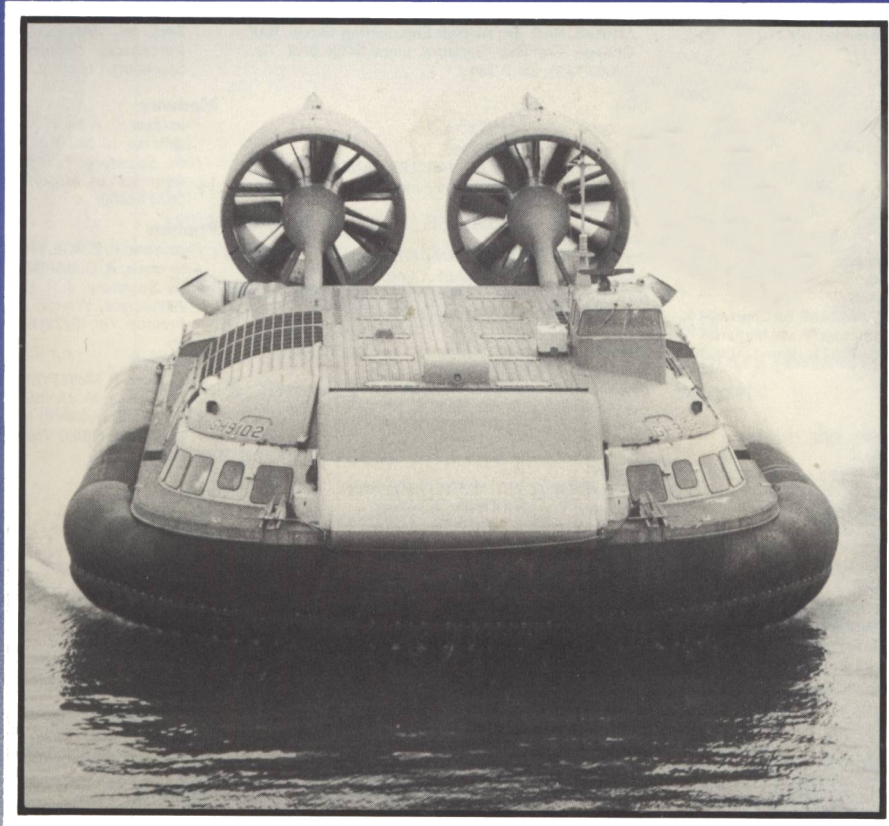


The **AERONAUTICAL** Journal



**Hydro/Aerodynamics —
cross fertilisation —
Hovercraft noise**

JANUARY 1982 Volume 86 No 851

DIVISIONS AND BRANCHES OF

THE ROYAL AERONAUTICAL SOCIETY

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

President: Professor R. D. ARCHER, MRAeS. *Hon. Secretary:* B. A. J. SCOLLES, MRAeS, 191 Royal Parade, Parkville, Victoria 3052.

Zimbabwe Branches at: Bulawayo, Gweilo and Salisbury.

Acting President: H. M. DOWELL, AMRAeS. *Secretary:* Mrs. MARGARET HEAP, Assoc RAeS, 84 Broadlands Rd, Emerald Hill, Salisbury.

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

President: R. L. WILLIAMS, AMRAeS. *Hon. Secretary:* C. S. BUTCHER, PO Box 3715, Auckland.

Southern Africa

President: Wg. Cdr. A. W. BOWER, MRAeS. *Hon. Secretary:* Wg. Cdr. N. F. HARRISON, MRAeS, PO Box 27335, Sunnyside 0132, RSA.

Bedford

President: Air Vice Marshal D. W. RICHARDSON.

Chairman: D. CLAYSON.

Hon. Secretary: G. I. PAULEY, Aircraft Research Assoc. Ltd., Manton Lane, Bedford. MK41 7PF. Tel: 0234 50681.

Belfast

President: Dr. P. F. FOREMAN, CBE, FRAeS.

Chairman: T. E. MORRISON, MRAeS.

