



**The origins
of the
Rochester Avionic Archives**

By

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ELLIOTT HISTORIC COLLECTION & ARCHIVE

1. Introduction

The Elliott Historic Collection and Archive was gifted by The Company to The Museum of the History of Science at Oxford. This provides a permanent secure location where good curatorial attention is available and where controlled public access can be given. It was intended that the Collection and Archive should remain together. Many objects in the Collection which were uniquely derived from the aerospace business of The Company were retained at Rochester and formed the basis of the Rochester Avionic Archives.

2. Company History

There are short accounts of the history of the Elliott Company in the Bulletin of the Scientific Instrument Society, No. 36, Ref 1 & 2. In summary, William Elliott began in Holborn in 1804 as a compass and drawing instrument maker. From 1850 William Elliott & Sons produced drawing, surveying, navigational, mathematical, engineering and meteorological instruments. Electrical equipment was added after Watkins & Hill were absorbed in 1856 and was followed by telegraph apparatus. Elliott combined with Theiler & Sons, Telegraph Engineers of Islington in 1893 and traded as Elliott Brothers London, moving from Central London to Lewisham in 1900. Further activities at that time were marine instruments, engineering instruments, mechanical calculators for ships' manoeuvres and gunnery, naval gunnery control systems, aircraft instruments. From 1920 until 1946 as Elliott Bros (London) Ltd. the Company concentrated on electrical engineering and instruments, naval systems and, in conjunction with Siemens Bros Ltd. of Woolwich, industrial control systems. After World War II the Company developed electronic computing and process controls for all industries, expanding to become Elliott Automation Ltd. The Company was always centred in London but as Elliott Automation had many provincial and overseas locations.

3. The Collection and Archive.

Sometime before 1950, to mark the supposed 150th year of the company's commencement, the new Chairman (Sir) Leon Bagrit asked for artefacts and documents with which a company museum could be set up. This became The Elliott Historic Collection and Archive which together occupied approximately 1500 cubic feet on about 500 linear feet of shelving.

3.1 The Instrument Collection.

When, in 1900 Elliott Brothers had moved from Central London to Lewisham to the factory named Century Works, presumably marking the turn of the century, very little in the way of old instruments survived the move. However, as a result of Sir Leon Bagrit's initiative from within the company and through gifts and advertisements over two hundred objects emerged.

The Collection included instruments used in, purchased by or donated to the Company and most of the Company's activities were represented, i.e. drawing, surveying, navigation, meteorological, engineering, electrical and telegraph instruments. Drawing instruments, their original speciality, include eidographs, curve tracers, and individual and sets of instruments. Some surveying instruments illustrate the expansion into that field which followed. Electrical instruments, for which they became chiefly known, range from simple telegraph linesman's galvanometers to laboratory standard instruments and industrial meters including early multi-range instruments and current transformers. A range of barometers illustrates the company's

activity in meteorological instruments. Engineering instruments include various forms of steam engine indicators, measuring instruments, and revolution indicators leading to early car speedometers. Marine and navigational instruments include an ebony octant and a Battenberg course computer. There were good examples of telegraphy instruments, a field in which Elliott was the leading supplier in the late 19th century, and mathematical instruments include an arithmometer and slide rule. The earliest was a fine case of drawing instruments by William Elliott and dated 1841.

The Collection was expanded a little during its time at Lewisham with the addition of objects from electrical and process control engineering of the 1960s. About 30 objects were of other Companies' manufacture but had associations with or are relevant to Elliott. Ultimately there were approximately 270 objects in the Collection at Lewisham

The objects were listed in a database of which about 90% were individually catalogued and some 50% had been photographed, though not all to professional standards. Most objects were superficially in good condition but had not been assessed by a professional conservator. All were stored in mechanically sound commercial grade packs.

