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Rochester Avionic Archives Newsletter

From the Curator.

Sadly there are two people to remember in this edition and I have written short obituaries for them both in this Newsletter.

Dick Collinson had nearly finished the fourth edition of his book 'Introduction to Avionic Systems' and his family will see that it is still published. Just about every avionic system that the Company has offered owes its origins to 'The Lab' that he led for so many years.

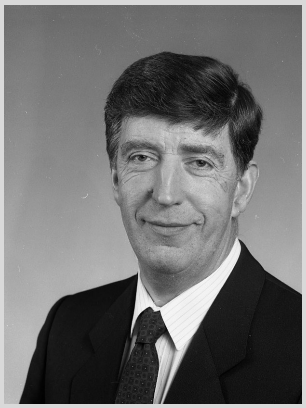
Dave Caney worked for the Company in the USA and the RAA owes him thanks for all his support in acquiring equipment from the USA for our Collection.

We recently found a stash of minidisks which we have just had digitised so we can now start looking at the video to see what we have. Apart from someone looking at a volcano and a wedding video the rest are on aviation subjects !

The team is fully back on site now and beginning to work on the backlog of tasks delayed by the Covid shutdown.

Chris Bartlett, Curator

Dick Collinson BSc (Eng), CEng, FIET, FRAeS



RICHARD PETER GLAVES COLLINSON was born in East Ayton, North Yorkshire in 1926, and was educated at Palmer's School, Grays in Essex. He had been in the Air Training Corps in the early part of the war, but when in 1944 aged 18 he volunteered for the Fleet Air Arm, he failed the medical and found himself instead as an artificer aboard the frigate HMS Modeste.

His career in engineering followed service in the Royal Navy from 1945 to 1947, when he took the University of London engineering degree course at Battersea Polytechnic. He graduated with a first-class Honours Degree in Electrical Engineering in 1951. Despite this military service in the Royal Navy, he subsequently spent his entire working career in the avionics industry.

His first job in graduating was with the Bristol Aeroplane Company where he worked on the 'Bloodhound' Missile Control System.

Dick then joined Elliott Bros as a Development Engineer at Borehamwood in 1953. He transferred to the newly formed 'Aviation Division' in January 1954; the engineering department was only 10 strong at that time, so it really was a case of being in at the beginning. Dick was one of the small group of engineers and managers that created the success of Elliott Bros. He and his wife Brenda were also to be see at the various social events this group held.

(Continued)

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Dick Collinson (Continued)

During his term at Borhamwood he worked on the Blue Steel Inertial Navigation System from the project initiation and was responsible for the first Blue Steel Navigator which was flown successfully in early 1959.

He was appointed Chief Systems Engineer of Military Aircraft Controls Division (MACD) in 1960 and transferred to Rochester in early 1961 where the first few years were spent on Inertial Navigation Systems development and Air Data Systems for Lightning and Buccaneer aircraft.

In 1961 he became Chief Engineer of the newly formed Flight Automation Research Laboratory (FARL). He became Divisional Manager of the Laboratory in 1962 and over the next three years the Laboratory activities expanded into a wide range of new developments. Examples which have since been successfully exploited are the Hydraulic Quadruples Actuator developed by Flight Controls Division (FCD) for the Tornado and the ‘strapdown’ attitude sensor system developed by Gyro Division for the new generation torpedoes

In January 1966 he was appointed Divisional Manager of Flight Instruments Division (FID). This was the year the Company started its successful penetration of the American market and FID secured the contract for the Air Data Computer; for the Lockheed C5A Galaxy in the face of fierce competition.

The appointment of Divisional Manager of Inertial Navigation Division followed in October 1968 The Division's major task over the next two years was the development of the Navigation Weapon Aiming System (NAVWASS) for the Jaguar aircraft.

