



# Rochester Avionic Archives Newsletter

## From the Curator

Many of you will have already heard of the death of Peter Hearne, who was a Director and General Manager of the Company. His influence on the products and direction of the business was profound, particularly in developing the Head Up Display market. I have put a short piece about him on page 4.

January 20<sup>th</sup> 1974 was the first flight of the F-16 and it is hard to believe it was 40 years ago. We have a number of 'firsts' this year for aircraft which flew with equipment from the Company. The VC-10 final flight has taken place now and we hope that this means we can acquire some of the items missing from our collection before they end up on eBay. The EAP is finally to be unveiled at Duxford on 14<sup>th</sup> February although it has been on display for some time. By the way, BAE Systems sponsors a lot of Aerospace museums and one I know about, if you are an employee, take your badge with you to the Shuttleworth Collection for a reduction in the entrance fee.

Our new website is going very slowly and we are amassing a lot of items to add to it as there is no point in putting them on the old site. We are sure the wait will be worthwhile.

The RAA has a brand new Scanner capable of handling the thousands of 4"x4" glass plate negatives we have, although we don't intend to scan these other than on demand. Sadly a catalogue of more recent pictures of Company events and equipment no longer appears to be kept. We recently found a Queen's Award Plaque hiding in the Library; it is amazing where these important pieces turn up.

Finally a plea; I met a lot of people at the Long Service Award Dinner at Cooling Castle many of whom claim to have a loft full (!) of wonderful heritage material. Please bring it in we would love to see it.

Chris Bartlett

## First flight of the F-16. 40 years ago!

The first **official** flight of the YF-16 took place on 2 February 1974. Its actual first flight took place accidentally during a high-speed taxi test on 20 January 1974. While gathering speed, a roll-control oscillation caused a fin of the port-side wingtip-mounted missile and then the starboard stabilator to scrape the ground, and the aircraft then began to veer off the runway. The GD test pilot, Phil Oestricher, decided to lift off to avoid crashing the machine, and safely landed it six minutes later. The slight damage was quickly repaired and the official first flight occurred on time. The YF-16's first supersonic flight was accomplished on 5 February 1974, and the second YF-16 prototype first flew on 9 May 1974. The dummy HUD was fitted for that first flight and the only working part was the large Spin-chute button.



YF-16 on display at the Virginia Air and Space Center



The dummy PDU fitted on the YF-16 first flight



The YF-16 patch

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### Some other first flights to celebrate in 2014!

The Super VC-10 was first flown from Brooklands on 7 May 1964.  
 The TSR2 was first flown at Boscombe Down on September 27, 1964.  
 The Tornado prototype first took flight on 14 August 1974 at Manching, Germany.  
 First production Airbus entered service in 1974  
 The first flight of the Typhoon was from Manching in Germany on 27th March 1994.



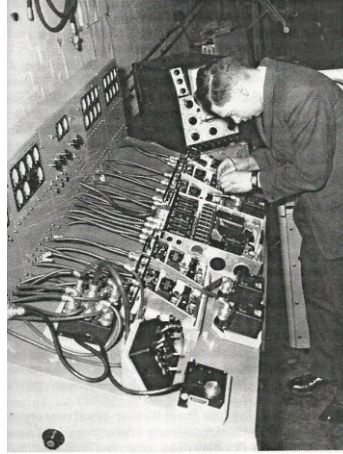
### First Flight of the English Electric Lightning 60 Years ago.

The prototype Lightning WG760 first flew in August 1954 and Elliotts supplied important equipment such as the Autopilot. While the aircraft itself understandably gets the glamour it is worth noting that it would not have been possible without Elliotts Flight Control system.

Ron Howard joined the aviation division at Borehamwood in October 1954 shortly after he arrived he was asked by Jack Pateman to configure the first GPAC analogue computer for stability and control studies for a Mach 2 interceptor which was to become the English Electric P1 Lightning. In 1957 a more modern GPAC computer was coupled to an actual aircraft in a hangar at English Electric's Warton factory and was used for autopilot simulation. The success of the Elliott analogue computer for the Lightning and VC-10 projects led to the establishment of a full three axis rig for the TSR 2 fighter project at Rochester.