3.2 The Document Archive.

Most of the Archive material was unique. Again, from within the company about 1050 documents were assembled and a searchable database existed. The document is William Elliott's own apprenticeship indenture of 1795, and some appertaining to Watkins & Hill, the well-known instrument manufacturer taken over by Elliott Brothers in 1856. An item may be a single folio, photograph, drawing, etc but may also be a volume of multiple entries such as an order book, ledger, catalogue, scrap book, or file containing a number of papers. Documents were stored in individual labelled envelopes and document boxes of commercial grade. The Order Books in particular show transactions with leading scientists, institutions and commercial concerns of the 19th and 20th centuries and there was a good run of the Company's catalogues. Some documents including a wage book, order books and correspondence are attributed to Watkins & Hill. The Archive contains much material relative to the history of science, scientific instruments and employment within the instrument trade.

4. Safeguarding the Collection and Archive.

There are no records to date that show if the Collection and Archive was ever on display at Lewisham nor that any value was acquired from it for the Company. In the later 1980s Elliott Bros at Lewisham was taken over by Plessey, later Siemens Plessey. About 1989 their operations were moved from Century Works to New Century Works, Marine Wharf, Plough Way, SE16. Operations on this site ceased in 1993 and certain archives were donated to the Lewisham Local History and Archives Centre. At some point prior to this two of the Directors from Elliott Bros at Rochester, Ron Howard and Ron Bristow (who before retirement in 1992 was an Assistant General Manager at Rochester GEC-Avionics), removed the Elliott Historic Collection and Archive to safekeeping at Rochester. At Rochester the material was stored in the old Flying School and here it was not on display or even generally known about by the employees.

On the 30 November 1999 Marconi Electronic Systems (MES) and British Aerospace (BAe) merged to form BAE Systems. It was a very minor part of the £7.7 billion merger but the

Elliott Historic Collection and Archive was taken into the Marconi Trust. The Marconi Trust also acquired the Eddystone Collection, the GEC Collection and the far better-known Marconi Collection. *

The Elliott Historic Collection and Archive was moved to the Marconi site at Great Baddow where Louise Weymouth was the Curator; it was later moved to the Marconi's Chelmsford New Street works. However, Ron Bristow and Chris Bartlett felt that the items in the Collection specifically associated with the story of Elliott Bros at the Rochester site should be retained. Some 45 items were extracted from the Collection at the 'Flying School' and removed to a storage cupboard at the main site.

In 2002 the Marconi Trust wanted to give the Elliott Historic Collection and Archive to a Museum and they opened a discussion with Ron Bristow to discuss the proposal with relevant Museums and to give recommendations to the Trust. He noted that museums have great difficulty in finding space, staff and funding for large acquisitions and are highly selective nowadays; nevertheless he identified three museums (Oxford, Cambridge, and the Museum of London) who were prepared to take the instrument collection and the archive, possibly placing the archive material in nearby facilities. (Ron Bristow felt that the Maritime Museum and the Science Museum might just want to pick out a few items or that the Science Museum would place the items in the Blythe Road Store not on public display).

As the fortunes of the Marconi Company declined, in about 2005 they decided to put the Collections up for sale; Marconi PLC had already ceased to fund the Marconi Trust. Ron Bristow approached the three museums and determined that all three were still interested in acquiring the Elliott Historic Collection and Archive. Ron Bristow was asked to get a value for the Elliott Historic Collection and Archive and sought advice from Christies. (The Marconi Collection was valued in 2004 at £3M)

At this point Ron Bristow began to ask whether the Elliott Historic Collection and Archive was actually the property of Marconi to dispose of. The name of Elliott Bros (London) Ltd was acquired by BAE Systems in the merger and indeed it can be seen at BAE Systems Lancaster House at Farnborough as one of the Heritage companies.

A number of options were noted:

- If BAE Systems own it, they might be willing to have it placed in one of the Museums.
- If BAe do not own it, they certainly acquired the skills and traditions it represents, and might be able to influence Marconi towards a more public-spirited attitude.
- Again, if BAe do not own it, they might be prepared to do a deal with Marconi either to acquire the Collections or to have them placed in one of the museums.