Dick's interests were always directed towards the engineering aspects of the business and he undertook a staff appointment as Project Development Executive in January 1971 to cover the field of new products and technology

In April 1972 he returned to FARL as Divisional Manager The laboratory’s activities were expanded and a whole range of new technologies and concepts were initiated and developed for the product divisions to exploit for many European and United States aircraft. These ranged from fibre optics for the Boeing YC14 flight control system to helmet mounted displays and sighting systems. The ‘Lab’ was responsible for most of the major new products developed by the company such as 'Fly-by-Wire' Flight Control Systems, Holo-graphic Head-up Displays, Helmet Mounted Displays, Unmanned Aircraft Systems, MIL STD 1553B Data Bus Systems, Display Generation Systems, Video Map Displays and an Optically Signalled Flight Control System for Airships - 'Fly-by-Light

Dick Collinson received his 25 years' service award on Monday 24 July 1978 and was presented with a quartz clock by Mr W.H Alexander (See Newsletter 31). Towards the end of his career, Dick was appointed Technical Executive in GEC Avionics responsible to the Technical Director for advising on future avionics research.

He retired on 1st November 1992 after over 38 years of distinguished service at Elliott Bros through all the name changes to Marconi Electronic Systems.

Dick Collinson was a Fellow of The Institution of Engineering and Technology and also a Fellow of The Royal Aeronautical Society. For many years he was a committee member of the Medway Branch of the Royal Aeronautical Society and he gave frequent lectures to the RAeS Branch.

In 1989 The RAeS announced the award of the Society's Silver Medal to Dick Collinson "in *recognition of his most significant contribution to research and development for advanced avionics equipment and systems and to their service in the UK and abroad."* The medal was presented on the occasion of the Wilbur and Orville Wright Memorial Lecture at the Society in London.

After retiring he wrote the text book Introduction to Avionics Systems, now in its fourth edition, which is the bible for avionics students and has been translated into several languages including Arabic.

Remembering Dave Caney


David Caney (left) with Charles Berry and the award (A).

Sadly we record that Dave Caney died recently at the age of only 59. He represented the Company in the Fort Worth Office for many years building a close relationship with Lockheed Martin

In 1983 Dave worked in the Airborne Display Division as an Apprentice and in that year he received an award for the Quality Assurance Apprentice of the year He received the' The Charles Berry Trophy Award' shield from Charles Berry who was the USAF Quality Assurance representative who came in from retirement to present it. He also received a framed scroll from Mr W Alexander.

Dave's wife belonged to a USN Reserve unit and these pictures show them at a ceremonial "dining out" meal at the Fort Worth Museum of Flight in 2007 .

In the background is F-16 B-2, the Falcon Eye F-16 demonstrator jet which was the reason for Dave's trips to LM Aero in the late 80s and led to him meeting his future wife.

