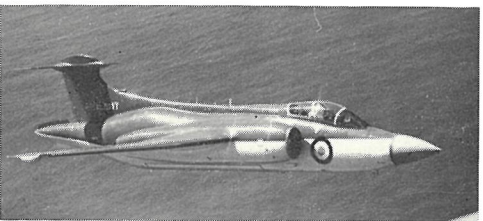
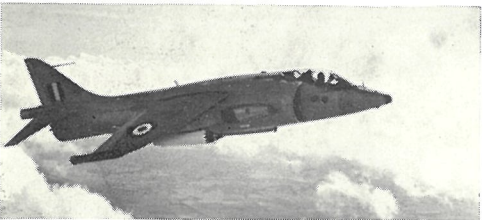
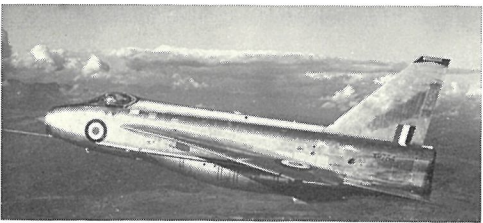
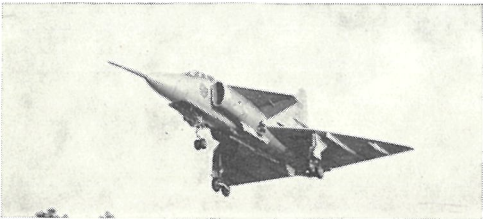
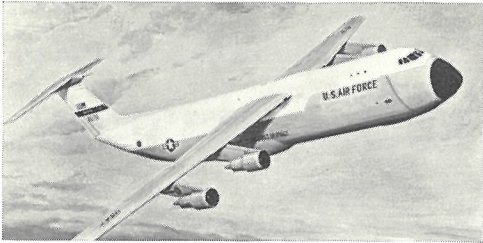
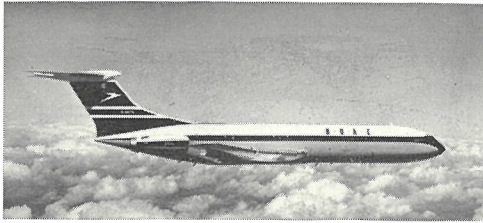


**ELLIOTT-AUTOMATION**

**AEROSPACE**



# Contents

---

	Page
The Elliott-Automation Group	1
Flight Control – Transport	3
Flight Control – Combat	6
Airspace Control	8
Space	10
Inertial Navigation	12
Test Equipment	13
Head-up Displays	14
Flight Instruments	16
Engine Instruments	17
Trainers and Simulators	18
Recorders	19
Radar	20
Radio & Communications	21
Products & Components	22
Service & Support	23
The Principal Aerospace Companies	24

---

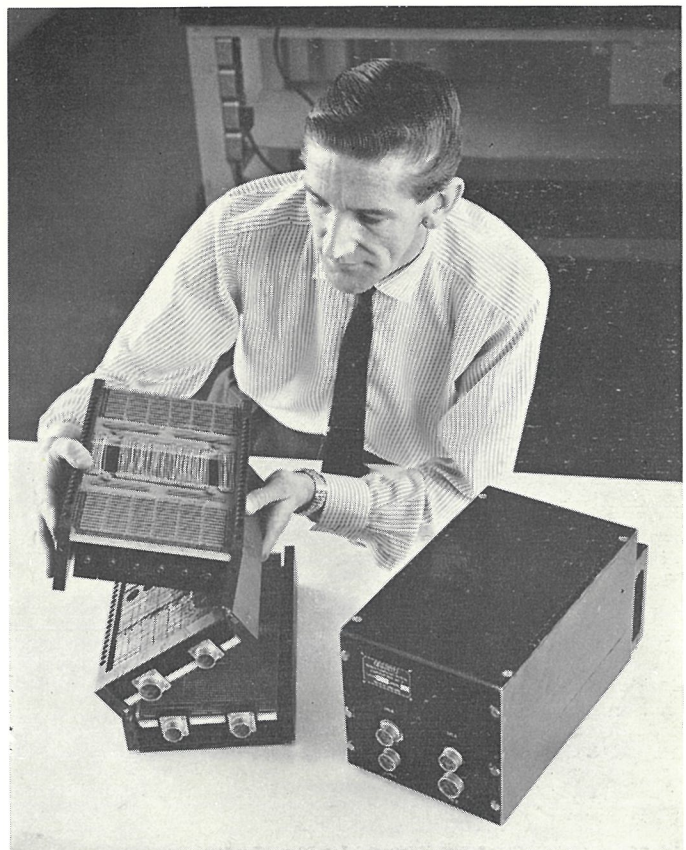
# ELLIOTT-AUTOMATION

## AEROSPACE

Elliott-Automation is a unique company. Its origins stretch back to the eighteenth century. During both World Wars, Elliotts manufactured large quantities of flight and engine instruments for the Royal Air Force. In 1946 the decision to convert an old and respected instrument making business into the pioneering force in automation opened up a whole new world of opportunity. Today, there is hardly any human activity to which automation does not give a new dimension. This booklet gives an indication of what Elliott-Automation is achieving in one particular field — that of aerospace.

All automatic control involves comparison and decision taking. In complex control systems these functions can best be performed by the electronic digital computer. That this is so was first appreciated by Elliotts in 1947. After twenty years of computer design and manufacture the company has the proud achievement of having implemented the widest range of on-line computer applications of any company anywhere.

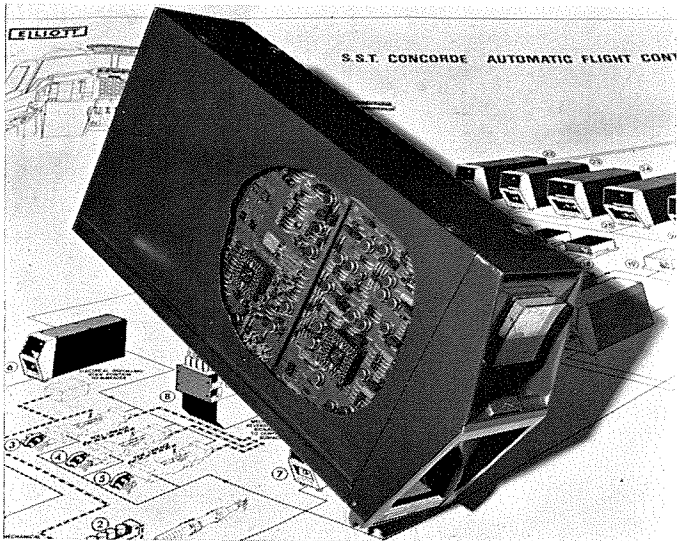
For aerospace we have developed a number of micro-miniature computers which have already been ordered for several airborne applications. In this booklet there are many examples of what is already being achieved: we are on the threshold of new advances throughout this chosen field.