Ron Howard was approached to help in determining if Elliott Brothers (London)Ltd still exists on paper and has assets, and that there were no past actions which had taken the Collection away from EB(L) Ltd ownership. Ron Howard involved the Rochester Legal Advisor Phillip Davies to try to get answers to the questions.

BAE Systems have a Heritage Committee with representatives from all sites and the Company Secretary suggested to Phillip Davies that the Rochester representative, Tony Simm, got involved. As Tony Simm was due to retire in late 2002, Ron Bristow suggested

that Chris Bartlett should be asked to help. Chris (Head of Technology at Rochester) was very interested in Company history and keen to prevent the dispersal of the Elliott Historic Collection and Archive. Ron Bristow requested assistance from Ron Howard who although he had retired still had good links to the Board of BAE Systems and in particular Dick Evans. In the meantime, the matter was brought to the attention of BAE Systems Heritage Committee with a letter similar to the following:

'ELLIOTT HISTORIC COLLECTION & ARCHIVE

This important collection of Elliott artefacts and documents is in the custody of the Marconi Trust which was originally established to care for a collection of Marconi items. It had been the intention of the Marconi Trust to gift the Elliott items to a museum which could provide permanent, secure, accessible, custody and discussions with relevant museums were well advanced.

Subsequently Marconi Trust decided that the Elliott items, amongst others, should be sold to raise funds. This arises because Marconi PLC are not now funding Marconi Trust in the manner expected. Currently Marconi Trust are endeavouring to have the Elliott items valued.

Elliott Bros (London) Ltd is a British Aerospace company. The ownership of the Elliott collection and archive is, however, thought to lie with Marconi as a result of merger arrangements. The Elliott Company material derives from its own history in instrument-making, electrical engineering, nautical, aviation and defence systems; it does not derive from Marconi. The archive material is unique and is listed in the National Register of Archives; it is important to company, military, naval and aviation historians. The instrument collection is important and supports the archive material. British Aerospace acquired the defence and aviation interests of Elliott Bros (London) Ltd and its successor Companies and would be the natural custodian of the Elliott historic material. Maintenance of historic collections is difficult to support in a commercial environment, however, and an arrangement with an appropriate museum is likely to be more acceptable and enduring. There is a serious risk that exposing the Elliott material to sale would result in it being permanently dispersed, possibly to overseas buyers. This would be a serious loss of a Company and national historical asset. BAe are likely to have an interest in the outcome of the situation and the matter is therefore brought to the attention of the British Aerospace Heritage Committee.'

At the end of March Ron Bristow heard unofficially that Marconi thought that they might have institutions willing to buy both archive and collection. He had been unable to find a buyer and wondered if they may be talking to a wealthy private collector, or possibly a dealer in disguise. A letter similar in content to that below was sent by Ron Howard to Dick Evans Chairman of BAE Systems:

'Dear Dick,

Elliott Historic Collection

I am writing to you and your fellow Board members on a heritage matter, which is the future of the Elliott Collection.

Elliott Brothers London) Ltd., which is the "ancestral birth" company of BAE SYSTEMS (Rochester) was founded in 1804 and the Elliott Collection comprises archives and instruments going back to that date. The Archives are unique and cover transactions and connections with the leading 19th century scientists and engineers, sales of aircraft instruments to British and American aviation companies from the early 20th century, and naval fire control equipment through and between the World Wars. The Instrument Collection includes marine and aviation items, including early mechanical instruments, compasses, plotters, computers and altimeters, in good condition and representing the Company's wide activities.

Due to previous GEC/Marconi company arrangements the Elliott Collection is now in the possession of the Marconi Trust at Chelmsford. Unfortunately, its future as a unique and integrated collection is not assured there and Marconi Trust is currently preparing to sell the Elliott material.

There is a serious risk that a sale would result in the Collections and Archives being permanently dispersed, possibly overseas. This would be a loss of a Company and national historical asset and, while the maintenance of historic collections is difficult to sustain in a commercial organisation I am sure that BAe would not wish this to happen.'

