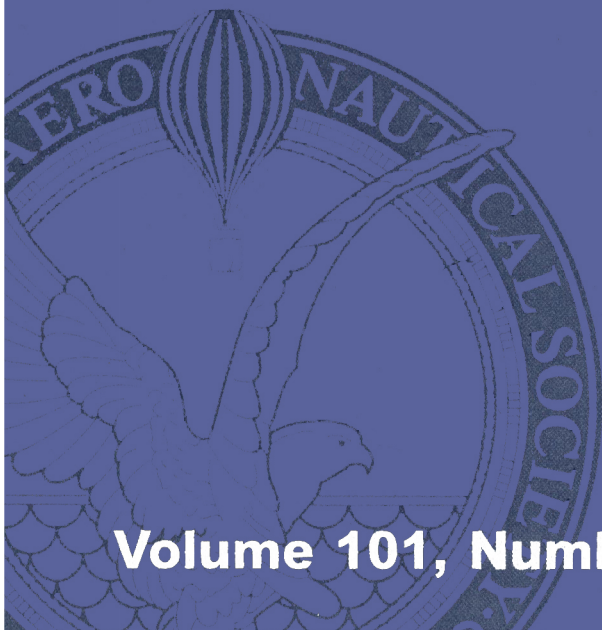
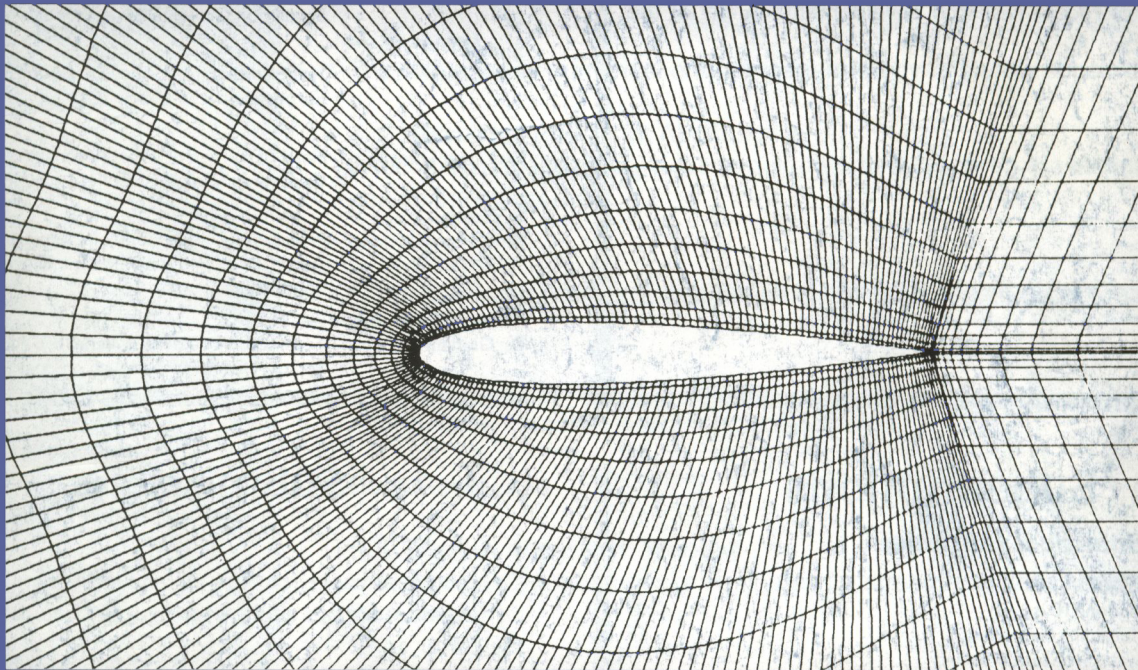


THE AERONAUTICAL JOURNAL



Volume 101, Number 1001

January 1997

Aims and scope

The aims and scope of *The Aeronautical Journal* are intended to reflect the objectives of the Royal Aeronautical Society as expressed in the Charter of Incorporation. Briefly, these are to encourage and foster the advancement of all aspects of aeronautical and space science. Thus the topics of the *Journal* include most of those covered by the various Sections and Groups of the Society, such as aerodynamics (including fluid mechanics), astronautics, dynamics and control, flight simulation, guided flight, noise and vibration, propulsion, rotorcraft, structures and materials, systems and test procedures. Papers are therefore solicited on all aspects of research, design and development, construction and operation of aircraft and space vehicles. Papers are also welcomed which review, comprehensively, the results of recent research developments in any of the above topics.

