

INCLUDING  
SUPPLEMENTARY  
PAPERS



# THE AERONAUTICAL JOURNAL

MAY 1970

THE PRESIDENT, 1970-1971

THE HISTORY OF THE AVRO VULCAN

S. D. Davies

RECENT PROGRESS IN ALL-WEATHER LANDING TECHNIQUES

R. M. P. McManus  
and D. K. Craig

A PROBABILISTIC APPROACH TO AERONAUTICAL RESEARCH AND  
DEVELOPMENT

R. A. Harvey

THE DEVELOPING SCENE IN BRITISH LIGHT AVIATION

D. Stinton

ERNEST FREDERICK RELF—AN APPRECIATION

## TECHNICAL NOTES

Synthesis of an Aircraft Roll-Stabilisation System: An Application of Inverse  
Optimal Control Theory

B. Porter and  
M. A. Woodhead

Some Correlations for the Turbulent Boundary Layer on a Flat Plate

P. D. Chappell

A Circulation Meter

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The Stability of a Wind Tunnel Model on Flexible Supports

W. G. Molyneux

Effects of Rotation on a Turbulent Jet Flow over a Cylinder

H. Kell and  
K. Sridhar

THE LIBRARY NOTICES

## SUPPLEMENTARY PAPERS

MULTIVARIABLE SEARCH AND ITS APPLICATION TO AIRCRAFT DESIGN OPTIMISATION W. Z. Stepniewski  
and C. F. Kalmbach, Jr.

THE ROYAL AERONAUTICAL SOCIETY

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 Conventional tracks  
 STOL tracks



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# Electronic displays from Smiths Industries

## The new technique of electronic head-down display is well advanced at Smiths Industries

The unretouched photo taken on long exposure shows a 5½" c.r.t. display of engine pressure ratio and emphasises the clarity and stability of the symbology. Virtually any type of information can be presented on this type of head-down display on a sequential or selective basis.

The head-down unit receives information from the new Smiths digital waveform generator, which represents a major advance in symbol generation for electronic displays.

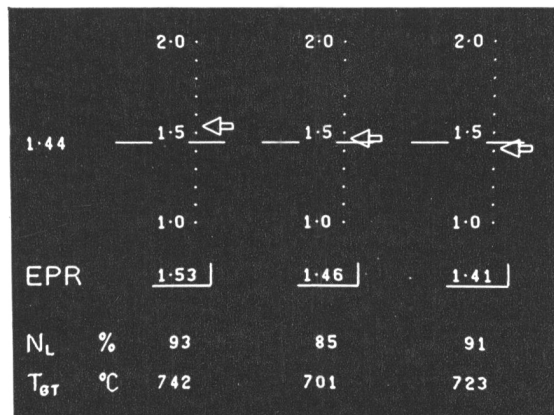
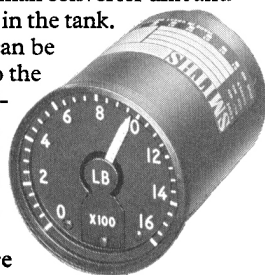
Small, light and entirely new in concept, this generator greatly increases the flexibility of the display system by use of plug-in modules for re-programming. It employs M.O.S. chips and multi-layer circuit boards for greater reliability and will accept digital and/or analogue input signals—other features include failure monitor capability, press-to-test facility and a predicted MTBF in excess of 1000 hours.

### Head-up

Smiths Industries advanced head-up display systems have been specified for the Harrier and Jaguar aircraft—development is also taking place on a head-up system for civil applications.

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The Type 7 Capacitance Fuel Gauge has been specifically designed by Smiths Industries for feeder-liner, executive and light aircraft requiring a simple and inexpensive fuel measurement system. Operating directly from a 28 V dc supply, Type 7 is accurate, uncomplex and compact. Basically it consists of a 2 inch indicator, a small converter unit and a probe or probes in the tank. The installation can be tailored exactly to the needs of the particular application. Typical accuracy figures for a basic system in normal temperature and fuel conditions are ±1.15% tank empty to ±1.30% tank full.



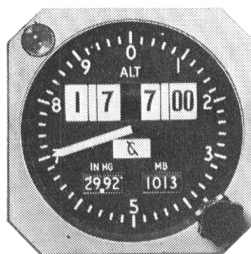
Compensation for variations in fuel permittivity is easily incorporated by the addition of an immersed capacitance reference unit.