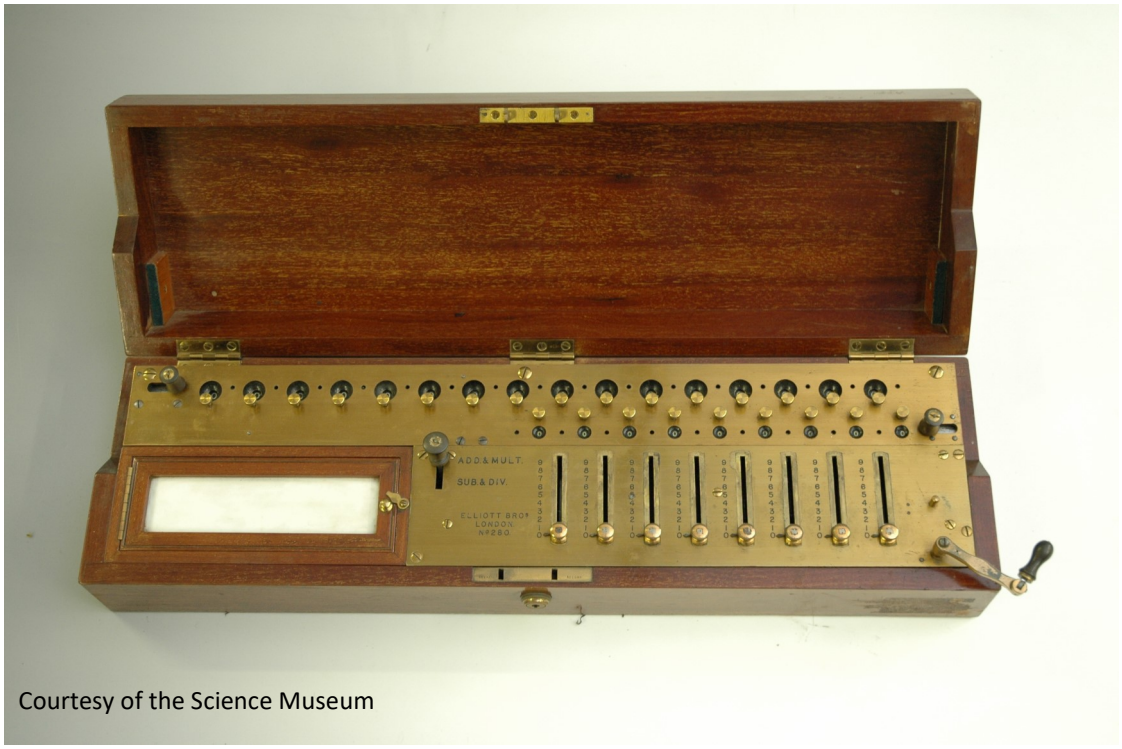
Visit by the Junior Institute of Engineers to Elliott Bros factory at Lewisham

Wednesday 10th December 1902

This is an extract from the visit report:.

'Work was commenced in the factory at Lewisham, at the end of 1899, when the firm of Elliott Brothers had been in existence for just 100 years, hence its title—The Century Works. Finding that the premises in St. Martin's Lane, in which the manufacturing business had been carried on for a number of years, were too small, and could not be enlarged to accommodate the increasing work, a move was made to a completely new set of buildings at Lewisham. The general scheme of the new buildings is to have all the manufacturing on one floor, so as to facilitate distribution of materials, &c. The factory is built in four separate blocks separated by roadways which are provided with a small railway upon which trollies can be easily moved from place to place. In only two parts of the premises are there upper floors:—(1) In the office block the general and private offices, Manager's office and drawing office occupy the whole upper floor, and (2) in the store building the space devoted to the inspection and storage of finished parts and a large experimenting room, are upstairs.

Very complete registers are kept to enable the whereabouts of the enormous number of instruments which the firm have made to be recorded, and the card system is used for this entirely. There is an elaborate system of telephones connecting all departments, and much thought has been bestowed upon schemes for obviating running



Courtesy of the Science Museum

An early Arithmometer by Elliott Bros c.1900

The Arithmomètre was patented in France by Thomas de Colmar in 1820 and manufactured from 1851 to 1915. This version was licenced by Elliott Bros from a design by Layton. It has a brass face, a wooden body with a hinged lid, brass hinges and a keyhole fitting. The face has 16 numbers displayed along the top row, 9 smaller number displayed underneath this and 8 scales below this each with a range of 0-9. The inscription on the face is 'ADD & MULT. / SUB. & DIV.' There is a small compartment with a hinged lid and handle.

The Arithmometer was the first mechanical calculator strong enough and reliable enough to be used daily in an office environment. This calculator could add and subtract two numbers directly and could perform long multiplications and divisions effectively by using a movable accumulator for the result. The Arithmometer was a key player in the move from purely mental computers to calculating machines that took place during the second half of the 19th century.

Elliott Bros expand their business

In 1963 Elliott Automation acquired Perl Controls and Baldwin Instrument Co of Dartford; Baldwin had two areas of operation: nucleonic instrumentation and fluid power equipment, both complementary to Elliott's existing activities - i.e. Elliott Nucleonics and Isotope Developments in nucleonics. The Company also created a new Satchwell Controls divisions - one at East Kilbride and the other at Slough; Perl Controls was expanded to cover all of the gas controls of Satchwell.

A Model Steam Locomotive by Elliott Bros.