Editorial Advisory Committee

Chairman: Dr Eric Rogers

Editor: Prof John Stollery

Aerodynamics

Prof Peter Bearman Head of Department, Aeronautical Engineering Department, Imperial College
Tony Cross Manager — Aerodynamic Technology/Technologist Adviosr CFD, BAe Military Aircraft Division

Avionics and Simulation

Prof David Allerton Head of Department, Department of Avionics, College of Aeronautics, Cranfield University

Materials

Dr Juila King Head of Materials, Rolls-Royce Aerospace Group

Propulsion

Dr Peter Stow Head of Aerothermal Methods, Rolls-Royce Aerospace Group

Rotorcraft — including rotorcraft systems and simulation

Alan Vincent Head of Engineering, GKN Westland Helicopters
Dr Gareth Padfield Head of Rotorcraft Group, Flight Dynamics and Simulation Group, DRA Bedford

Space

Roy Gibson Space consultant, former Director General of the European Space Agency

Structures

Prof Glyn Davies Head of Aerostructures, Aeronautical Engineering Department, Imperial College

Systems

Prof Donald McLean Professor of Flight Control, Department of Aeronautical and Astronautics, University of Southampton

Testing Techniques

Dr Graham Coleman Technical Director (Air Vehicles), Air Systems Sector, DERA Farnborough

Subscriptions

The Aeronautical Journal

Non-members

Annual subscription (10 issues) £200
Single copies, including back issues £5

From: The Royal Aeronautical Society
Publications Subscriptions Department
Bradley Pavilions
Bradley Stoke North
Bristol BS12 0BQ, UK
Tel: +44 (0)1454 620070 Fax: +44 (0)1454 620080

RAeS members

Annual subscription (10 issues) £23
Single copies, including back issues £3.50

From: The Professional Affairs Department
The Royal Aeronautical Society
4 Hamilton Place
London W1V 0BQ, UK
Tel: +44 (0)171 499 3515 Fax: +44 (0)171 499 6230
E-Mail: professional@raes.org.uk

RAeS Conference Proceedings

Details, price and availability of Royal Aeronautical Society Conference Proceedings can be obtained from:

The Conference Office
The Royal Aeronautical Society
4 Hamilton Place
London W1V 0BQ, UK
Tel: +44 (0)171 499 3515 Fax: +44 (0)171 493 1438
E-Mail: conference@raes.org.uk

Submissions

To submit a paper to *The Aeronautical Journal*, THREE printed manuscripts along with figures should be sent to the Editor at

The Royal Aeronautical Society
4 Hamilton Place
London W1V 0BQ
UK

For further advice on submitting papers to *The Aeronautical Journal*, please refer to the Guidelines for Authors on page iv. If previously agreed with the editorial staff, it may be possible to supply a paper in a different format.

The Royal Aeronautical Society reserves the right to not accept a paper which is not submitted in the required manner.



Contents

Volume 101, Number 1001

Reproduction of any of the papers published in this journal is not permitted without the written consent of the Editor.

Editor
Professor J L Stollery CBE DSc(Eng) FEng FAIAA
HonFRaES

Managing Editor
B F Baldwin BSc MRaES

Deputy Editor
S M Penney BEng CEng MRaES

Assistant Editors
C S C Male BSc(Eng) Grad RAeS
J A Price BA Grad RAeS

Publisher
The Royal Aeronautical Society (RAeS)
4 Hamilton Place
London W1V 0BQ.
Tel: +44 (0)171-499 3515.
Fax: +44 (0)171-629 4009.
E-Mail: raes@raes.org.uk
publications@raes.org.uk

The Royal Aeronautical Society
is a registered charity: No. 313708

RAeS Director
R J Kennett FIMgt FInstD FCIT FRSA
AFAIAA FRAeS

The content does not necessarily express the
opinion of the Council of the Royal Aeronautical
Society.

Printed by
Manor Park Press
Unit 7 Highfield Industrial Estate
Edison Road
Hampden Park
Eastbourne BN23 6PT

ISSN: 0001-9240

Published monthly
except June and August

S. S. Houston Validation of a blade-element helicopter model for large-amplitude manoeuvres	1
C. B. Allen The reduction of numerical entropy generated by unsteady shockwaves	9
J. C. Gibbings and S. M. Al-Shukri Effect of sandpaper roughness and stream turbulence on the laminar layer and its transition	17
L. W. Traub <i>Technical Note:</i> Analytic prediction of vortex drag of high aspect ratio tapered wings	25
G. R. Braithwaite and R. E. Caves Airline safety — some lessons from Australia	29
Book Reviews	34
S.K. Morton and J.P.H. Webber Heuristic design of composite laminates for strength, stiffness and multiple load cases	35

Frontcover: Near aerofoil grid for a NACA 0012 section. **From:** The reduction of numerical entropy generated by unsteady shockwaves, pp 9-24.

Guidelines for authors

Papers will be considered for publication in *The Aeronautical Journal* if they meet the terms and conditions below. If these are not met, the Editor reserves the right to withdraw the paper without redress, which may be at any time up to publication.

1.0 PREPARATION OF PAPERS

1.1 General

For a paper to be considered, three clearly typed (double spaced) copies must be sent to the Editor with photocopies of figures (including any photographs) if not included within the printed text. Handwritten manuscripts are not acceptable. The accompanying letter must state that the paper has not been published previously or submitted for publication elsewhere.

The receipt of papers will be acknowledged by return, with a copy of these conditions and a reference number which should be used in all correspondence.