Hon. Secretary: W. GORDON, MRAeS, Dept. of Mech. Eng., College of Technology, College Square East, Belfast BT1 6DJ. Tel: Work — Belfast 27244.

Birmingham and Wolverhampton

President: J. LENHAM, MRAeS.

Chairman: E. ALBRECHT, MRAeS.

Hon. Secretary: K. HOMFRAY, AMRAeS, 58 Chartwell Drive, Bushbury, Wolverhampton, West Midlands WV10 8JQ. Tel: Work — 0902 22321; Home — 0902 787631.

Boscombe Down

President: Air Cdre. R. G. SPIERS, OBE, FRAeS.

Chairman: B. RAMSDALE, BSc.

Hon. Secretary: Wg. Cdr. C. T. B. PEILE, MRAeS, RAF, O/C RAF Handling Squadron, Boscombe Down, Salisbury SP4 0JF. Tel: 09802 3331. Ex. 2513.

Bristol

President: H. METCALFE, FRAeS.

Chairman: J. M. HAHN, CEng, MRAeS.

Hon. Secretary: D. C. GREENMAN, MRAeS, Aerodynamics Dept, No 7 Drawing Office, British Aerospace Aircraft Group, Filton House, Bristol BS99 7AR. Tel: 0272 693831. Ex. 464.

Brough

President: L. W. MILSOM, CEng, MIMechE.

Chairman: M. EDWARDS, CEng, MRAeS.

Hon. Secretary: E. J. SOLMAN, MRAeS, British Aerospace, Holme-on-Spalding Moor, York. Tel: 06962 60421. Ex. 46.

Cambridge

President: Professor W. A. MAIR, CBE, FRAeS.

Chairman: N. A. J. HARRY, FRAeS.

Hon. Secretary: J. MOSELEY, AMRAeS, 6 Cooks Drove, Earith, Huntingdon, Cambridge PE17 3QG.

Chester

President: R. GRIFFITHS, FRAeS.

Chairman: R. C. GODWIN, MRAeS.

Hon. Secretary: J. R. YOUNG, AMRAeS, British Aerospace, Hatfield Chester Division, Broughton, Chester. Tel: 0244 535333.

Christchurch

President: M. COBHAM, FRAeS.

Chairman: R. C. GODWIN, MRAeS.

Hon. Secretary: R. J. STANDING, MRAeS, British Aerospace, Weybridge Bristol Division, Bourne-mouth (Hurn) Airport, Christchurch, Dorset. Tel: 020-16 3201.

Coventry

President: A. H. POPE, FRAeS.

Chairman: A. J. WEBBER, MRAeS.

Hon. Secretary: A. J. EAGLES, 30 Lupton Ave, Coventry CV3 5BQ. Tel: 0203 415412.

Cranwell

President: Air Vice Marshal B. BROWNLOW, AMRAeS.

Chairman: Wg. Cdr. S. L. BUGG, MRAeS, RAF.

Hon. Secretary: Sqn. Ldr. M. P. THOMAS, CEng, MRAeS, RAF, o/c Aircraft Engineering Group, RAF College, Cranwell, Sleaford, Lincs NG34 8HB. Tel: 0400 61201. Ex. 7. 284.

Derby

President: D. A. HEAD, FRAeS.

Chairman: J. BUSH, FRAeS.

Hon. Secretary: D. P. HARPLEY, AMRAeS, Rolls-Royce Ltd, East Midlands Airport, Derby DE7 2SA. Tel: 0332 811216

Dublin

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

Chairman: Capt. G. McCABE, CEng, MRAeS.

Hon. Secretary: J. CONNERNEY, Eng. Wing, Air Corps, Baldonnel, Co. Dublin. Tel: 592493. Ex. 28.

Gatwick

President: A. T. PUGH, FRAeS.

Chairman: B. C. CHILCOTT, MRAeS.

