## The JOURNAL of NAVIGATION

Vol. 35, No. 3	SEPTEMBER	198
Integrated Navigation Marcus St Erme Ca		367
A High-precision Ur M. G. Pearson	nderwater Navigation System	374
Weather Satellite Inf R. M. Morris	formation for Offshore Industry	386
Dekametric Radar fo E. D. R. Shearman	or Surveillance of Sea-state and Ocea and L. R. Wyatt	anic Winds
R. L. CLOET, S. L. I and A. J. Duncan	Towed Depth-measuring System HURST, C. R. EDWARDS, P. S. PHILLIPS Catellites for Sea-state Observation a	411 nd
Predictions T. D. Allan		421
The Nautical Chart R. MAYBOURN		432
Communication and Adam J. Kerr and I		439
Shipping and the Eu Aline De Bièvre	ropean Environment	451
Present Developmen Nabil Hilaly	t Phases of the Suez Canal Project	460
Economic Aspects of Kostas Giziakis	Marine Navigational Casualties	466
Marine Traffic Analy T. P. Whalley	rsis	479
The Development of J. P. O'Sullivan	Electronic Navigation Systems	482
The Placement of Ar ALAN J. WATTS	ncient Sites in the New Forest Area	491
The North Atlantic (V. W. Attwooll	Organized Track Structure	497
The Development of L. Bennett	Programs for Minimum-time Track	
Some Interim Result R. Monk	s of the Study	502
FORUM, Reviews, R	ecord	517, 522, 525

## THE ROYAL INSTITUTE OF NAVIGATION CAMBRIDGE UNIVERSITY PRESS

## THE ROYAL INSTITUTE OF NAVIGATION

Patron

HRH THE PRINCE PHILIP DUKE OF EDINBURGH, KG, KT, OM

OFFICERS AND COUNCIL 1981-2

President

Captain B. J. Calvert

Vice Presidents

Rear-Admiral D. W. Haslam, CB, OBE W. H. McKinlay

Treasurer

G. E. Beck

Chairman of the Technical Committee

Dr J. F. Kemp

Chairman of the Membership & Fellowship Committee

M. G. Pearson

Other Members of Council

Captain B. H. G. M. Baynham, RN (ret)

D. M. Page

Wing Commander D. W. Broughton, MBE, RAF Commander J. Paton, RN (ret)

Commander A. E. Fanning, MBE, DSC, RN (ret) Commander P. Le Pla, RN

Captain L. W. Fifield

Commander M. R. H. Llewellyn, RD, RNR (ret)

Wing Commander E. Matthews, OBE, RAF (ret)

E. R. Hargreaves

Director M. W. Richey, MBE

## THE JOURNAL OF NAVIGATION

The Journal is published three times a year by Cambridge University Press and is edited by M. W. Richey. It contains original papers contributing to the science of navigation, including those presented at the meetings of the Institute together with the ensuing discussion. In addition the Journal includes a record of current navigational work, reviews of important books, and other matters of concern to those interested in navigation. The views expressed in the Journal are not necessarily those of the Institute, or of any organization or department to which the authors may belong. Crown Copyright may be reserved.

The Journal (ISSN 0020-3009) is issued free to all Members of the Institute. The subscription price to non-members for Volume 35, 1982, is £30 (USA and Canada US \$82.50) post free; single parts are available at £12 (USA and Canada Us \$33) plus postage. Orders, which must be accompanied by payment, may be sent to any bookseller or subscription agent or direct to the publishers, Cambridge University Press, The Edinburgh Building, Shaftesbury Road, Cambridge CB2 2RU, or in the USA and Canada to Cambridge University Press, 32 East 57th Street, New York, N.Y. 10022. Back volumes are also available from the Publishers at £24 each.

Enquiries for advertising space should be addressed to Cambridge University Press.

The postal address of the Institute is The Royal Institute of Navigation, at The Royal Geographical Society, 1 Kensington Gore, London SW7 2AT (Telephone: 01-589 5021).