The picture shows a sectioned model locomotive, scale 1:5, with inside cylinders and single drivers. The design is similar to the ‘Patent locomotive’ of Stephenson.

The model was made around 1840-5 by Elliott Bros, 30 Strand, London.

Courtesy of the Science Museum

It all started a long time ago!

The first Flight Control systems

The first recorded attempt to control an aircraft by automatic means took place in France in 1873 when Colonel Charles Renard tested, near Arras, a large model with ten superimposed wings fitted with an auto-stabiliser which was not sufficiently powerful to overcome the inherent aerodynamic faults of the decaplane. It crashed.

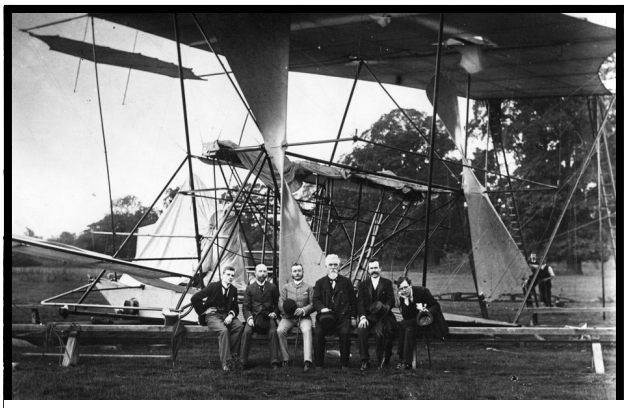
In 1891 Sir Hiram Maxim patented a steam powered aeroplane which used a pendulous gyroscopic stabiliser to control pitch and to keep the machine on an even keel or fly at any desired inclination. His great full sized aircraft was damaged on the launching rails before its first flight in 1884, the project was then abandoned.

Maxim's system was remarkably sophisticated, having all the basic elements of a modern autopilot - an automatic engage synchroniser, a pilots controller, limited authority amplifying servo, albeit, driven by steam, and a pitch attitude sensor. (*It is of particular interest that the flight took place at Bexley not so very far from the BAE Systems site at Rochester. Ed)*

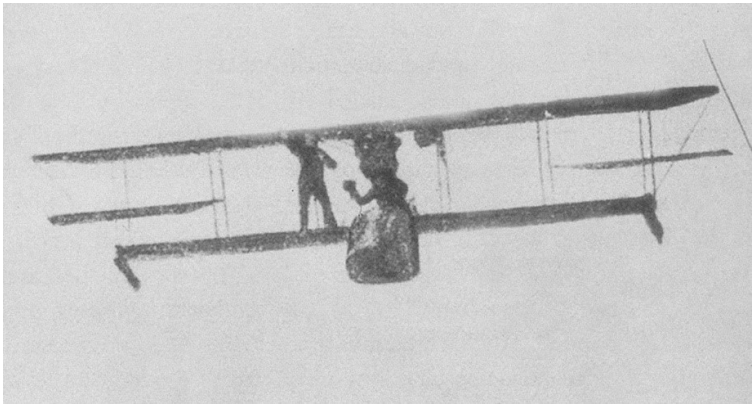
J.W.Dunne's attempts, before the First World War, to perfect an inherently stable aeroplane with swept back wings flouted the convention of the day and proved to have limited manoeuvrability, an inevitable aspect of the design philosophy. Any divergence in gusts took too long to rectify, a circumstance which almost certainly led to the death of the great German pioneer, Otto Lilienthal, flying one of his hang-gliders in 1896.

The Wright brothers proved the wisdom of active control with neutral stability at Kitty Hawk in 1903 but it was to be Elmer Sperry who demonstrated a practical auto-stabiliser system fitted to a Curtiss flying boat in 1914.

The UK Royal Aircraft Establishment started development of systems for remotely controlled aircraft. This work led to the WWII system in RAF Bombers and Coastal Command aircraft that became known as ‘George’. In the 1950s Elliotts began working on auto-stabilisers while Smiths Industries led with both military and civil Autoland systems. The Smiths system was fitted to the Trident in the early 1960s and Elliotts followed with the system for the VC10.