Elliott 920M micro-miniature computers for aerospace environments



BAC One-Eleven



Concorde autopilot electronics unit

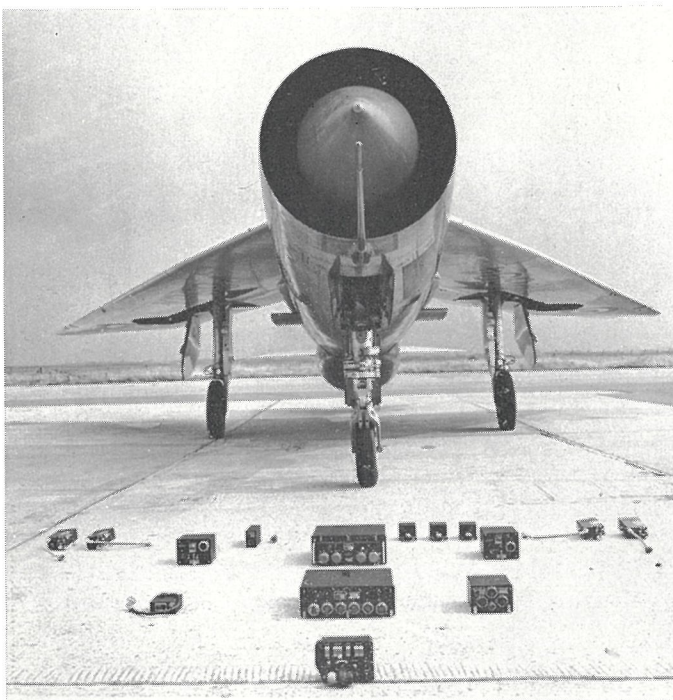


BOAC VC10



Hawker Siddeley P.1127 V/STOL  
close-support aircraft

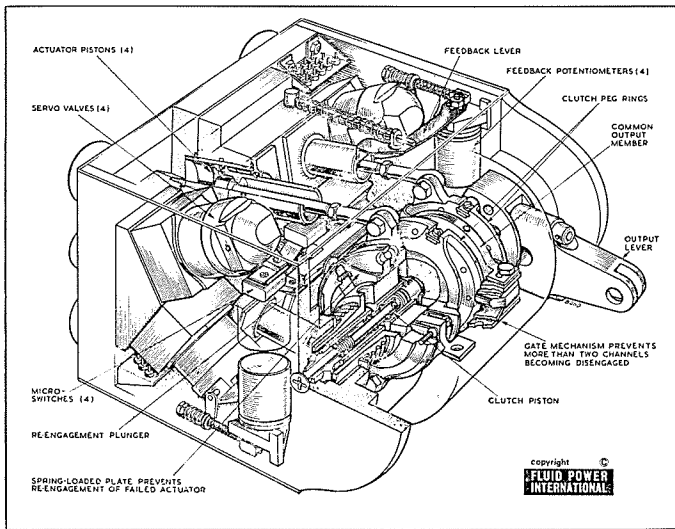
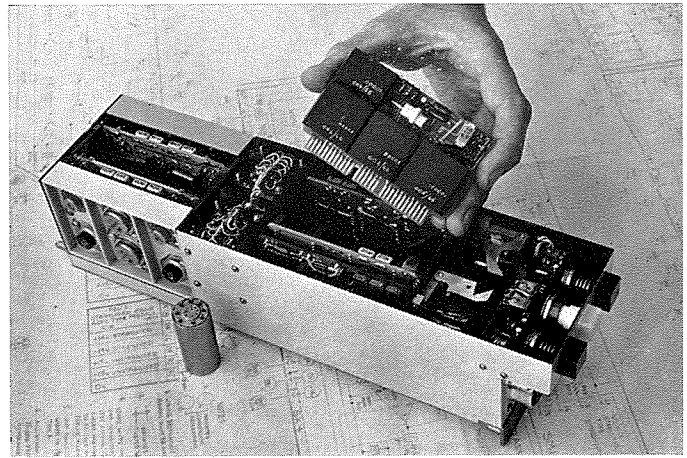
## Flight Control-Combat



In addition to producing conventional combat autopilots, Elliotts has developed the most advanced techniques in stabilisation and autopilot control for VTOL aircraft and for the systems required for the next generation of advanced military aircraft.

Flight control system for  
Lightning interceptor

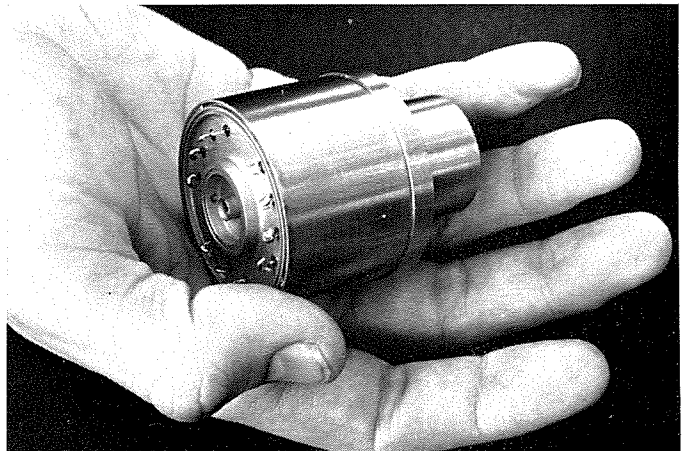
Two-axis autostabiliser for P.1127



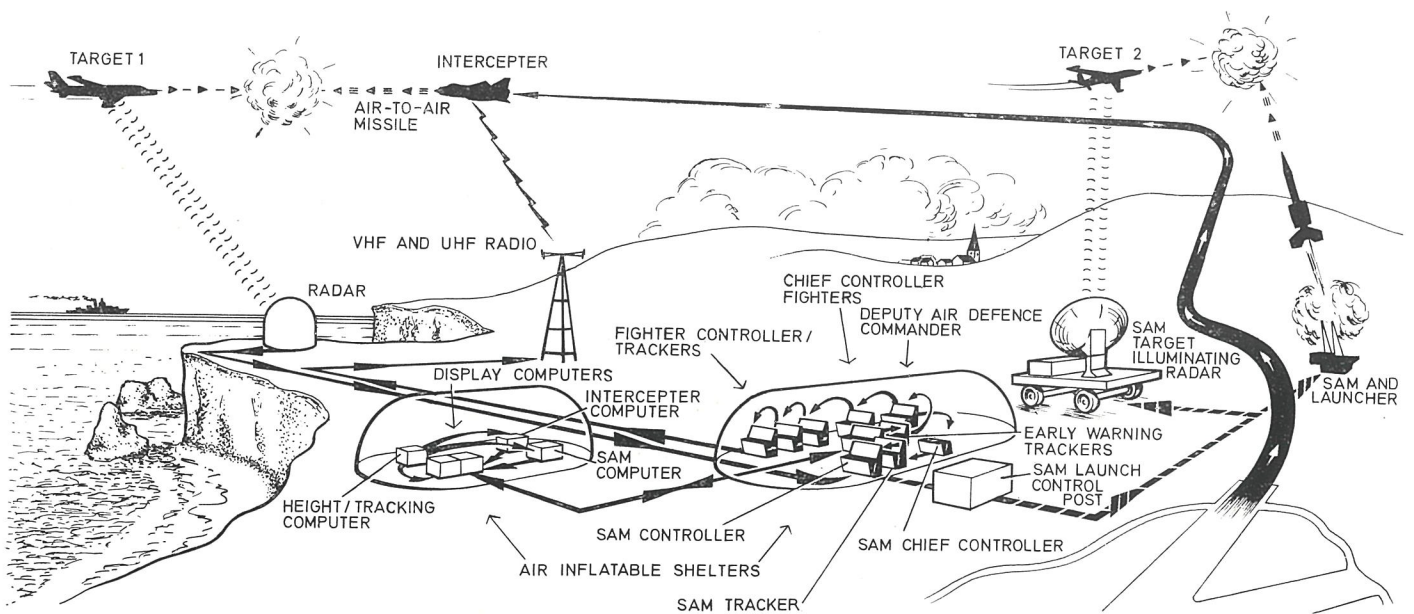
Quadruplex electro-hydraulic actuator

### Examples

- Lightning . . . . . FCS and autothrottle for RAF and Royal Saudi Air Force.
- Buccaneer . . . . . FCS for Royal Navy and South African Air Force.
- P.1127 . . . . . Two-axis autostabiliser.
- F-4K, F-4M Phantom Autopilot and navigation computer.
- C-5A . . . . . Energy Management Analogue Computer
- Avro 707C . . . . . Electrically signalled, failure-surviving manoeuvre demand controls.
- Hunter Mk. 12
- Drone autopilots . . . Jindivik, Meteor and Canberra.

