

The AERONAUTICAL Journal



Contents

D.G. Mabey <i>et al</i> Buffeting tests in a cryogenic windtunnel	1
D.G. Thomson <i>et al</i> An investigation of piloting strategies for engine failures during takeoff from offshore platforms	15
M.Ö. Çarpınlioglu and Ö.T. Göksel Effect of spherical roughness elements on the transition of a 3-D boundary layer	26
R.H. Barnard Collectively variable incidence wingtips for lift control and reduced gust sensitivity	29
Library reviews, additions and reports	36

Volume 99 Number 981

January 1995

THE AERONAUTICAL JOURNAL

Aims and scope

The aims and scope of The Aeronautical Journal are intended to reflect the objectives of the 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 all those which are covered by the various Sections and Groups of the Society such as fluid mechanics and aerodynamics, propulsion, structures and materials, rotorcraft, astronautics and guided flight, dynamics and control, aeromarine technology, aviation medicine, air transport, test flying, flight simulation, air law, management studies, history of aviation and humanpowered flight. Thus papers are 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.

DIVISIONS AND BRANCHES OF THE ROYAL AERONAUTICAL SOCIETY

Australia Branches at: Adelaide, Brisbane, Canberra, Melbourne and Sydney.

President: Air Cdre W.J. BELTON, CEng, FRAeS. Hon. Secretary: R.D. BARKLA, CEng, MRAeS. PO Box 573, Mascot, NSW 2020.

New Zealand Branches at: Auckland, Blenheim, Canterbury, Hamilton, Otago, Palmerston North and Wellington.

President: Wg Cdr R.M. ALLAN, CEng, FRAeS, RNZAF Retd. Hon. Secretary: J.H. MOUNCE, CEng, MRAeS. Tech Service Manager — Int'l & Dom, AKL35 Air New Zealand Limited, Private Bag, Auckland 1.

Pakistan President: S. AJAZ ALI, CEng, FRAeS. Hon. Secretary: Dr S.A. HASAN, CEng, FRAeS, 4th Floor, IEP Building, 177/2 Liaquat Barracks, Karachi 75530. Tel: 92-7780233.

Southern Africa President: D.P. du PLOOY, CEng, MRAeS. Hon. Secretary: Ms LESLIE STOKOE, PO Box 9168, 1625 Eldeen, Republic of South Africa.

Zimbabwe President: Wg Cdr E. CHINGOSHO, MRAeS. Hon. Secretary: A.S. MATIKITI, IEng, AMRAeS. Engineering Dept., Air Zimbabwe, PO Box 1931, Harare, Zimbabwe.

Bedford

President: R.J. WHYSALL, CEng, MRAeS.

Chairman: G.W. WOODS, CEng, MRAeS.

Hon. Secretary: C.I.P. MARTIN, AMRAeS. Hunting Engineering, Reddings Wood, Amptill, Bedford MK45 2HD. Tel: 01234 841000.

Belfast

President: T. STONE, FRAeS.

Chairman: Professor D. NIXON, FRAeS.

Hon. Secretary: Dr S.T. McLWAIN, Grad RAeS. Aerodynamics, Mechanical Engineering Group, Short Missile Systems, Montgomery Road, Belfast, Northern Ireland BT6 9HN. Tel: 01232 465650.

Birmingham, Wolverhampton and Cosford

President: S.L. HISCOX, MRAeS.

Chairman: R.J.P. HOWARD, AMRAeS.

Hon. Secretary: A.R. BANBURY, CEng, Associate RAeS. 13 Grasmere Close, Tettenhall, Wolverhampton WV6 9DP. Tel: 01902 745957.

Boscombe Down

President: Air Cdre C.J. CRUICKSHANKS, FRAeS.

Chairman: Dr D.W. WILLIAMS, CEng, FRAeS.

Hon. Secretary: Wg Cdr K. MACKENZIE, CEng, MRAeS. ATG, Armament Division, A&AEE Boscombe Down, Salisbury SP4 0JF. Tel: 01980 662975.

Bristol

President: S.J. SWADLING, CEng, FRAeS.