Hiram Maxim with various dignitaries sits on the launch rail of his giant steam powered aircraft at Baldwyns Park, Bexley in1894.



Elmer Sperry flyng hands-off in the Curtiss flying boat over the Seine in Paris in 1914 while his mechanic bravely walks out onto the wing.

Elliott Flight Automation Press Information 13 March, 1969 VC10 Lands automatically on first flight.

A significant demonstration of the increasing confidence in electronic auto control systems in airliners was given last Saturday (March 8) when the seventeenth Super VC10 for British Overseas Airways Corporation made two fully automatic landings at London Gatwick airport during its very first test flight from British Aircraft Corporation's Wisley airfield.

The aircraft was fitted with a production Elliott Flight Automation dual monitored autopilot system, which has full Air Registration Board approval for automatic landing with passengers. BOAC's whole fleet of Super VCIOs is being equipped with the Elliott system.

No American airliner has yet reached a comparable level of failure-surviving landing performance.

Equally significant was the successful operation during Concorde's maiden flight of two portions (three-axis autostabilisation and autothrottle) of the Elliott-SFENA second generation dual monitored automatic flight control system. Two other portions (flight director and electric pitch-axis trim) were fitted for use at the pilot's discretion.

The Rochester Airport site of BAE Systems

Airport History

On August 9th, 1933 Rochester City Council decided on the acquisition of land for a municipal airport. (Fig 1) The Air Ministry had already given approval and some £30,000 was established as the cost. The site chosen was convenient for the main roads between Rochester, Chatham and Maidstone located between the Rochester Maidstone Road and what was then called Dark Lane (now City Way) not far from Fort Horsted. The land at this time was largely wooded and very flinty such that the local Borstal boys were employed to remove the flints by hand! 105 acres of land was acquired for £10,000 from a Mr Auger and further land was acquired from the Ebenezer Sports Club playing field (the church in Clover street Chatham). At about the same time, Short Brothers, who were building seaplanes and land planes at their Seaplane Works on Rochester Esplanade, were finding the Seaplane Works too small and were seeking a site for an airfield, to build land planes.

At the meeting of the Rochester City Council Estates and General Purposes Committee Aerodrome Subcommittee on 22 November 1933, it was recommended that Short Brothers be given the lease for 120 acres required for flying, on condition that the land was used as an Airport and that public landing and flying rights were preserved. Despite the lease not being effective until the 1st January 1934 prior to that a Short Scion took off from the site on 16th December 1933. It was not, however, until September 1934 that consent was obtained by Rochester City Council from the Air Ministry to establish and maintain the Aerodrome. The original lease ran for 14 years but a new lease became necessary after the development and extensions during 1938 after which Shorts required greater security of tenure. A new lease was negotiated to run from 1st January 1941 for 18 years with options on extension. The new Davis Estate close by proved to be a source of additional workers for the factory.

The Prince of Wales (the future King Edward VIII) briefly visited Rochester Airport in June 1934 on his way to Maidstone and he returned in June 1935 to formally open the Airport.

In 1934 Douglas Pobjoy moved his firm, Pobjoy Airmotors from Hooton Aerodrome in Cheshire and took a three-acre site to the west of the field. By the end of the year Pobjoy moved into a newly-completed and fully equipped 35,000 sq ft factory block. The company, now called Pobjoys Airmotors and Aircraft Ltd, made aero engines and later constructed aircraft becoming increasingly dependent upon Shorts.

In early 1934 Short Brothers laid the foundations for the first Hangar on the North end of the site, but even so the construction of the two L17 aircraft ‘Scylla’ and ‘Syrinx’ had to be carried out in the open! To make a factory, Shorts erected two black apex roofed Hangars on the base and this was known as the ‘Black Shed’.

Fig. 1 Rochester Airport plan 1930.

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Fig. 2 Rochester Airport 1934 showing the Pobjoy Engine Works to the bottom of the picture and the first two Hangars at the top.

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To be continued