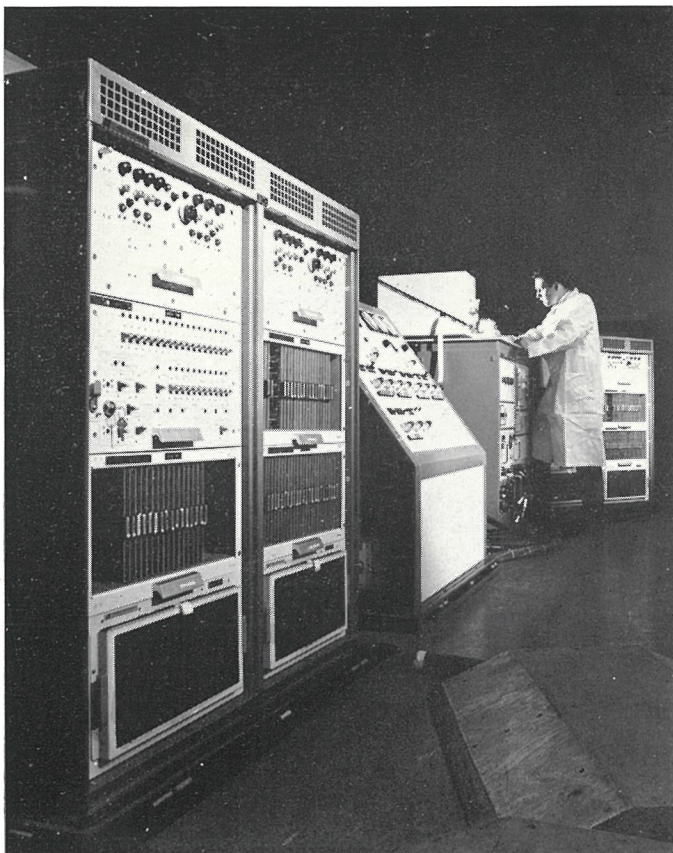


Self-monitored rate gyro



Nomad mobile defence system for the Royal Air Force

# Airspace Control



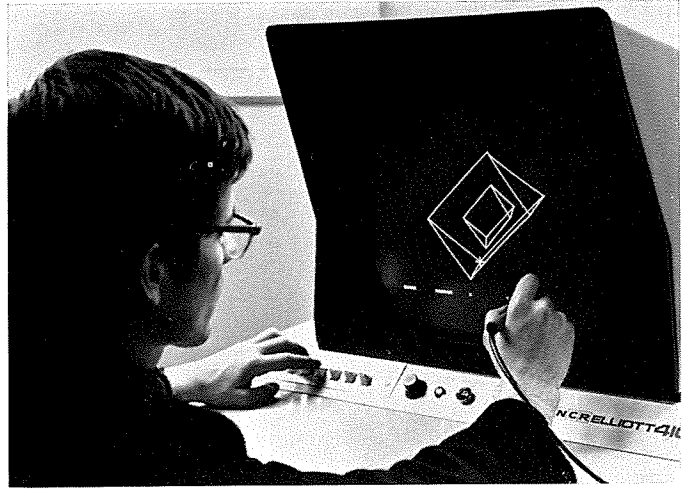
Firebrigade computer-controlled interception system was the first defence system to provide effective control of supersonic interceptions. It was ordered by the RAF and the Royal Netherlands Air Force. Nomad, a more sophisticated, air-transportable system incorporating a computer complex, is the first of its kind to be put into production. Nomad systems are being delivered to the RAF.

Secondary radar decoding, defruiting and display equipment has been manufactured for the Government, the RAF and for export. A computer-controlled SSR system is being supplied to Eurocontrol.

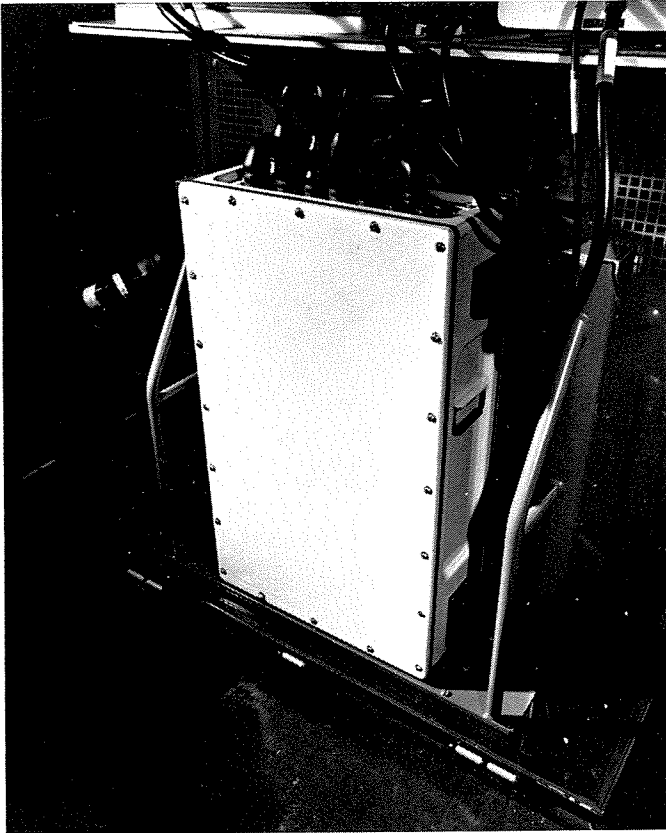
Advanced studies on the problems of future air traffic and of control, involving new computer techniques and software, have brought orders for computer systems, heuristic studies of airspace, approach control evaluation and simulation for research.