Chairman: D.C. GREENMAN, CEng, MRAeS.

Hon. Secretary: J.G. MATTHEWS, Grad RAeS. Department B56, Technical Centre (C2), British Aerospace Airbus Ltd., Filton, Bristol BS99 7AR. Tel: 0117 936 4006.

Brough

President: G. CHISNALL, CEng, MRAeS.

Chairman: S.J. BLEE, CEng, MRAeS.

Hon. Secretary: G.M. CAMMISH. Manufacturing and Structural Development, BAe (Military Aircraft) Brough, North Humberside HU15 1EQ. Tel: 01482 664143.

Cambridge

President: Professor M. GASTER, FRS, CEng, FRAeS.

Chairman: Wg Cdr P.N. GILBERT, CEng, MRAeS.

Hon. Secretary: D.N. WHITEHEAD, CEng, MRAeS. c/o Aircraft Design Office, Marshall Aerospace, The Airport, Newmarket Road, Cambridge CB5 8RX. Tel: 01223 373232/373541.

Cardiff

President: Gp Capt I.F. EASTON, CEng, FRAeS.

Chairman: J.A. STEELE, IEng, AMRAeS.

Hon. Secretary: Wg Cdr A.G. WILLENBRUCH, CEng, MRAeS. Engineering Wing, RAF St Athan, Barry CF6 9WA. Tel: 01446 798798 Ex. 6053.

Chester

President: S.A.E. DYKE.

Chairman: J.R.F. YOUNG, AMRAeS.

Hon. Secretary: Dr J.E. ROBINSON. Padeswood Lodge, Padeswood, Mold, Clwyd CH7 4JF. Tel: 01244 546420.

Christchurch

President: M.J. COBHAM, CBE, FRAeS.

Chairman: K.W. NORRIS, FRAeS.

Hon. Secretary: M.G. PORTER, CEng, MRAeS. Flight Refuelling, Brook Road, Wimborne, Dorset BH21 2BJ. Tel: 01202 882121.

Coventry

President: J.B. ROBERTS CEng, FRAeS.

Chairman: Dr B.D. HOBBSON, CEng, MRAeS.

Hon. Secretary: R.I. RATCLIFF, IEng, Technician RAeS. 6 Erithway Rd, Green Lane, Coventry CV3 6JT. Tel: 01203 413779.

Cranwell

President: Air Vice Marshal D. COUSINS, RAF.

Chairman: Wg Cdr M.F.J. NETHAWAY.

Hon. Secretary: Sqn Ldr J.E. MORTON, CEng, MRAeS. RAF College Cranwell, Sleaford, Lincs NG34 8HB. Tel: 01400 261201 Ex. 6437.

Derby

President: J.O. KEIR, FRAeS.

Chairman: D.C. COOK, CEng, MRAeS.

Hon. Secretary: K. COBLEY, CEng, MRAeS. c/o Compressor Technology, Rolls-Royce plc, PO Box 31, Derby DE24 8BJ. Tel: 01332 249017.

Gatwick

President: M.J. WILLETT, FRAeS.

Chairman: A.J. HEATH, OBE, CEng, FRAeS.

Hon. Secretary: D.L. BATES, Associate RAeS. 52 Grant Road, Addiscombe, Croydon CR0 6PG. Tel: 0181-654 1150.

Glasgow

President: Dr A.W. BABISTER, CEng, MRAeS.

Chairman: F.J. MULLEN.

Hon. Secretary: G.D. CATTO. 2 Lang Avenue, Bishopton, Renfrewshire PA7 5BL. Tel: 01505 862225.

Gloucester and Cheltenham

President: D.G.M. DAVIES, OBE, CEng, FRAeS.

Chairman: R.H. ASHFORTH, CEng, FRAeS.

Hon. Secretary: R.F.J. MCCARTHY, CEng, FRAeS. Dowry Aerospace, Anson Business Park, Cheltenham Road, Gloucester GL2 9QH. Tel: 01452 711428.

Hatfield

President: F.W. VANN, CEng, FRAeS.

Chairman: F.B. OGILVIE, AMRAeS.