The following text was also possibly or alternatively sent:

Elliott Brothers (London)Ltd. is not only now a Company of BAE SYSTEMS, albeit dormant, but the long-standing working bond between the previous Aerospace and "Elliott" Rochester companies on projects including Lightning, Blue Steel, VC10, BAC-111, Concorde, Jaguar, Tornado, Jaguar FBW, EAP, Eurofighter, to would be further strengthened by the return of the Collection to BAE SYSTEMS.

One possible solution would be for the Elliott material to be placed in a prestigious museum with some guidance coming from BAE. Amongst other benefits would be the possibility of its use for post-graduate research because the Archive in particular is highly respected in University and Museum circles.

A great deal of work on the preservation, cataloguing and identifying the Collection has been done over the past decade or more by Ron Bristow, who before retirement was an Assistant general Manager at Rochester GEC-Avionics and is very knowledgeable about Elliotts and its industrial context.

He is in close touch with the Rochester representative of the BAE Heritage Committee regarding the current problem.

It would have very wide appreciation if you and your colleagues could lend your support to any sensible solution which emerges for retaining the Collection and Archive together in a safe and accessible environment in the UK, where I believe and hope in its third century the Collection could be embraced by the new systems company as a useful part of its unrivalled heritage.

In April 2005 Ron Howard had quite a long telephone call from Australia with Brian Tucker (a Director at the Rochester site) about the Elliott Collection. Brian Tucker had already been informed about the Marconi problem by Chris Bartlett.

Brian had some pieces of old Elliott hardware acquired at auction by John Hyde and felt that the Company should try to get 'marketing miles' out of it from time to time. Brian was not sure that Elliott Brothers (London) Ltd was still a company (dormant) of BAE Systems and wanted to check up on this. He worried that if the collection went to a museum, it may be safe but could in effect disappear again into a basement. He would much rather see it in BAE Systems custody with a company interest in making use of it for study, periodic displays and marketing.

Ron Bristow commented that the first aim must be to prevent the Elliot material being lost or dispersed through Marconi selling it. He was adamant that the long-term aim must be to put it into a Museum and was encouraged by a positive response from the Museum of the History of Science at Oxford. There it would be used for post-grad research & teaching and Objects

could be lent out for display and publicity, especially back to an organisation which had helped or sponsored the museum in question.

Ron Bristow was very much against taking the Elliott Historic Collection and Archive back into industry. He argued that there is a long list of such collections and archives in industry which have been dispersed, put in skips, etc. Elliotts is one of the very few remaining and it would only take a change of personality or management to jeopardise the material.

In 2005 the Elliott Historic Collection and Archive (that which was not retained at Rochester) went to the MHS at Oxford. Ron Bristow passed over copies of his data bases of the hardware and the archives. It was the only institution which could take the material immediately, at its own expense, and keep the archive and the hardware together. Jim Bennett, the Director of the MHS wanted to use the material for public display, research, tuition, etc as soon as possible but this had to wait until sufficient funding became available. Marconi would not allow publicity about the gift because they had creditors breathing down their necks at the time. In 2006 the material was still not on public display but a year later it was. At this point the correspondence trail runs dry but in 2011 the instruments had all been added to the MHS online database. To mark their cataloguing, a small display was opened in the Museum's entrance gallery in May 2011.

In 2015 Ron Bristow donated his personal collection of about thirty instruments to the Museum of the History of Science at Oxford, so that it could be with other Elliott objects. He also acquired a number of duplicated items from the MHS which came back to be part of the RAA (two speedometers and an ammeter).

Sadly, Ron Bristow died in 2016.

5. The Collection expands.

In April 2005 Chris Bartlett took early retirement from BAE Systems and subsequently on Thursday 25th August 2005 he decided to formally identify the new collection and archives held at BAE Systems Rochester as the **Rochester Avionic Archives (RAA)**.

An initial grant was obtained from BAE Systems Heritage at Farnborough and Granada TV also gave financial support in recognition of the part the RAA played in the 'Great Warbirds' TV series.

