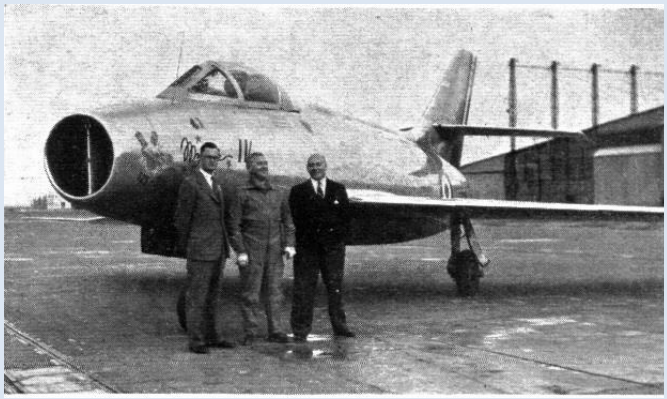
Rochester Avionic Archives Newsletter

From the Curator.
We have all worked hard to sort out the items shipped across from Australia by the family of the late Ron Howard. Much of this Newsletter is devoted to the new material. I think the unexpected highlight of the collection was the old scientific instruments -some Elliott items, but other important makers too. We plan to keep much of this equipment. Another discovery was finding a draft of Ron Howard's book. The early story of his youth in Australia is truly fascinating and the technical sections give a personal view of many of the key programmes in flight controls such as the Lightning, VC10 and Concorde.
My thanks to all my team in the RAA for their enthusiasm and we appreciate the continued support of BAE Systems. I wish all our Readers a very Happy Christmas and my best wishes for a peaceful New Year.

Chris Bartlett, Curator

AUTO-STABILIZED MYSTERES

In June 1952 Elliott Brothers (London), Ltd., was invited by Avion Marcel Dassault to co-operate in the elimination of "Dutch roll" from the Mystere IV. The French firm were aware that the British company had been developing, in conjunction with the R.A.E., an automatic stabiliser for high-speed aircraft.
A modified version of the Elliott Mk 1 auto-stabiliser was installed. It was found necessary to modify the rudder linkage to accept the stabiliser, which was not originally designed for powered-control aircraft. The first installation was completed before the end of October, and flight tests were made at Melun-Villaroche. An entirely new jack was accordingly developed by Elliott Brothers in conjunction with Rotax, Ltd., and the Mystere's rudder linkage was modified to accept it. This new work was concluded early in December, and a series of test flights was made by Dassault test-pilot Col. K. W. Rozanoff (the almost legendary character whose feats are said to include rolling an R.A.F. Lancaster during the war). This time the outcome was reported as altogether satisfactory: instability in roll and pitch had been completely cured and Dutch roll eliminated. Elliott Brothers state that the Mystere IV thus becomes **the first European powered-control aircraft to have its control-system automatically stabilized.**
A similar system was fitted to the French Vautour and Baroudeur



The picture above shows Col. Rozanoff, Dassault Chief Test Pilot, with the Mystere IV prototype on which the auto-stabiliser was fitted.
On the left is Mr.T.Broadbent, Elliott Brothers' Chief Engineer; on the right, Wing Commander E.G. Monk, the Elliott Bros Technical Sales Manager. Painted on the Mystere's nose is a sonic-bang record; of 125 Mach 1-plus flights, Rozanoff has made 106 of these.

In 1951, even before the work on the Mystere, Elliotts had fitted a Yaw Stabiliser to the RAF Meteors and sold 546 of these systems. The next big programme was the Autopilot, Autothrottle and 3-axis Autostabiliser on the Lightning. Around 400 systems were produced for the Lightning. The work on automatic flight controls has continued to the present day system on the Typhoon.

Curator: Chris Bartlett, Deputy Curator: Ann Jackson, Secretary Geoff Harvey
Tel: 01634 203321
e-mail: info@rochesteravionicarchives.co.uk *Website:* www.rochesteravionicarchives.co.uk

Paintings

Painting at the RAeS

Ron Howard presented this painting on behalf of Elliott Bros to the Royal Aeronautical Society at Hamilton Place. The painting is by Arthur Henslowe and it was restored in 2002. It depicts a de Havilland DH6.

HMS Chatham

In May 1990 Ron Howard presented to Captain Forbes and the Crew of HMS Chatham a painting of the first HMS Chatham built in Chatham Dockyard and launched on 20th October 1691.
A local artist, Geoff Hall, has depicted her in Chatham Dockyard in 1724 as she was after her rebuild at Deptford in 1721.
'*We hope that the new HMS Chatham and her crew have a long and happy association with our Company and its equipment on the ship and, in the tradition of her earlier predecessors, we wish her a fair wind and a following sea*.'