By the early 1950s all automatic flight control systems were designed to reduce to the absolute minimum the number of moving parts in the more complex computers which were then being demanded. Suitable transistors were not readily available until the mid-1950s, and valves were most undesirable, so for a short period the magnetic amplifier came again into prominence. These are being used extensively during the Second World War by the German designers. The Elliott Mark 13 and subsequent automatic flight control systems installed in the Lightning are representative of such technology. These have magnetic operational amplifiers in which the majority of gearing adjustments in the computers are effected in the amplifier feedback loops. They also employed the newly available silicon diodes and ultimately the Lightning system was designed so as to be able to withstand a temperature environment limited only by the dissipation capability the Silicon junctions.

*(Part of text courtesy of Simon Lavington's book 'Moving Targets')*



Units of analogue automatic flight control system, inserted in a flight laboratory ground test development rack in about 1957 – 1958. The units in the photo with black handles, either from a lightning were Buccaneer. Within a unit the small black rectangular boxes with labels are magnetic amplifiers. The two separate black boxes with connectors, opposite the engineer's knees, are gyro units.



The English Electric Lightning with the equipment supplied by Elliotts. These include the Flight Control Computer (Autostabiliser/Autopilot), Pilot's Controller, Air Data Computer, Gyros, Height Lock Transducer, Pitot Static and Static Transducers and Magnetic Amplifiers



### Odd Film

In our collection of 16mm films we have some odd ones which don't really seem to belong to Elliott Bros at all. There is one featuring a company called Glacier Metals which is in a film can marked 'Integrated HUD Weapon Aiming Systems'. This film involves some Middle Eastern visitors drinking tea but has some nice scenes of the gatehouse and some 1960's lorries.

The Glacier Metal Company was founded in North London in 1899 and for some seventy years was a significant presence just off the Ealing Road, originally on the west side, to the south of the Grand Union Canal. The company is now part of the Glacier Vandervell Europe Group in Scotland. They were specialists in plain bearings and interestingly appear on the same page as Elliott Bros in 'Flight' of 2<sup>nd</sup> Sept 1955. So, they were suppliers to the aerospace industry and maybe to Elliotts for bearings in their electro-mechanical equipment. I did write to them but had no response. Does anyone know what connection there might be?



Margaret Thatcher came to Airport Works on the campaign trail in 1987. The date on this cartoon is August 23<sup>rd</sup> but if it was 1987 that was a Sunday? Did she really try on a Helmet?

ADVICE NOTE N° 03619

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An Elliott Bros Advice note from Sydenham

### Some less obvious bits of the RAA collection.



An LCD Beer Mat!



A BAE Systems Mug



A VGS Stress Ball



### The 40 Foot Hanger



View of the Main 40 foot Hanger looking towards the big Hanger Doors and showing the Phoenix Test Rig and Target. There are rumours to be bullets still to be found from the German air attack in September 1940. The Hangers originally came from Kingsnorth and were where Short Brothers built Stirling Bombers during WWII.

The picture below shows part of the site in 1940. The main roof view (somewhat enhanced) is the existing main factory, erected by Shorts and is the 25 foot hangar. The more derelict buildings to the bottom left are the Pobjoys Aero-engine Factory. The William-Elliott main entrance is the low building coloured white on the RHS side of the enhanced roof line. This building is now two storey (See last Newsletter). In the background, at the top is the Fort Horsted College (now a housing estate). You will note the curved roadway that is now Marconi Way. The roof of the 40 foot hangar is still in camouflage to blend with the woodland to the left. The main roof of the 25 foot hangar has been replaced. Compare this with the picture in Newsletter 10.



An advertisement for Elliott Autoland showing the VC-10, BAC1-11 and Bristol 221 in about 1964

### It is still raining!



If you look back to Newsletter 5 there was an article from the EFA News of 1968 noting that in September the heaviest rain for 200 years had washed out the Rochester site.

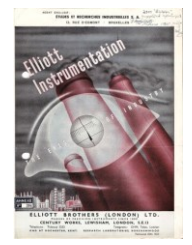


This negative is annotated 'Handover of 1<sup>st</sup> AQS901 2<sup>nd</sup> March 1979' but it shows the Helicopter Air Data Probe and two other units. Any ideas?

### Company history

If you are interested in the early history of the company have a look at the website of the Museum of the History of Science. They have some nice pictures on their website and a database of the Collection which covers the earliest scientific instruments to mass production of instruments in the 20<sup>th</sup> Century, There is a lovely set of Drawing Instruments actually made by William Elliott.