The original collection comprised the 48 items extracted from the Elliott Historic Collection and Archive, a number of displays and other items located on the site, the Lightning, Buccaneer, Tornado and other Elliott aviation items that Brian Tucker had seen and some flight instruments and capsules which were donated by Mollie Proctor (the widow of Ron Proctor).

The Collection was housed in a small room within a store area on the mezzanine floor of the 40' Hanger. It was then moved to the Ground Floor of Tower 3, thence to the Corsair Building. The Corsair area consisted of an Office, a Media room and the Main Store. The new display cabinets in the Company Restaurant and Reception had been installed and populated with exhibits.

Finally, the RAA was moved (so far) to the Mezzanine Floor of the 25' Hanger in the old Short Brothers offices. Each time the RAA has grown and it currently occupies a Main Store with a Presentation Area, another store on the Mezzanine area of the 40' Hanger with side rooms for preservation work, a Media Room and a shared area with the local RAeS.

The objectives of the RAA are:-

- o To establish and maintain a collection of avionics archives recording the work at the Rochester site of BAE Systems for the benefit of the public, employees, and researchers
- o To advance education by the establishment and maintenance of an Avionic Collection.

The RAA is supported by BAE Systems (Operations) at Rochester with finance and the allocation of rooms, utilities and computing. The RAA has a Director or Senior Manager of BAE Systems who acts as liaison into the company. It has a Bank Account to allow proper traceability and control of finances. The Collection (hardware) and Archive (documents and media) are the property of BAE Systems. The RAA is managed by a team of volunteers comprising a Curator and eight assistants.

The RAA works closely with the local Royal Aeronautical Society with whom it shares offices. The RAA cannot be open to the public but there is a fully searchable public Website as the main vehicle for researchers.

The collection exceeds 1700 pieces of equipment such as HUD's and Air Data Computers and also has a substantial archive of Brochures, Company Newspapers, Films and Videos. We have over 60,000 negatives from the 60's onwards, many are glass plate. The oldest items are a few from the original Elliott Bros in the mid-1800s but the majority of the items are of mid to late 20th century origin. The emphasis is on equipment made or relevant to the Rochester site and the work of Elliott Bros, Marconi and BAE Systems.

The RAA has display cabinets in the Restaurant area where exhibits are rotated every few months. The RAA has also taken ownership of various site display cases such as those in the Paul Fuller Room and in Readiness and Sustainment.

The RAA supports Company events such as the Long Service events and other Award ceremonies. We can provide technical support for legacy programmes and site issues and background for presentations to employees who are retiring. Annually the RAA also hosts young people on work experience.

An early concern about the Collection and Archive at Rochester was the long-term security should the site be closed or the Company ceasing to see the value in such a collection.

However, the incorporation into the BAE Systems Heritage group has been an important safeguard. If the RAA were no longer able to operate at Rochester there is no doubt that the Farnborough site would host it. However, heritage is now seen as part of the business of the Company and is seen as a tool in marketing and employee development.

It is clear too that the role of an organisation like the AAI is also important to establish where the various parts of the heritage material are preserved. There is substantial material of course in the RAA but the Science Museum, The Museum of the History of Science and the Lewisham Library (National Archives) all hold key parts of the Company history and none of these are linked.

The RAA is proud to represent a Company which has been trading albeit under different names for over 219 years and equipping aircraft from the earliest days of flight.

** The Eddystone collection (communications receivers) was eventually returned to Eddystone employees who had contributed it and a little Eddystone museum was set up. There was a legal case (details not known) and it cost Marconi compensation.*

The Marconi Collection and Archive: (largely the radio equipment) was donated by the Marconi company to the Museum of the History of Science in Oxford. (MHS). It was accompanied by some financial aid.

The Marconi Archive: (papers and ephemera). This, including all the Titanic radio-telegrams etc have also gone to the Bodleian Library at Oxford, except for photos, photo plates etc which went to Essex County museums.

The collection of GEC and other companies electrical hardware (domestic, professional, etc) went to Amberly and to Christchurch.