The ship was decommissioned in 2011 at Portsmouth, but the Chatham Dockyard does not have the painting. We are trying to locate it in the National Museum of the Royal Navy or the Royal Navy/MoD.

RAF Halton Painting

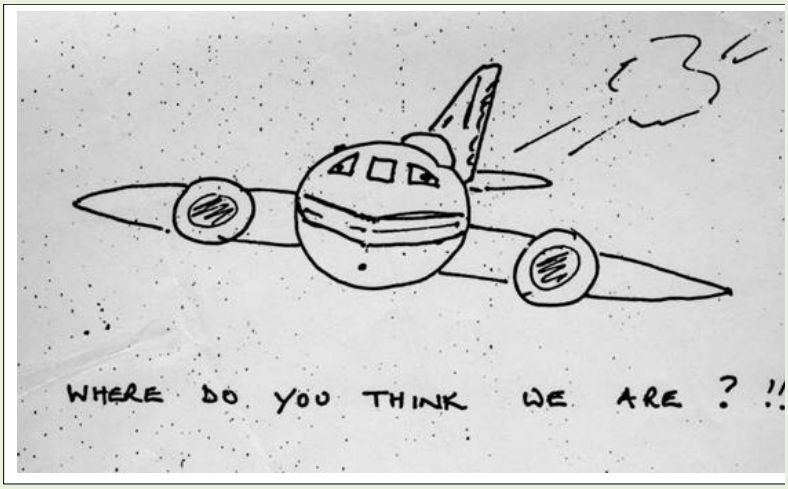
In June 1990 the late Ron Howard presented yet another painting to the School at RAF Halton on behalf of GEC Avionics.
The picture was commissioned from Michael Taylor of the Guild of Aviation Artists and depicts the 'Halton Brats', which was the affectionate name given to the apprentices.
The MoD have not yet responded to my query about this.

Wave Machines

This wave machine was made by Elliott Brothers in the late-19th century, after a design by Baden Powell (1796-1860). Powell was Savilian Professor of Geometry at Oxford from 1827 and was also the father of Robert Baden-Powell, founder of the Boy Scout movement. In his 1841 book Powell wrote:
"*For the sake of those readers ... who may be commencing their acquaintance with the undulatory theory, it may not be out of place here to mention a method of imitating the different kinds of vibrations producing a wave by mechanical means. ... A glance at an illustration of this kind enables the mind to grasp the idea at once, even when unaccustomed to the mathematical analysis of it."*

Elliott Christmas Card from 1960

Navigation for beginners!



The equipment and hence the aircraft, knows where it is at all times. It knows this because it knows where it isn't. By subtracting where it is from where it isn't (or where it isn't from where it is, depending on-which is the greater) it obtains a difference of deviation. The internal guidance system uses deviations to generate corrective commands to fly the aircraft from a position where it is to a position where it isn't. The aircraft arrives at the position where it wasn't, and consequently, the position where it was is now the position where it isn't. In the event that the position where it is now, is not the same as the position where it originally wasn't the system will acquire a variation (variations are caused by external factors and discussion of these factors is beyond the scope of this simple explanation). The variation is the difference between where the aircraft is and where the aircraft wasn't. If the variation is considered to be a significant factor, it too may be corrected by the internal guidance system. The aircraft must now know where it was. The 'thought process' of the equipment is as follows: because a variation has modified some of the navigation information which the aircraft acquired; it is not sure where it is. However, it is sure where it isn't and it knows where it was. It now subtracts where it should be from where it wasn't (or visa-versa) and by differentiating this from the algebraic difference, between where it shouldn't be and where it was, it is able to obtain the difference between its deviation and its variation; this difference being called Pilot Error.

When Australians were Aliens!

In 1969 H.M Customs and Excise wrote formally to the Company to tell them that “agreement cannot be given to the carriage of Mr Howard, a national of the Commonwealth of Australia, on flights made under the business users concession. Flights on such occasions must be made via a designated airfield.
So, presumably Ron Howard had to travel to Customs Airports like Manston or Southend to board our Company Aircraft to travel on business for the UK. Even though he held a British Passport he was still classed as an alien!