Nomad air-transportable equipment pallets

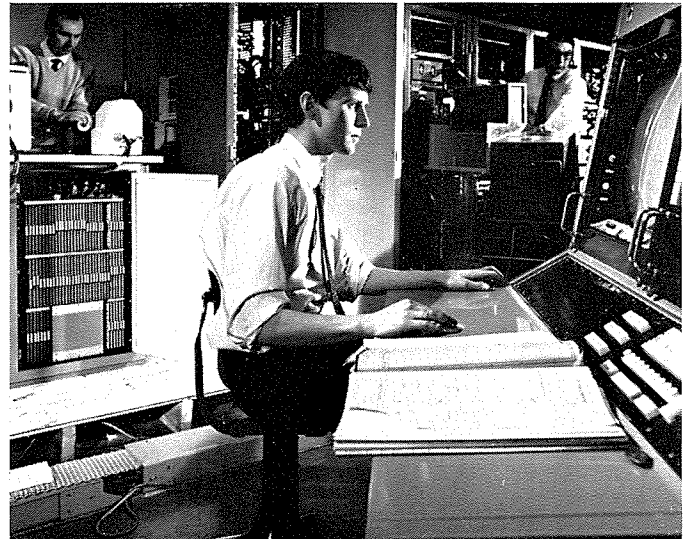




Light pen and electronic display



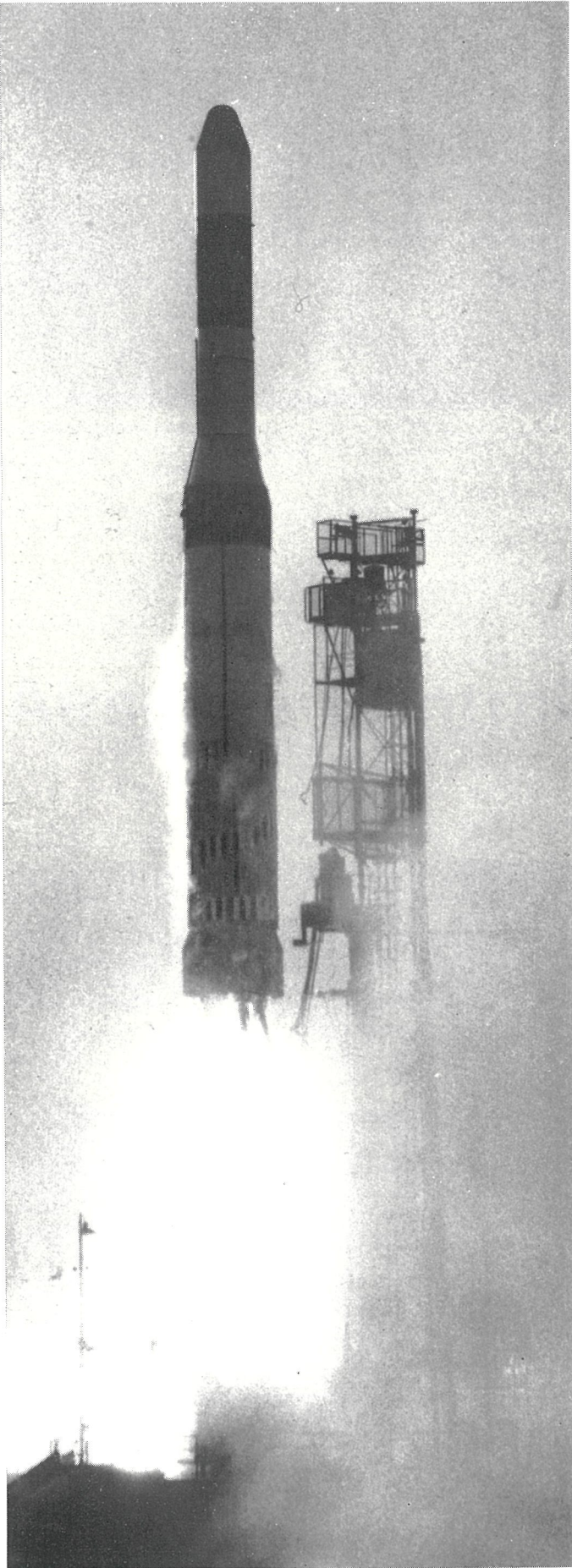
920B computer in Nomad equipment pallet



Computer-controlled SSR system for Eurocontrol

# Space

Elliott-Automation is working on sounding rockets, satellites and space guidance techniques. These activities have involved co-operation with the Royal Aircraft Establishment, ELDO, ESRO, other European manufacturers and with a number of British universities for whom the Company is designing and manufacturing 'passenger' experiments to fly in United States satellites.



MCS 920M microminiature computer for digital inertial guidance of Europa launch vehicles (left)





Three-axis attitude control for Skylark sounding rocket

## Examples

- ELDO Europa . Digital inertial guidance: 920M computer.
- Skylark Attitude Control . Stage 1, sun-pointing.  
Stage 3, Sun- and moon-pointing.  
Stage 5 (Starling) star-pointing.
- EST . . . . European Satellite Team, formed 1966.
- Satellites . . . . Propane attitude control.  
Experiments for ESRO TD-2, OAO-C, Nimbus D.
- Bearings . . . . Lead-lubricated, long-life ball bearings.



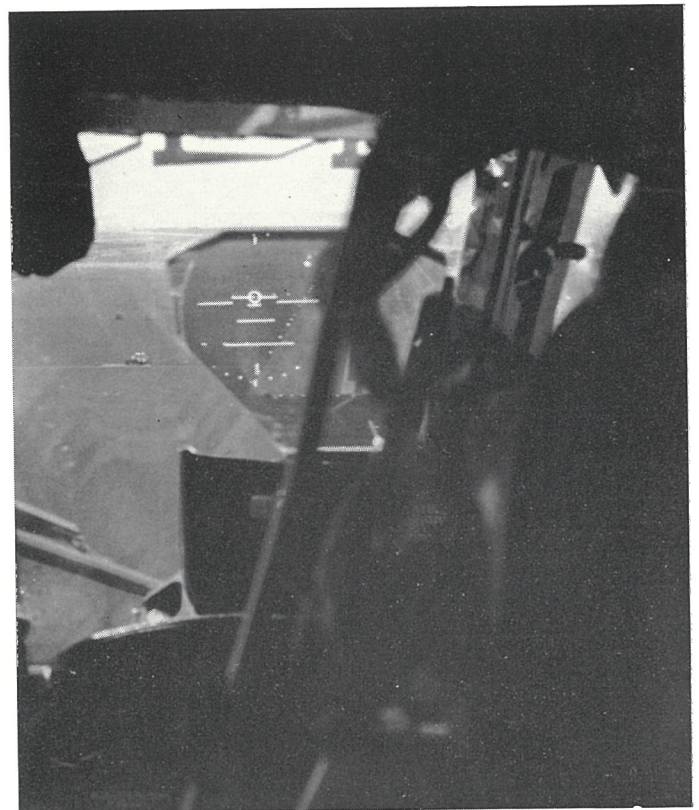
Telescope structure for passenger experiment in OAO-C satellite



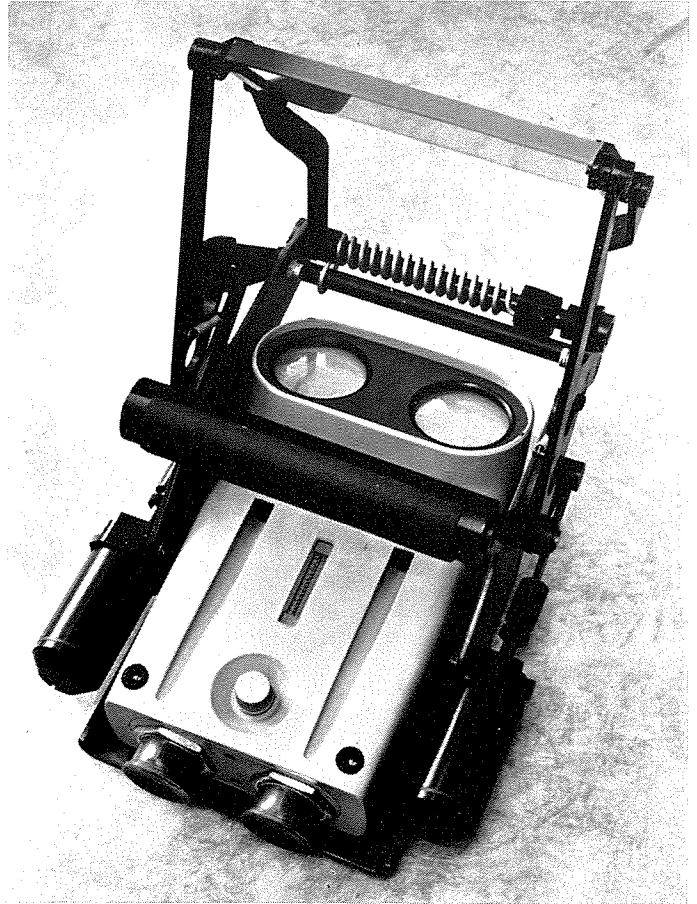
Buccaneer of South African Air Force

## Head-up Displays

Displays have been produced for weapon delivery, navigation, flight director, and all-weather landing applications. A digital wave-form generator is being made for the US Navy's Integrated Light Attack Avionic System and a twin-tube display with the Elliott all-ceramic tube has been developed for civil transport aircraft. Elliott head-up displays are also being supplied for the Swedish Saab Viggen combat aircraft.