Hon. Secretary: D.H. TIPPER, CEng, MRAeS. 4 Bishops Rise, Hatfield, Herts AL10 9HB. Tel: 01707 271025.

Heathrow

President: SIR COLIN MARSHALL, Hon Companion RAeS.

Chairman: K.D. MITCHELL, Associate Member RAeS.

Hon. Secretary: R.A. KENNEDY, IEng, AMRAeS. British Airways (S1) PO Box 10, Heathrow Airport, Hounslow, Middx TW6 2JA. Tel: 0181-562 3366.

Isle of Wight

President: R.L. WHEELER, CEng, FRAeS.

Chairman: R.L. WHEELER, CEng, FRAeS.

Hon. Secretary: S. ASHWORTH, 21 Union Road, Cowes, Isle of Wight PO31 7TW. Tel: 01983 283022.

Loughborough

President: Professor G.L. WILDE, OBE, CEng, FRAeS.

Chairman: R.C.T. HARDING, Student RAeS.

Hon. Secretary: Professor S.J. STEVENS, CEng, MRAeS. Transport Technology Dept, Loughborough University of Technology, Leics. LE11 3TU. Tel: 01509 223403.

Luton

President: B. NEWTON

Chairman: P.J. SHARP, CEng, MRAeS.

Hon. Secretary: N.G. TOOMEY, IEng, MRAeS. c/o Monarch Aircraft Engineering Ltd (Planning Dept), Luton International Airport, Luton, Beds LU2 9LX. Tel: Work—01582 398542. Home—01234 54185.

Manchester

President: Professor J.B. SCOTT-WILSON, OBE, FEng, FRAeS.

Chairman: A.A. McDICKEN, MRAeS.

Hon. Secretary: I.R. FORD, Student RAeS. PS50, Avro International Aerospace, Woodford, Stockport, Cheshire SK7 1QR. Tel: 0161-957 4586.

Marham

President: Gp Capt. G.E. STIRRUP, FRAeS.

Chairman: Sqn Ldr R.B. ECKERLEY, CEng, MRAeS.

Hon. Secretary: Flt Sgt N.P. KING, AMRAeS. 617 Squadron, RAF Marham, Kings Lynn, Norfolk PE33 9NP. Tel: 01760 337261 Ex. 6423.

Medway

President: P.A. HEARNE, FEng, Hon. FRAeS.

Chairman: G.R. SLEIGHT, CEng, FRAeS.

Hon. Secretary: R.T. TWINE, MRAeS. c/o GEC-Marconi Avionics Ltd, Airport Works, Rochester, Kent ME1 2XX. Tel: 01634 844400 Ex. 3534.

Middle Wallop

President: Col W.G. HARRISON.

Chairman: Lt Col T.W. PERKS, MRAeS.

Secretary: Major P. MILBORN, MBE, IEng, AMRAeS. OC Training Company, School of Aeronautical Engineering, Army Air Corps Centre, Middle Wallop, Stockbridge, Hampshire SO20 8DY. Tel: 01264 364305.

Preston

President: Professor D. GARDNER, FEng, FRAeS.

Chairman: M. MANSELL, CEng, FRAeS.

Hon. Secretary: M. GILCHRIST, BEng, Grad RAeS. Weapons Management (W14), British Aerospace Defence, Warton Aerodrome, Preston, Lancs PR4 1AX. Tel: 01772 855274.

Prestwick

President: P. BERRY, MRAeS.

Chairman: D.R. SHEPHERD, CEng, MRAeS.

Hon. Secretary: A.R. FROST, AMRAeS. 21 Fullerton Road, Prestwick KA9 2BU. Tel: 01292 78204.

Sherborne

President: Position vacant.

Chairman: P. SAUNDERS, IEng, AMRAeS.

Hon. Secretary: J.D. SIMPSON, Student RAeS. 27 Mill Close, East Coker, Yeovil BA22 9LF. Tel: 01935 702149.

Southampton

President: Professor G.M. LILLEY, CEng, FRAeS.

Chairman: P.R. BOYLE, CEng, MRAeS.