Déjà vu

‘Britain must not sacrifice her national capability to a European dream’

This was said by Ron Howard Managing Director of GEC Avionics on his appointment as President of the Society of British Aerospace Companies in July 1989.
At that time GEC Avionics had global sales of more than £300million of aircraft equipment each year and the UK Aerospace industry sold more than £10 billion.

A real Aladdin’s Cave of treasures! A table full of scientific instruments

Objects from the Ron Howard Collection

We think this is an award of some sort!

Elliotts in Telegraphy

Elliotts have not received much attention in the literature on the history of telegraphy, but towards the end of the 19th century were described by Sir Charles Bright, a leading telegraph engineer, as a classic company holding the foremost position in telegraph instruments and that the business was extensive is borne out by Company documents. An order book for 1861-2 shows entries for the Electric and International Telegraph Company, Bonelli's Telegraph Company, the Gutta Percha Company, amongst many others. Telegraph instruments in the 1873 catalogue of Electrical Test Instruments include:

- Detector Galvanometer
- Tangent Galvanometer for the Indian Telegraph Service
- Horizontal Astatic galvanometer, high resistance, for telegraph stations abroad
- Reflecting galvanometer for service abroad and boat service
- Sir W Thomson's marine galvanometer
- Latimer Clark's galvanometer
- Speaking galvanometer for submarine cables
- Double reversing keys, signaling keys
- Station switches,
- Jenkins commutators

Later catalogues show a greatly increased range of telegraph equipment. Many of the contractors supplied by Elliott Bros are shown in the list on the title page of the 1895 catalogue of Electrical Testing Apparatus.

As an example, a short account of Elliott's business in Portugal with the Brazilian Submarine Telegraph Company is given in the Society's Bulletin.

Telegraphy was thus an established Company activity by the time Frederick Henry Elliott died in office in 1873 at the age of 53.

Telegraph Galvanometer, by Elliott Brothers (London) Ltd., 20th Century
Courtesy of The Museum of the History of Science Oxford.

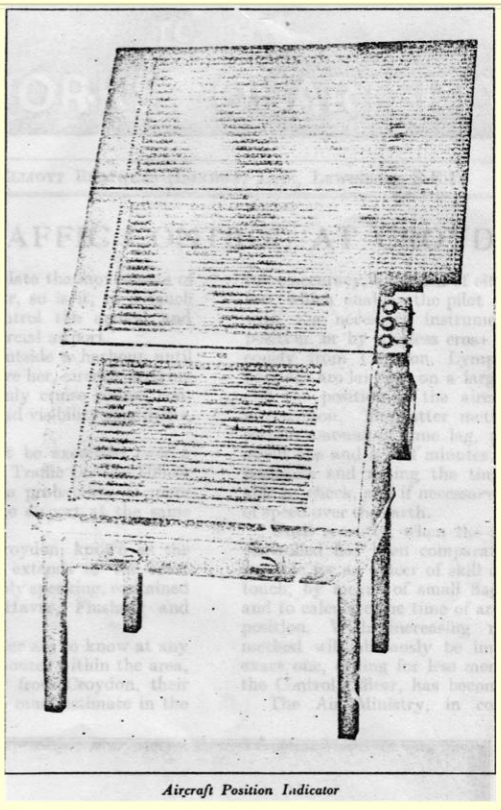
Air Traffic Control in 1938

'Control must be exercised over a wide area to enable the Air Traffic Control Officer to form an early estimate of the probability of more than one aircraft approaching the airport at the same time. The area controlled from Croydon, known as the London-Continent Airway Area, extends to the coastline of the Continent, and is, roughly speaking, contained within the points: Croydon, Havre, Flushing and Clacton.

The duties of the Control Officer are to know at any moment, the positions along the routes within the area, of all aircraft flying to or away from Croydon, their speeds over the ground, which he must estimate. Until recently, when the number of aircraft, to be controlled has been comparatively small, it has been possible for an officer of skill and experience to keep in touch, by means of small flags stuck in a large map, and to calculate the time of arrival from the last known position. With increasing numbers, however, this has become impracticable.

The Air Ministry, in collaboration with Elliott Brothers (London) Ltd., has therefore devised an instrument known as the Aircraft Position Indicator, which will help materially in the efficient and safe control of the increasing number of air liners using Croydon as a terminal.

From the '*Engineering Supplement to the Century Works Quarterly Review*', August 1938



A rather poor picture of the Air Position Indicator. (I have asked the Historic Croydon Airport Trust if they have a better picture. Ed)