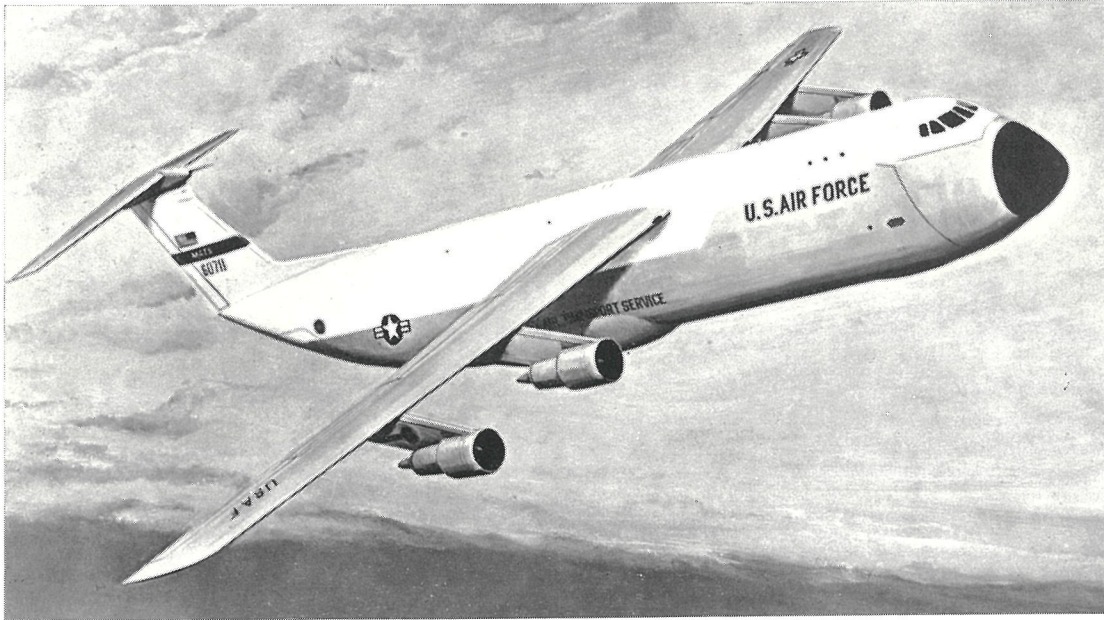
Head-up display in the Comet 4 of  
Blind Landing Experimental Unit



Twin-tube head-up display  
with all-ceramic tubes



Head-up display in  
RAF Belfast transport

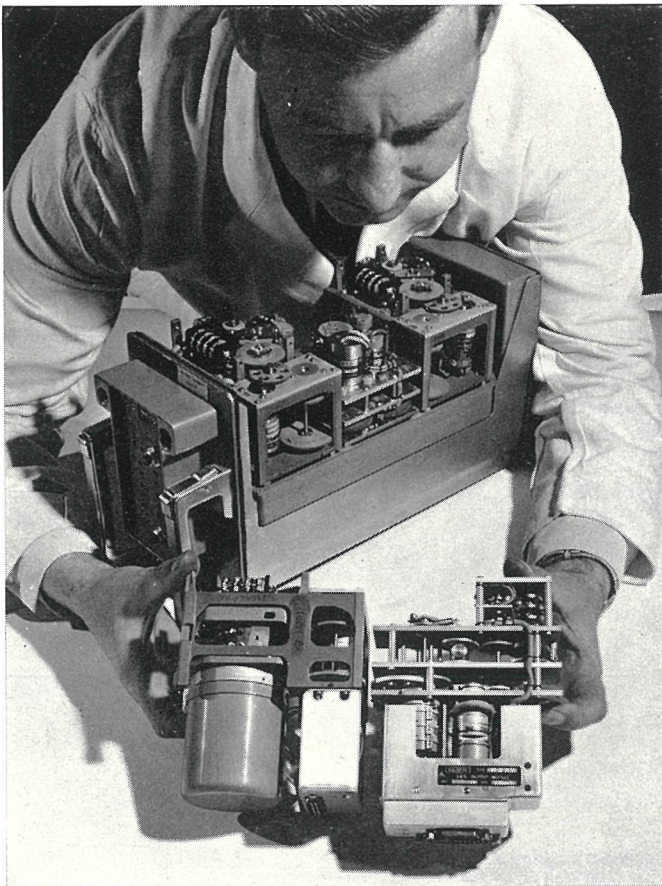


Lockheed C-5A heavy logistics transport

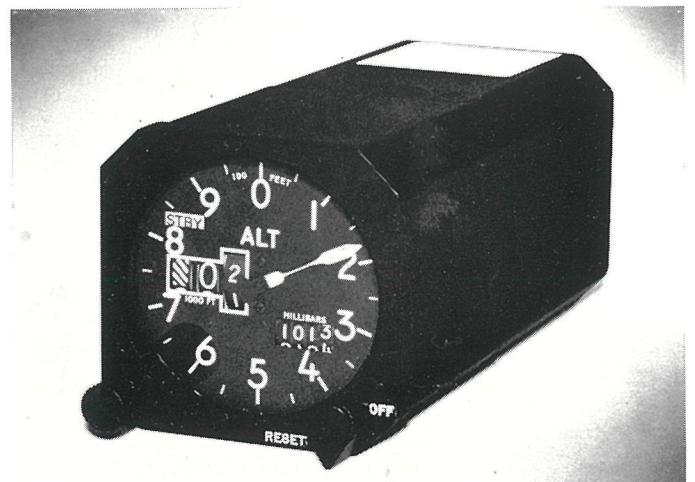
# Flight Instruments

The modular air data computer in simplex and monitored form for military and civil aircraft is a major production activity. An advanced air data system is being manufactured for the Lockheed C-5A. Flight instruments, including servo-operated altimeters, Machmeters, airspeed indicators and temperature indicators, accompany the monitored air data system in the HS.801, and are in quantity production for other aircraft.