Hon. Secretary: D.R.J. BAXTER, CEng, FRAeS. Department of Aeronautics and Astronautics, University of Southampton, Highfield, Southampton, Hants SO9 5NH. Tel: 01703 593882.

Southend

President: BARONESS PLATT of WRITTLE, CBE, FEng, FRAeS.

Chairman: D. ROBERTS, Technician RAeS.

Hon. Secretary: Eurling M. NICOLINI, MRAeS. 29 Symons Avenue, Leigh-on-Sea, Essex SS9 5QD. Tel: 01702 521554.

Stevenage

President: D.A. LAYBOURN, FCA, FRAeS.

Chairman: Dr J.M. YOUNG, FRAeS.

Hon. Secretary: D. MURPHY, CEng, MRAeS. British Aerospace Space Systems, Gunnels Wood Road, Stevenage, Herts SG1 2AS. Tel: 01438 736737.

Swindon

President: Professor M.G. FARLEY, CEng, FRAeS.

Chairman: Wg Cdr T. KIRBY.

Hon. Secretary: V.A. SIMON, 20 Hawkswood, Covingham Park, Swindon, Wilts. Tel: 01793 525350.

Weybridge

President: Professor I.R. YATES, CBE, FEng, FRAeS.

Chairman: Miss J.M. GULLAND CEng, MRAeS.

Hon. Secretary: K.J. DAVIES, CEng, MRAeS. 65 Stringers Avenue, Jacobs Well, Guildford, Surrey GU4 7NN. Tel: 01483 31529.

Yeovil

President: V.A.B. ROGERS, CBE, FEng, FRAeS.

Chairman: R.I. CASE, FEng, FRAeS.

Hon. Secretary: F.N.R. BALLAM, CEng, MRAeS. Box 285, Westland Helicopters, Yeovil, Somerset BA20 2YB. Tel: 01935 703779.

OVERSEAS BRANCHES

Cyprus

President: D.M. PANTAZIS, FRAeS.

Chairman: D.M. PANTAZIS, FRAeS.

Hon. Secretary: C. PERICLEOUS, MRAeS. 8 Georgiou Christodoulou, Acropolis, Nicosia, Cyprus. Tel: 357-2-310430.

Hong Kong

Chairman: R. FAIRFIELD, FRAeS

Hon. Secretary: M.J. POMFRET, MRAeS. MME Dept HK

Polytechnic, Hung Hom, Kowloon, Hong Kong. Tel: Office 3-7666647. Home: 3-7213732.

Malaysia

Chairman: Dato R. SINGH, IEng, FRAeS.

Hon. Secretary: Lt Col A. LATIF B. TAAH, AMRAeS, MRAF.

Dept of the Air Force, Ministry of Defence, Jalan Padang Tembak, 50634 Kuala Lumpur, Malaysia. Tel: 03-2354358.

Munich

President: Professor Dipl. Ing G. MADELUNG, FEng, HonFRAeS.

Chairman: J. VINCENT, FRAeS.

Hon. Secretary: G. PARKER, Student RAeS. NAMMA, Postfach 1303, 82003 Unterhaching, Germany. Tel: 89-666 80140.

Northern Germany

Chairman: Sqn Ldr A.C. MAJOR, CEng, MRAeS, RAF.

Hon. Secretary: Sqn Ldr A.C. MAJOR, CEng, MRAeS, RAF.

Puma Maintenance Flt, RAF Laarbruch, BFPO 43, Germany. Tel: 02837 895367.

Republic of Ireland

President: R.W. O'SULLIVAN, CEng, FRAeS.

Chairman: H. REILLY, MRAeS.

Hon. Secretary: J.J. CONERNEY, Technician RAeS. Eng.

Wing, Air Corps, Baldonnel, Co. Dublin. Tel: 592493. Ex. 6633.

Toulouse

President: J. PIERSON, FRAeS.

Chairman: A.S. McClymont, FRAeS.

Hon. Secretary: W.A.N. FORD, CEng, FRAeS. Chrestias, Avenue du Bouconne, 31530 Lévisgnac, France. Tel: (33) 61 85 42 58.