Some individual items may have also been returned to donors.

6. The items extracted from the Elliott Historical Collection and Archive in 2005

<u>Object Name</u>	<u>RAA Cat. No.</u>	<u>Original Elliott Collection Cat. No.</u>
<u>Concorde Quadruplex Hydraulic Actuator</u>	C0085	2000
<u>Tornado Quadruplex Hydraulic Actuator</u>	C0086	2001
<u>Quadruplex Hydraulic Actuator</u>	C0087	2002
<u>Quadruplex Hydraulic Actuator (space model)</u>	C0088	2003
<u>Switching Altimeter</u>	C0090	2005
<u>Rate Gyro, self-monitored</u>	C0091	2006
<u>Transistor Amplifier Module</u>	C0474	2008
<u>Magnetic Amplifier</u>	C0094	2009
<u>Motor Driven Potentiometer (Mess Motor)</u>	C0095	2010
<u>Rotational Accelerometer</u>	C0096	2011
<u>MRG B</u>	C0097	2012
<u>Force Balance Mechanism</u>	C0099	2015
<u>Torque Motor</u>	C0100	2016
<u>Torque Motor</u>	C0101	2017
<u>Carpenter Relay</u>	C0102	2018
<u>Air Data Sensor</u>	C0103	2019
<u>Air Data Sensor</u>	C0104	2020
<u>Force Balance Mechanism</u>	C0105	2021
<u>Six Air Data Sensor Capsules</u>	C0106	2022
<u>Height Lock Transducer</u>	C0107	2023
<u>Transmitting Airspeed Unit</u>	C0108	2024
<u>Differential Pressure Transducer</u>	C0109	2025
<u>Transducer</u>	C0110	2026
<u>Acceleration Transducer</u>	C0111	2027
<u>Concorde Autostabiliser Switch Unit (space model)</u>	C0112	2028
<u>Indicating Accelerometer</u>	C0113	2029
<u>Pitot-Static Transducer Mk2 Type II</u>	C0153	2030
<u>Tobias Intruder Alarm System</u>	C0114	2031
<u>Tobias Intruder Alarm Seismic Sensors</u>	C0115	2031
<u>Air Data Pitot-Static Transducer Unit</u>	C0116	2032
<u>Air Data Static Transducer Unit</u>	C0117	2033
<u>Air Data Pressure Reference Unit</u>	C0118	2034
<u>Air Data System Static Capsule Unit Demonstrator</u>	C0119	2035
<u>Static Capsule Mechanism (capsule case missing)</u>	C0120	2036
<u>Air Data System, Pitot-Static Capsule Sensor Mechanism</u>	C0121	2037
<u>Static Capsule Mechanism (capsule missing)</u>	C0122	2038
<u>Static Capsule Mechanism (capsule missing)</u>	C0123	2039
<u>Air Data System, Capsule Sensor, Cam-Corrector Mechanism</u>	C0124	2040
<u>Pitot-Static Capsule Sensor, Cam-Corrector Mechanism</u>	C0125	2041
<u>Actuator Fork Coupling</u>	C0126	2042
<u>Energy Management Analog Computer (EMAC)</u>	C0128	2043

<u>Energy Management Analog Computer (EMAC)</u>	C0127	2044
<u>HUD Electronics Unit</u>	Not found	2045
<u>Height Lock Transducer</u>	C0130	2046
<u>Static Transducer Mk3</u>	C0131	2047
<u>Air Data System Power Supply Unit</u>	C0132	2048
<u>Lightning Air Data Static Transducer Unit</u>	C0133	2049
<u>Lightning Air Data Pitot-Static Transducer Unit</u>	C0134	2050
<u>TSR-2 Pilot's [AFCS] Controller Panel</u>	C0135	2051
<u>Altimeter & TAS Indicator</u>	C0136	2052
<u>Adjustable Gap Transfer</u>	C0148	1018
<u>Air Data Sensor Unit</u>	C0154	2101
<u>Lightning Air Data Computer</u>	C0188	2014

Revisions

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