Hon. Secretary: A. G. SAYCE, MRAeS, 18 Palmers Close, Meath Green, Horley, Surrey

Glasgow

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

Chairman: T. J. GOODWIN, AMRAeS.

Hon. Secretary: F. FRENCH, MRAeS, 27 Bourtree Road, Hamilton ML3 8QA. Tel: 03552 20200. Ex. 163.

Gloucester and Cheltenham

President: Sir ROBERT HUNT, FRAeS.

Chairman: K. BEST, MRAeS.

Hon. Secretary: R. W. WHITE, MRAeS, c/o Smiths Industries Ltd, Bishops Cleeve, Cheltenham, Glos. Tel: 024-267 3333. Ex. 2423.

Halton

President: Gp. Capt. O. J. TRUELOVE, MBE, CEng, MRAeS, RAF.

Chairman: P. R. SAMPSON, AMRAeS.

Secretary: Sqn. Ldr. P. G. HISCOCK, RAF, Airframe Training Squadron, RAF Halton, Bucks HP22 5PG. Tel: 0296 623535. Ex. 440.

Hatfield

President: M. J. GOLDSMITH, FRAeS.

Chairman: F. W. VANN, FRAeS.

Hon. Secretary: K. GREEN, FRAeS, Repair Drawing Office, British Aerospace, Hatfield — Chester Division, Hatfield, Herts. Tel: 07072 62345. Ex. 89.

Isle of Wight

President: Sir CHRISTOPHER HARTLEY, KCB, CBE, DFC, AFC.

Chairman: R. L. WHEELER, MRAeS.

Hon. Secretary: N. MAY, Technical Office, British Hovercraft Corporation Ltd, East Cowes, Isle of Wight. Tel: 098 29 4121.

London Airport

President: K. G. WILKINSON, CBE, FRAeS.

Chairman: Capt. T. A. FULTON, MRAeS.

Hon. Secretary: D. S. FORSYTH, AMRAeS, Room 200A, TBK S477, British Airways, PO Box 10, London (Heathrow) Airport, Hounslow, Middx TW6 2JR. Tel: 01-759 5511. Ex. 3340.

Loughborough

President: Professor D. J. JOHNS, FRAeS.

Chairman: F. G. MACCABEE, MRAeS.

Hon. Secretary: L. E. WOODFIELD, AMRAeS, Transport Technology Dept, Loughborough University of Technology, Loughborough, Leics. LE11 3TU. Tel: Loughborough 63171. Ex. 470.

Manchester

President: C. E. FIELDING, OBE, FRAeS.

Chairman: D. L. RAFFLE, CEng, MRAeS.

Hon. Secretary: J. H. MANGAN, MRAeS, Assist. Sec., W. JAMES, Aerodynamics Dept., British Aerospace, Manchester Division, Woodford, Stockport, Cheshire. Tel: 061-439 5050. Ex. 278

Medway

President: P. A. HEARNE, FRAeS.

Chairman: M. MOULTON, MRAeS.

Hon. Secretary: F. H. WOOD, MRAeS, c/o Marconi Avionics Ltd, Airport Works, Rochester, Kent. Tel: 0634 44400.

Preston

President: F. E. ROE, FRAeS.

Chairman: A. G. BARNES, MRAeS.

Hon. Secretary: J. R. HUNTINGTON, MRAeS, British Aerospace, Warton Division, Warton Aerodrome, Preston. Tel: (0772) 633333. Ex. 60.

Prestwick

President: R. McINTYRE, FRAeS.

Chairman: J. M. JANKE, MRAeS.

Hon. Secretary: V. B. M. McLEONARD, AMRAeS, 21 Hillhouse Gdns, Troon, Ayrshire KA10 6SZ. Tel: 0292 311351.

Southampton

President: Professor G. M. LILLEY, FRAeS.

Chairman: Dr. R. A. EAST, MRAeS.

Hon. Secretary: S. W. D. WOLF, BSc, AMRAeS, Dept. of Aeronautics and Astronautics, The University, Southampton, Hants. SO9 5NH. Tel: 0703 559122. Ex. 2303.