Modular air data system



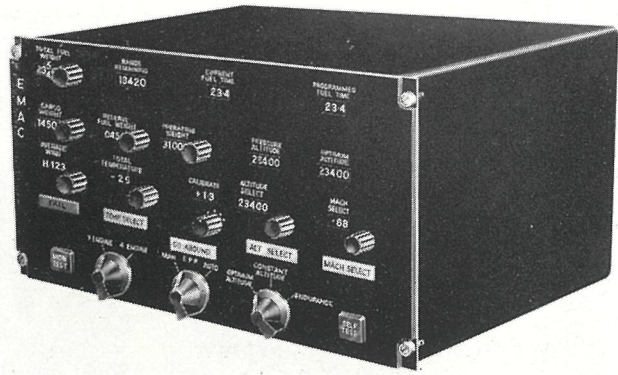
Servo altimeter with barometric capsule for stand-by operation



# Engine Instruments

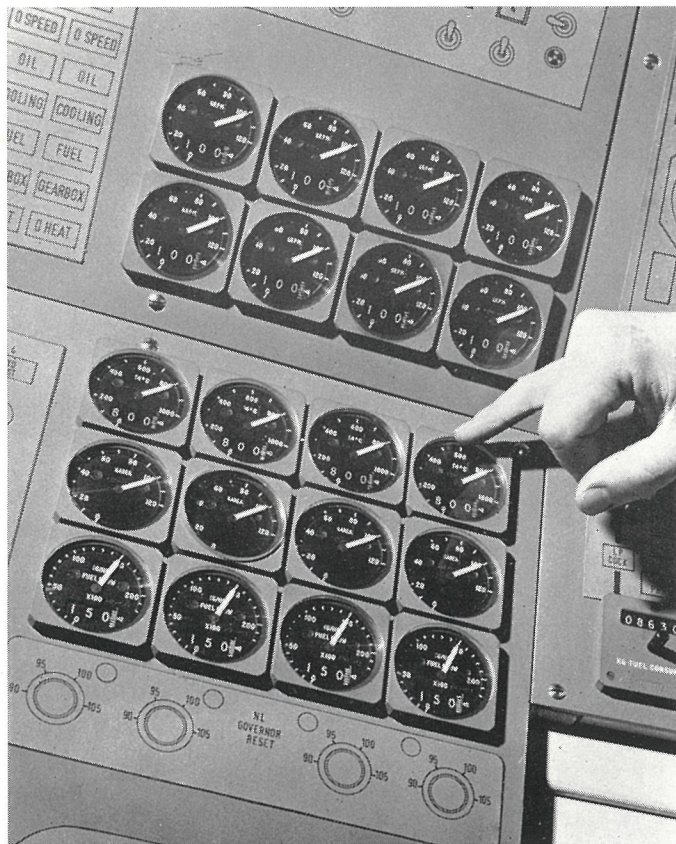
A new range of miniature engine instruments, with computers incorporated in the 2-in. case of the indicator, has been ordered for the Concorde prototypes. The new true mass flowmeter, developed in the Elliott flow laboratory, the most advanced in Europe, is being supplied for Concorde, P.1127 and British F-4K and F-4M Phantoms.

New techniques for engine control by computer, and for energy management for cruise and range control, are under development.

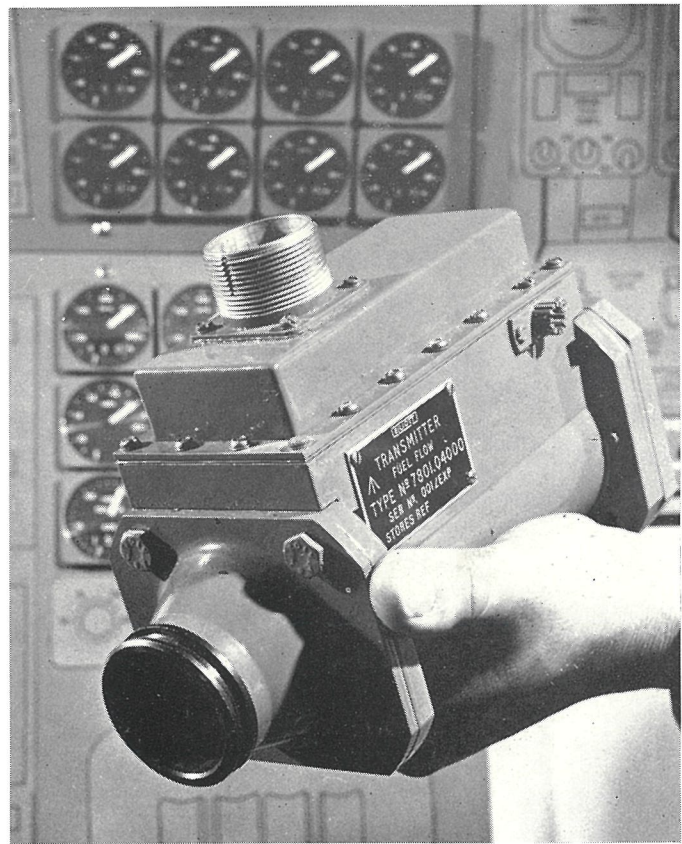


Energy Management Analogue Computer for Lockheed C-5A

2 in. diameter engine instruments for Concorde



True mass fuel flowmeter for Concorde, P.1127 and F-4M and F-4K Phantoms



# Trainers & Simulators



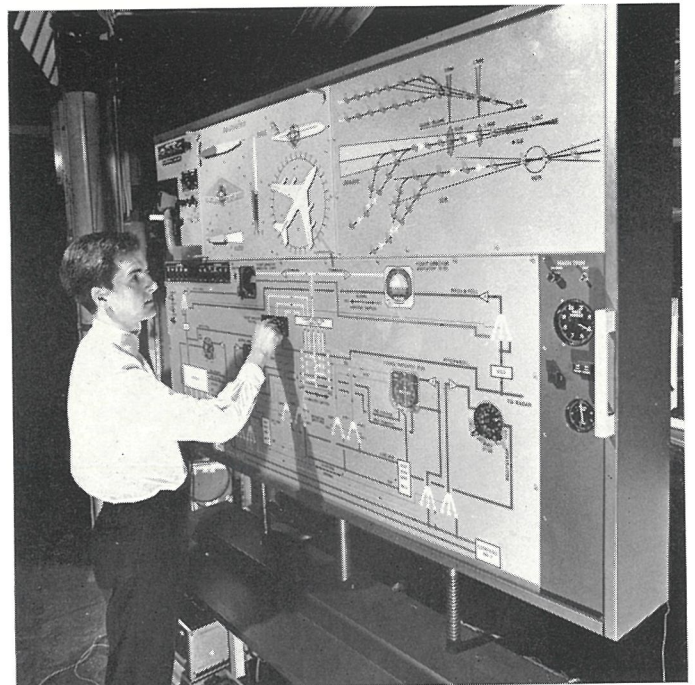
Euclid digital air traffic research simulator

Simulators controlled by general-purpose digital computers to provide training for aircraft, airborne navigation, radar and sonar systems, ground-based radar complexes, naval tactics and nuclear powerplants place Elliotts in the forefront of simulator development.

