically behavioural traits are treated qualitatively. McCormick's book does not describe how to become a test pilot. It is not a text on the practicalities of test flying although a brief outline of flight test actions is given and some practicalities are mentioned along the way. And it gives only the briefest of introductions to measurement equipment. Even from the cover photograph and the opening words of the Preface, one anticipates the light aircraft example to be the Piper Cherokee, but finds the Cessna 172 instead (for numerous in-depth calculations on the Cherokee one can refer to the author's earlier textbook).

The book introduces a full set of practical, theoretical tools which can be used to predict all the principal aspects of an aircraft's performance and behaviour. It is based on the notes collected by the author over the years teaching his flight testing course. McCormick clearly enjoyed teaching his course, which shows together with his continuing drive to have his students think and fully understand the material being presented.

The author's style is direct and succinct. And he does make you think. Even in his earlier textbook he showed structures for possible computer programs, leaving students to write their own. This practice reappears here, the reader being given enough information to go away and solve the aerodynamic problems (if initially equipped with enough personal expertise in mathematics and programming).

For the student who will be going on to study aerodynamics in more detail this is a good introduction. Indeed, for the student, this could be a useful revision text.

For the more general reader the book is perhaps a little too ambitious in some of the mathematical manipulations expected, which include calculus, matrix handling and complex numbers. Having said this, the book introduces analyses that may still be of interest to the general reader and, whilst the reader may not feel able to tackle the sums, the description of what is being calculated is clear and concise.

In summary, this book is a rich distillation of applied theory and deserves close study.

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