Southend

President: A. J. BROOKE-WALDER, MRAeS.

Chairman:

Hon. Secretary: D. M. GLADSTONE, MRAeS, 36 Brooke House, Town Square, Basildon, Essex SS14 1HX. Tel: Basildon 284621; Work: 22861. Ex. 287.

Stevenage

President: T. G. KENT, CB, MRAeS.

Chairman: C. H. MARTIN, CEng, FRAeS.

Hon. Secretary: M. F. RICKETT, AMRAeS, British Aerospace, Dynamics Group, Gunned Wood Rd, Stevenage, Herts. SG1 2AS. Tel: 0438 3456. Ex. 325.

Swindon

President: W. GILLESPIE, MRAeS.

Chairman: W. H. BUNTING, MRAeS.

Hon. Secretary: R. J. WESTMACOTT, MRAeS, 45 Hesketh Crescent, Swindon SN3 1RZ. Tel: 0793 823815.

Thames Valley

President: E. N. MOBBS.

Chairman: J. L. FAREHAM, MRAeS.

Hon. Secretary: A. M. DOBSON, MRAeS, M.L. Aviation Co Ltd, White Waltham Aerodrome, Berks. Tel: 062-882 3361.

Weybridge

President: J. T. STAMPER, FRAeS.

Chairman: M. W. SALISBURY, MRAeS.

Hon. Secretary: A. M. DOBSON, MRAeS, British Aerospace, Weybridge Bristol Division, Weybridge, Surrey. Tel: 97 45522. Ex. 6945.

Yeovil

President: B. D. BLACKWELL, FRAeS.

Chairman: Dr. J. P. JONES, FRAeS.

Hon. Secretary: S. J. LOVE, MRAeS, Development Instrumentation, Westland Helicopters Ltd, Yeovil, Somerset. Tel: 0935 5222. Ex. 160.

The AERONAUTICAL Journal

Volume 86 No 851 January 1982

Incorporating The Institution of Aeronautical Engineers
and The Helicopter Association of Great Britain



Editor: Jay Wolff,
Assoc. Member RAeS

Assistant Editor: Michèle Didyk

Secretary of the Society:
E. M. J. Schaffter, MA, CEng, FRAeS
4 Hamilton Place, London W1V 0BQ
Tel: 01-499 3515
Telegrams: Didaskalos,
London W1

Advertisements:
J. G. Heller,
Cheiron Media Ltd,
43a Dulwich Village,
London SE21 7BN
Tel: 01-299 1711/2

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

None of the papers or paragraphs
must be taken as expressing the
opinion of the Council unless
otherwise stated.

Printed by
Manor Park Press Ltd,
Unit 7, Highfield Industrial Estate,
Edison Road, Hampden Park,
Eastbourne.

Subscriptions: £75 per annum,
post free.

Single copies, including back
numbers: £7.50

All foreign currency rates on
application.

Published by
The Royal Aeronautical Society,
4 Hamilton Place,
London W1V 0BQ, England
ISSN: 0001-9240

PUBLISHED MONTHLY

Contents

1

H. H. Pearcey

Hydrodynamics and aerodynamics
— cross fertilisation in research and
design

23

P. A. E. Stewart

The application of dynamic cold
neutron fluoroscopy for the
visualisation of fuel and oil system
operating characteristics in gas
turbine development

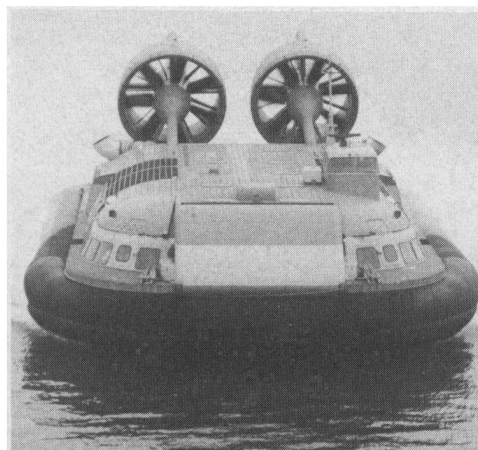
29

J. W. Leach

Hovercraft environmental noise: a
review and future prospects

40

**Library reviews, additions and
reports**



Cover picture

The propulsion of the Vosper Thornycroft VT2 is provided by two variable pitch propulsion fans, 13.5 ft in diameter, the largest ducted air propulsors in the world. One advantage is a considerable reduction in noise, (see paper on hovercraft environmental noise, pages 29-39).