Flight system trainer for Qantas Boeing 707

## Examples

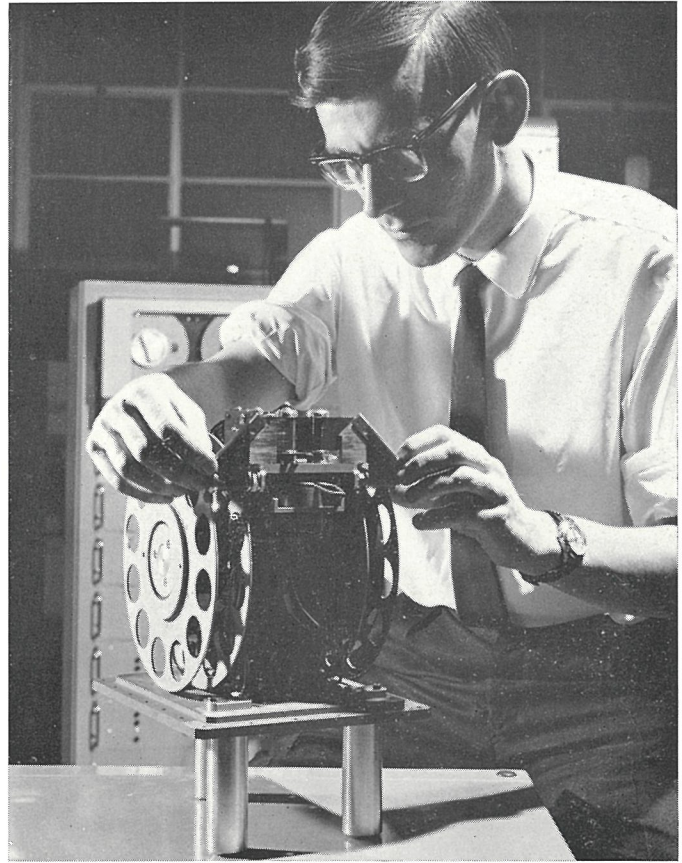
- HS.801 . . . . . Flight simulator computer complex.  
Digital maritime crew trainer.
- F-111K . . . . . Simulator computer complex.
- Simulator M1 . . . . . Digital civil/military radar ATC simulator.
- Euclid . . . . . Digital ATC research simulator.
- Naval Tactics . . . . . Digital training simulator.
- Nuclear Powerplant . . . . . Digital control room simulator.



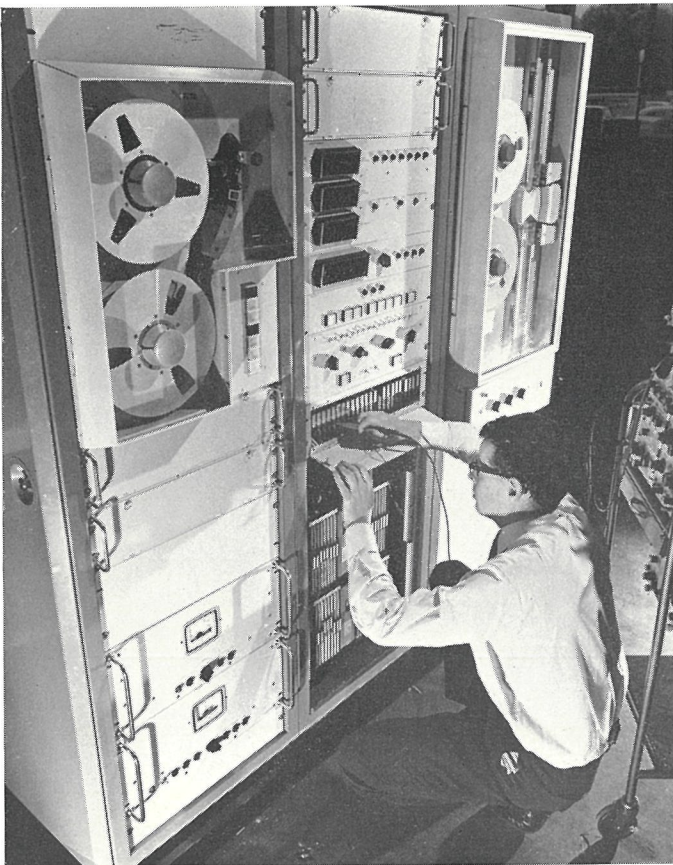


# Recorders

Both airborne and ground-based precision tape recording equipment has been developed. Outstanding examples are the airborne accident recording system and ground replay equipment for the Concorde prototypes and a range of reformatting equipment for converting recorded data from various sources into a form suitable for processing by computer.



AIR-3 high-density airborne recorder tape unit



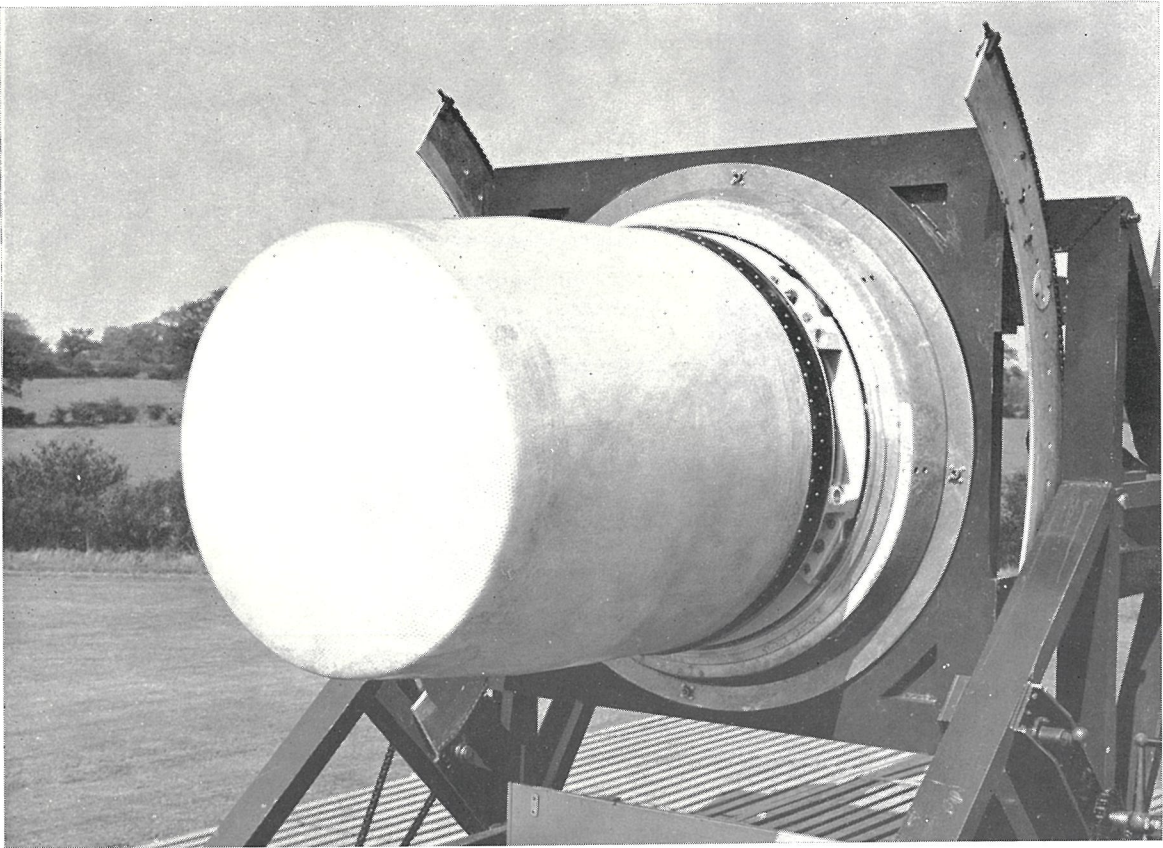
Translator for reformatting recorded data for analysis by computer

# Radar



Most of the Company's work in this field is classified, but it includes major theoretical and experimental studies for the next generation of airborne military radar systems. New equipment developments include Cassegrain aerials, special microwave valves and components, and portable battlefield surveillance radar.