Prior to submission, manuscripts should be read critically by a third party who is familiar with the subject area and has a good grasp of the English language. Authors must also obtain permission where necessary to use any material in a paper which is copyright or the property of any other persons or entity, including their employers. Any fees incurred are the sole responsibility of the authors.

1.2 Figures

All figures must be provided by the authors. Illustrations should be kept to a minimum and should, where appropriate, be produced to the same scale. A list of figures helps in the production of the paper.

1.3 Full paper format

Formal papers should comply with the structural guidelines below and should preferably not exceed 10 000 words. The following is the recommended generic format:

Title: The title should be kept short and concise.

Abstract: A single paragraph abstract of around 150 words which summarises the paper and contains no references.

Nomenclature: A list of all symbols used in the text and figures, whether familiar or not, should be given in alphabetical order, with for example c before C, and all English letters listed before Greek symbols. Subscripts and Superscripts should, where possible, be listed separately. SI units should be used throughout and are thus not required to be shown here.

MAIN TEXT

1. Introduction: Discuss the *raison d'être* of the work, including previous work by others and how the work being presented aims to advance or complement this.

2. Descriptive section: This could be either description of apparatus if an experimental paper, or a discussion of the practical applications if a more theoretical paper.

3. Theoretical section: Equations should be numbered in the order given and referred to in the text by number as, for example, Equation (19). Complex groupings should not be included in text, but should be numbered as equations.

4. Procedural section: Describe the procedure which utilises that described in (2) above.

5. Presentation and discussion of results: Tables of results, numbered in order, should be referred to here, and should include only the main results. Errors should be considered an important part of any analysis.

6. Conclusions: This section should be very concise, and bullet points are recommended for clarity. The degree to which the aims have been achieved should be clearly portrayed to the reader. Suggestions for future work or work in progress are encouraged.

References: References should be numbered sequentially in the text as they occur. For example, most commonly for papers⁽¹⁾ and reports⁽²⁾

1. Miller, P and Wilson, M. Wall jets created by single and twin high pressure jet impingement, *Aeronaut J*, March 1993, 97, (963), pp 87-100.

2. Green, J.E., Weeks, D.J. and Brooman, J.W.F. Prediction of turbulent boundary layers and wakes in compressible flow, *ARC R&M No 3791*, 1979.

and for books⁽³⁾

3. King-Hele, D. *Satellite Orbits in an Atmosphere*, Blackie, Glasgow, 1987.

Appendices: If no suitable reference is available appendices may be used to clarify certain points, such as a step in the theoretical analysis.

1.4 Technical Notes

These can be up to 2000 words in length and have no set form. They can be abstracts, comments upon unpublished papers, notes on interim results or a prompt for further research. They do not have to contain figures or nomenclature and may be in the form of a letter.

1.5 Engineering Notes

These are a maximum of one page and may be used to communicate practical solutions to problems encountered on the shop floor or in the laboratory.

2.0 THE REFEREEING PROCESS

2.1 Initial refereeing

Two referees are used for a paper: one for a Technical or Engineering Note. One copy of the manuscript is sent to each referee with a referee report form and a request that the referee reply within six weeks or suggest an alternative referee. Hence, in some cases, delays may occur in finding a referee with suitable experience who is willing to review the paper. Authors may, if they wish, provide a list of suitably qualified independent referees to aid this process.

2.2 Revising the paper

Once both referees have replied, their comments are sent to the authors who are invited to revise the paper as suggested. It is helpful if a list of those changes included by the author is provided.

A paper will be rejected at this stage only if this is suggested by both referees. Authors are reminded that the process is confidential, and that only referees of the highest calibre are used.

2.3 Secondary refereeing

Unless a paper has been accepted "as is" by both referees, a revised manuscript will be sent once more to the referees, with another report form. If the Editor feels, having considered the second reviews, that the authors have not adequately responded to the original reviews of the referees, then the paper may be rejected. Thus it is imperative that all comments be addressed properly by authors. A third referee may be approached if the Editor thinks this is appropriate. The Editor ultimately reserves the right to reject a paper on grounds of quality or lack of cooperation from authors.

2.4 Acceptance

Once a paper is accepted, the authors will be invited to send the latest version of the text on disk, without any structure (i.e. no codes — tabs, bold, italics, embedded figures, tables, equations etc).

The positions of equations should be indicated in the saved text. Original figures should also be sent at this stage, a set being required without annotation or borders as well as one with. For computer generated figures only those in 300 dpi TIFF format can be accepted.

The preferred format is an Ascii text file on a 3.5" disk, although a 5¼" disk is acceptable.

2.5 Following acceptance

About one month before the cover date, authors are sent galley proofs for checking, and should keep this in mind if likely to be away during this time. Authors are jointly entitled to 50 complimentary reprints of their paper, and may order any number of additional reprints at a price subject to quotation. These will be considerably cheaper if ordered to coincide with the original print run, and in any case will not be available if ordered later than two months after the cover date.

The original manuscript, figures and disk will be returned at this time.

CONDITIONS OF PUBLICATION

Unless specifically attributed, no material in *The Aeronautical Journal* shall be taken to represent the opinion of the RAeS and its Council.