(Pictures courtesy of Museum of the History of Science)



### Readiness and Sustainment

The RAA appreciates the help from Derek Sanders and his team in R&S. They have really useful records and knowledge about many older projects. 'At one time the only difference between R&S and the RAA was that all the equipment in R&S works' (Ed). However much of the really old stuff like VC-10 has now finished. On a recent list of projects they supplied what was 'Beaver ATE', 'DN181', 'Rushton', 'Scot Rate Gyro' or 'PTR'? Some of these might be Edinburgh Ferranti projects.

P.S. I recall when R&S was AS&RD affectionately known as Aviation Service and Despair (Ed)'



Peter Hearne

**Peter Hearne M.Sc, D.L.C., C.Eng., F.R.A.e.S., F.I.Mech.E**

Peter Hearne was born in Sunderland, Co. Durham, and educated at Sherborne School Dorset, Loughborough College of Technology and The College of Aeronautics Cranfield and, in the USA at the Massachusetts Institute of Technology.

His industrial career began in 1946 as a Design engineer with Saunders Roe. From 1949 to 1954 he was in the Operations and Engineering Development Units of BOAC at London (Heathrow) Airport, involved in the development and introduction into service of new types of advanced civil aircraft including new airliners such as the Comet and Britannia and helicopters. His final position held there was as Helicopter Project Engineer with BEA at London Heathrow and Gatwick, and responsible for all helicopter development and experimental flight operations.

In 1959, after about a year with British Oxygen as Commercial Manager of the Aeronautical Equipment Group, he joined Elliott Brothers (London) Limited. From being Division Manager of the Company's 300-strong Guided Weapons Division, he was appointed Assistant General Manager in 1960, responsible for three similar divisions. In 1985, he was appointed Director and General Manager, with specific responsibilities for avionic systems of the divisions concerned. Within the GEC Marconi group he was responsible for all major electronic system development for such advanced aircraft as Tornado , Eurofighter, Boeing 777, F16 and the F22.

In 1990 he spent two years as President of GEC-Marconi operations in the USA, with responsibility for the avionics, sensors and radio communications sectors.

He was President of the Royal Aeronautical Society, 1980-1981, and was a member of its council from 1976. In September 1982 he was awarded The John Curtis memorial sword, awarded annually by the magazine Aviation Week and Space Technology for outstanding effort in Anglo-American aerospace activities.

Throughout his career, he was keenly interested in flight operations, since learning to fly in 1945. Additionally Peter Hearne had a relatively unusual combination of engineering science and extensive experience in flight operations matters , both military and civil and including flight extensive experience in flight operations matters , both military and civil including flight test and development flying. He had accumulated some 4500 hours as a pilot in a wide variety of aircraft with Multi-engine, full Instrument rating and Flying Instructor's ratings and was a keen sailplane pilot and owner.

After he left the Company he set up Aeroex to provide consultancy and expert witness capability. He was a frequent writer to Journals such as Flight International and was often forthright and controversial. We all have many stories about Peter and he was certainly one of life's characters for whom it was a privilege to work.

Peter died on Friday 24<sup>th</sup> January. He was at a reception at the Lasham Gliding club when he apparently had another stroke and slipped away quite peacefully there and then.

**P132**

Does anyone have any information on BAe P.132 – a maritime patrol aircraft based on the ATP and aimed at Singapore in the early 1990s?

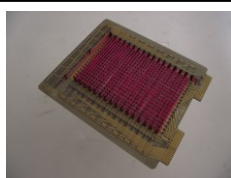
This was a variant for use in military naval operations, with a surveillance radar under the forward fuselage, nose-mounted FLIR and internal sonar buoys. A suite of special crew stations also featured, as did a choice of up to six weapon pylons under the wings and fuselage.

A team of BAe, GEC and Thorn-EMI looked at this concept as aircraft provider and sensor providers – GEC to provide the electro-optics and the tactical system, Thorn to provide the Searchwater radar and mission support system. Sue Wood and Pat Keast were involved from Rochester. However none were built.



**Open Day 1970**

This is the Technical Publications Dept at AS&RD preparing for the Open Day in 1970. The 24 Clubs from the Social Section were represented and the Cine Club made a film; ('I wish we still had that' Ed)



Some new items in our collection; L-R, A Holographic Coin, Core Plane, Gyro and a Control Panel