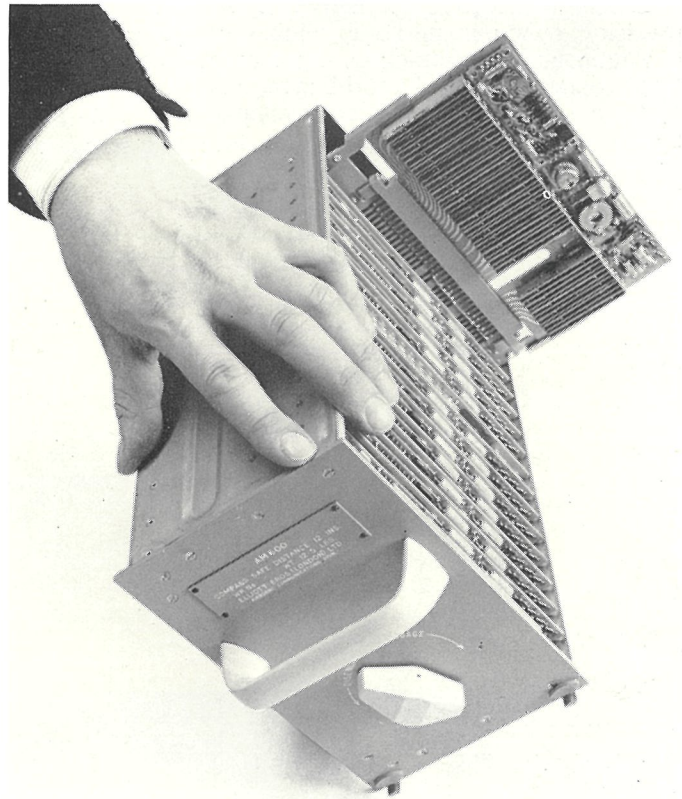
The Visor terrain-warning radar for airliners



Cassegrain radar aerial assembly

# Radio & Communications

Principal aviation developments are the Series 70 audio systems ordered for HS.801, P.1127 and Jaguar. The audio system for HS.801 is the most comprehensive yet designed for any aircraft. Elliott rescue beacons have been ordered in quantity by World airlines.



Solid-state switching unit of the Series 70 audio system for HS.801

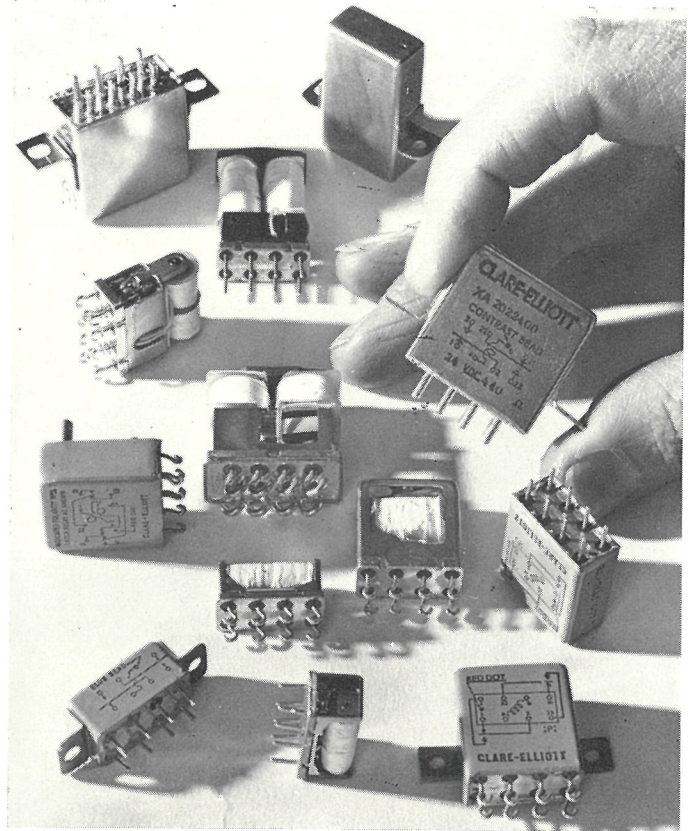


Dual frequency rescue beacon for airliners

# Products & Components

Special aviation components include miniature relays, precision synchros and sub-miniature rate gyros.

Within Elliott-Automation, other companies manufacture programmed freight and baggage handling conveyor systems, airport information systems and automatic reconnaissance film processors.



Some examples from the range of miniature aircraft relays



Slab synchros



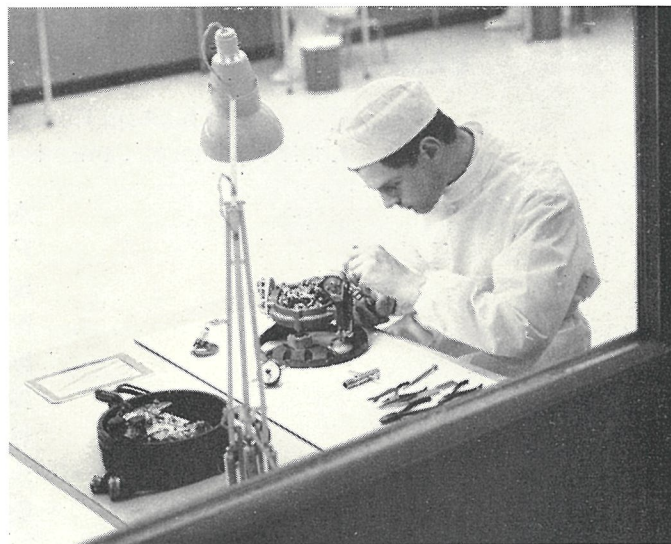
Sub-miniature, precision rate gyro

# Service & Support



A field service engineer assists an airline

Elliott aviation equipment is designed with maintenance requirements in mind, and special divisions provide after-sales service, technical support in the field and training for customers' engineers. Where geographical conditions demand, associations have been formed with local companies to provide industrial support at close range.



Overhauling and repairing airborne equipment in an instrument clean room



Aviation Service and Repair Division maintenance workshop

# The Principal Elliott-Automation Aerospace Companies

---

## **ELLIOTT FLIGHT AUTOMATION LIMITED**

Airport Works, Rochester, Kent.

Cables: Elliotauto Rochester Telex: 96118 Tel: Medway 44400

**Airborne Computing Division**  
**Aircraft Engine Instruments Division**  
**Aviation Service & Repair Division**  
**Data Analysis and Display Division**  
**Flight Automation Research Laboratory**  
**Flight Instruments Division**  
**Gyro Division**  
**Inertial Navigation Division**  
**Military Aircraft Controls Division**  
**Transport Aircraft Controls Division**

---

## **ELLIOTT SPACE & WEAPON AUTOMATION LIMITED**

Chobham Road, Frimley, Camberley, Surrey.

Cables: Elliotauto Camberley Telex: 85289 Tel: Camberley 3311

**Airspace Control Division**  
**Fuze Division**  
**Magnetic Tape Systems Division**  
**Military Data Presentation Division**  
**Military Data Systems Division**  
**Mobile Computing Division**  
**Naval Weapons Division**  
**Space & Guided Weapons Division**  
**Space & Weapons Research Laboratory**  
**Trainer & Simulator Division**

---

## **ELLIOTT-AUTOMATION RADAR SYSTEMS LIMITED**

Elstree Way, Borehamwood, Herts.

Cables: Elliotauto Borehamwood Telex: 22777 Tel: ELStree 2040

**Airborne Radar Division**  
**Communications Division**  
**Elliott Electronic Tubes Limited**  
**Mobile Radar Division**  
**Radar Research Laboratory**  
**Radar Service & Repair Division**

---