While primarily designed for aircraft fuels, Type 7 can also be applied to oil contents measurement.

## Altitude alerting meets FAA mandatory requirements

By March 1971 a sequence of audio/visual signals to warn pilots of approach to a selected flight level will be a mandatory FAA requirement for U.S. civil airliners. Smiths Type 3B Self-Sensing Servo Altimeter with an Altitude Alerting Unit is the simple answer.

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The Altitude Alert Unit, in a ½-3ATI case, has integral lighting with front replaceable lamps, automatic reset, press-to-test facility and an accuracy better than 50ft. at all warning levels.

## Engine health—taking the pulse

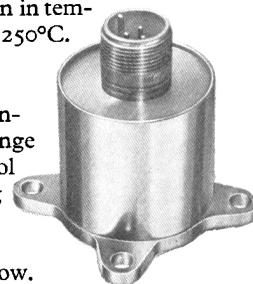
Accurate detection of shaft-speeds, gas temperatures and oil, fuel and air pressures is vital for monitoring the health and performance of aircraft gas turbines. On the RR Olympus 593 in the Concorde, for example, Smiths Industries supplies no less than 18 units per engine for sensing these vital parameters.

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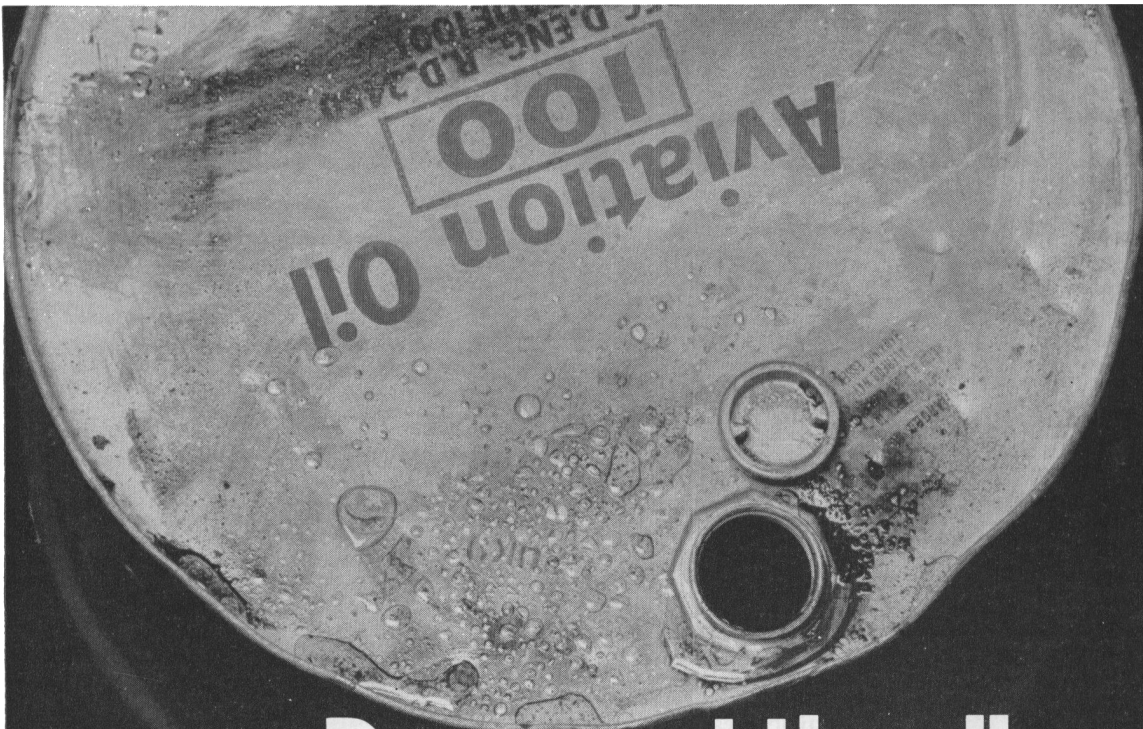


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WG.13 British Army



WG.13 French Navy



WG.13 R.A.F.



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SA.341 French Army



SA.341 British Army



SA.330 French Army



SA.330 R.A.F.

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