The Royal Aeronautical Society

FOUNDED 1866

INCORPORATED BY ROYAL CHARTER 1949

Patron: HER MAJESTY THE QUEEN

COUNCIL

President: J. T. STAMPER, MA(Cantab), FEng, FRAeS

President-Elect: CAPTAIN E. M. BROWN, CBE, DSC, AFC, MA, FRAeS, RN(Ret'd)

Vice-Presidents:

PROFESSOR M. G. FARLEY, CEng, FIMechE, CBIM, FIProdE, FRAeS
J. W. FOZARD, DCAe BSc(Hons), CEng, FIMechE, FRAeS
G. K. C. PARDOE, BSc(Eng), DLC, CEng, FBIS, FRAeS

Past Presidents:

PROFESSOR L. F. CRABTREE, BSc, DIC, PhD, CEng, AFAIAA, FRAeS
P. A. HEARNE, MSc, DLC, CEng, FRAeS

Members:

C. ABELL, OBE, CEng, HonFSLAET, HonFRAeS
M. W. ANDERSON, MA(Cantab), CEng, MICE, MSAE, AFAIAA, FRAeS
PROFESSOR R. D. ARCHER, CEng, MRAeS (*President — Australia Division*)
A. F. ATKIN, CBE, BSc (Hons), DipAe(Hull), FEng, FIMechE, FRAeS
R. G. AUSTIN, MSc, CEng, MAIAA, FRAeS (*Chairman, Rotorcraft Section*)
AIR CDRE F. R. BANKS, CB, OBE, HonCGIA, CEng, HonFAIAA, HonFRAeS, RAF (Ret'd)
A. E. M. BARTON, DFC, CEng, MRAeS
A. L. BLACKMAN, OBE, MA, FRAeS
WING CDR A. W. BOWER, OBE, DFC, MRAeS (*President — South Africa Division*)
DR P. H. CALDER, OBE, BSc, ACGI, PhD, CEng, MRAeS
I. B. CRIPPS, MRAeS (*Chairman — Branches Committee*)
J. L. CROWDER, MA, CEng, FMIS, MRAeS (*Chairman — Astronautics and Guided Flight Section*)
H. M. DOWELL, AMRAeS (*Acting President — Zimbabwe Division*)
N. FALCONER, MRAeS
DR W. F. HILTON, PhD, DSc, CEng, AFAIAA, FIERE, FRAeS
DR G. S. HISLOP, CBE, HonDSc, PhD, BSc, ARCST, FEng, FIMechE, FRSA, FRSE, FRAeS
G. C. HOWELL
T. H. KERR, BSc, FRAeS
D. KNIGHT, BSc(Eng) (*Chairman — Graduates' and Students' Section*)
B. P. LAIGHT, OBE, MSc, CEng, MIMechE, FRAeS
F. J. LOW, MRAeS
AIR MARSHAL SIR CHARLES PRINGLE, KBE, MA, FEng, FRAeS, FBIM, RAF(Ret'd)
D. J. RICHER, MSc, BSc
G. T. WANSBROUGH-WHITE, AMRAeS
R. L. WILLIAMS, AMRAeS (*President — New Zealand Division*)

Officers:

Hon. Treasurer: C. F. HUGHESDON, AFC, FRAeS
Solicitor: C. L. BYWATERS, Associate RAeS
Secretary: E. M. J. SCHAFFTER, MA, CEng, FRAeS