THE AERONAUTICAL JOURNAL

Editor-in-chief: Prof Peter Bearman

Associate Editors

Chairman: Prof Mike Graham

Professor David Allerton University of Sheffield

Professor Ken Badcock University of Liverpool

Wg Cdr Mike Bratby RAeS Air Power Group

Professor Laurent Dala
Council for Scientific & Industrial Research (CSIR)
Pretoria, South Africa

Mr Chris Fielding BAE Systems, Warton

Professor Ismet Gursul University of Bath

Professor Michael Henshaw Loughborough University

Professor Gareth Padfield University of Liverpool

Professor Shahrokh Shahpar Rolls-Royce, Derby Professor Chris Atkin City University, London

Professor Rene de Borst University of Glasgow

Professor Richard Brown University of Strathclyde, Glasgow

Professor Dimitris Drikakis
Cranfield University

Professor Victor Giurgiutiu University of South Carolina

Professor Keith Hayward RAeS Head of Research

Professor Richard Hillier Imperial College, London

Professor Ning Qin University of Sheffield

Professor Howard Smith Cranfield University Professor Holger Babinsky University of Cambridge

Dr Trevor Birch

Professor Jonathan Cooper University of Bristol

Professor Brian Falzon Queen's University, Belfast

Dr John GreenConsultant Chief Scientist, ARA

Professor Li He University of Oxford

Dr M R Nayak National Aerospace Laboratories, India

> **Dr Arthur Richards** University of Bristol

Professor Marilyn Smith
Georgia Institute of Technology, USA

Professor Constantinos Soutis University of Manchester **Professor Anthony Waas** University of Michigan, USA

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 its 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 Aeronautical Journal include most of those covered by the various Specialist Groups of the Society, which include:

Aircraft design, aerodynamics, air law, air power, air transport, air navigation, airworthiness and maintenance, aviation medicine, avionics and systems, environmental issues, flight operations, flight simulation, fluid dynamics, fluid mechanics, general aviation, guided flight, human factors, human powered flight, light aviation, management studies, propulsion, rotorcraft, safety, space, structures and materials, structural mechanics, systems and test procedures and UAVs.

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.

We recognise the inhibiting pressures of time and confidentiality and acknowledge that many of the design testing, manufacturing and operational problems that industry has to solve contain important information for the whole aerospace community. The Aeronautical Journal provides a platform for refereeing and presenting your work to an international audience.

Papers will be considered for publication in The Aeronautical Journal if they meet the terms and conditions listed in The Instructions for authors. 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.

Enquiries should be sent to: Wayne J Davis, Royal Aeronautical Society, No.4 Hamilton Place,
London W1J 7BQ, United Kingdom or aerojournal@aerosociety.com

Papers should be submitted at: www.edmgr.com/aeroj



CONTENTS

Volume 117 Number 1196

October 2013

M. Gresil and V. Giurgiutiu Guided wave propagation in composite laminates using piezoelectric wafer active sensors	971
D. Vechtel In-flight simulation of wake encounters using deformed vortices	997
I.A. Guz, J.J. Rushchitsky and A.N. Guz Effect of a special reinforcement on the elastic properties of micro- and nanocomposites with polymer matrix	1019
S.C. McIntosh and N. Qin The influence of transition onset location on the performance of shock control bumps	1037
A. Gad-Briggs, A. Haslam and P. Laskaridis Effect of change in role of an aircraft on engine life	1053

The new Aeronautical Journal Manuscript Management system

The Aeronautical Journal now operates an online Manuscript Management System (MMS) which processes manuscripts from receipt to print. Authors must now submit their manuscripts directly to us through our website to be considered for review and publication. The whole manuscript review process including revisions is now carried out via our user-friendly online manuscript processing system. Papers now will only be considered for publication if they have been submitted through the MMS.

We hope this new automated system will lead to a speedier and more efficient way of reviewing manuscripts.

Manuscripts should be submitted at: http://www.edmgr.com/aeroj where easy-to-follow instructions will guide you through the process.

Front Cover: This image shows ATTAS (Advanced Technologies Testing Aircraft System) during a test flight in 2007. ATTAS was used as a test aircraft by the German Aerospace Center (DLR) for 27 years. ATTAS was designed as a 'flying simulator' to test the flight behavior of others aircraft – in existence or virtual. (DLR)



Editor-in-Chief Professor Peter Bearman

Publishing Manager Chris Male

Production Editor Wayne J Davis

Publications Officer Annabel L Hallam

Production

Bill Read Tim Robinson

Book Review Editor

Brian Riddle

Publisher

Royal Aeronautical Society (RAeS) No.4 Hamilton Place

London W1J 7BQ, UK Tel: +44 (0)20 7670 4300 Fax: +44 (0)20 7670 4309

email: publications@aerosociety.com

http://www.aerosocietv.com **RAeS Chief Executive** Simon C Luxmoore

Subscriptions

Non-members

Annual subscription (12 issues) £436, Single copies, including back issues £39; Non-member subscription orders are available from; Royal Aeronautical Society, Publications Subscriptions Department, Dovetail Services Ltd, 800 Guillat Avenue, Kent Science Park, Sittingbourne, Kent ME9 8GU, UK. Tel: +44 (0)844 848 8426, Fax: +44 (0)844 856 0650, email: ras@servicehelpline.co.uk

RAeS members

Annual subscription (12 issues) £75, Single copies, including back issues £6·80; member subscription orders are available from; Membership Department, Royal Aeronautical Society, No.4 Hamilton Place, London W1J 7BQ, UK. Tel: +44 (0)20 7670 4300, Fax: +44 (0)20 7670 4309, email: subscriptions@aerosociety.com

RAeS Conference Proceedings

Details, price and availability of Royal Aeronautical Society Conference Proceedings can be obtained from; RAeS Conference and Events Department. No.4 Hamilton Place, London W1J 7BQ, UK, Tel: +44 (0)20 7670 4300. email: conference@aerosociety.com or via www.aerosociety.com/proceedings

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

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

The Royal Aeronautical Society is a registered charity: No 313708

Advertisement Sales

Emma Bossom +44 (0)20 7670 4342 emma.bossom@aerosociety.com

Printer

Buxton Press Limited Palace Road Buxton Derbyshire SK17 6AE

ISSN: 0001-9240 Published monthly

All papers are available to view free of charge for subscribers at: www.aerosociety.com/news/publications/aero-journal