



# Rochester Avionic Archives Newsletter

We have been hearing about the development of the Rochester site for some time and have followed the planning process with interest naturally about where our Museum would end up. Our new location will be in the Falcon Building which is described below. Originally the three Towers were to be demolished but in the current plan they are remaining and are currently being refurbished to a high standard. It is interesting to see the open plan working arrangements with few offices compared to the early days.

The RAA serves as a museum of the Company history but is becoming an important addition to the business. In addition we are beginning to play a part in supporting the Company in their work to encourage interest in STEM subjects. Our new home will allow us to do this in less cramped conditions.

**Chris Bartlett, Curator**

## Our next move!

The Falcon Building, named after the F-16 Fighting Falcon, was started in 1981 and scheduled for completion in June 1983. It is 11,120sq ft and currently contains Clean Rooms for the manufacture of Diffractive Optical Elements. There are showers and changing rooms, offices and conference rooms.

The official opening was on the 4th November 1987 by Mr Peter Levine Chief of Defence Procurement although it was actually in use in 1985. The building has foundations down to bedrock to minimise vibration.

The RAA will be allocated some space on the ground floor which is large enough to bring all of our collection and archive together in a clean environmentally regulated area. We will at last be able to have a nice 'presentation area' where we can host visitors and have exhibits in glass cases.

The site is naturally undergoing a clear out of unwanted items and we are hopeful that some interesting items will be discovered.

Recently some drawings of packing cases from the 1950s emerged. It will be interesting and of course a little sad to see the Hangars taken down and the unique Fuel Flow Lab demolished but the end result will be a modern factory.

The move is not likely to happen for a few years as there is a lot of work to do.



The Falcon Building in 1983

The museum started in the old Flying School then moved to Tower 3 after which we were tucked away in the Mezzanine area of the 40' Hangar. This was followed by a location in the Corsair Building and finally to our present position in the old building by the 'William Elliott' entrance. Each time the Collection and Archive have been bigger to move.

**Curator: Chris Bartlett, Deputy Curator: Ann Jackson, Secretary Geoff Harvey**  
Tel: 01634 203321

e-mail: [info@rochesteravionicarchives.co.uk](mailto:info@rochesteravionicarchives.co.uk) Website: [www.rochesteravionicarchives.co.uk](http://www.rochesteravionicarchives.co.uk)

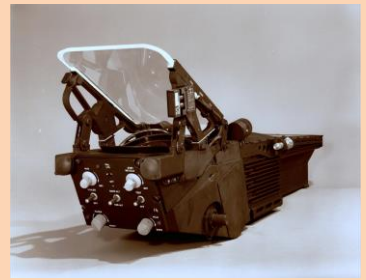
## Support for the Sullenberger Aviation Museum

*'After 31 years of making history and making imaginations soar, Sullenberger Aviation Museum, formerly known as Carolinas Aviation Museum, is proud to be partnering with the City of Charlotte, Charlotte Douglas International Airport, the national architectural and engineering firm Progressive AE, and internationally recognized design firm Freeman Ryan Design to develop plans for a state-of-the-art new location in Charlotte with a planned re-opening in summer 2024. The 105,000-square-foot multi-building campus will offer immersive learning experiences like flight simulators, interactive exhibits, STEM education programs and authentic RFID storytelling of the Carolinas' past, present and future in aviation.'*

<https://www.sullenbergeraviation.org/about-us/>

The A-7 HUD was the breakthrough into the U.S. market and was the start of a golden era for HUD's; 2534 of this design were made and build rates exceeded 30 a month at one time. The substantial throughput saw a large increase in the size of the Production Department and also the Environmental test area. Each HUD underwent temperature cycling with vibration in special chambers. As part of the design proving process some units also underwent Qualification testing with more temperature tests, shock tests and EMC emission and susceptibility being tested.

In August 1974 the 1,000th Head Up Display for the A-7 was handed over to LTV and a number of silver model replicas of the HUD were made in the Company Model Shop. In 1982 the 2000th delivery was celebrated. The pictures top to bottom show the A-7 Corsair II, the Head up Display PDU and EU



## Latest acquisition is a Simplex Steam Engine Indicator (C1837)



A Simplex Steam Engine Indicator in the Science Museum. The Science Museum had two of these and donated one to the RAeS Library at Farnborough who passed it on to the RAA.

(Picture © Science Museum)

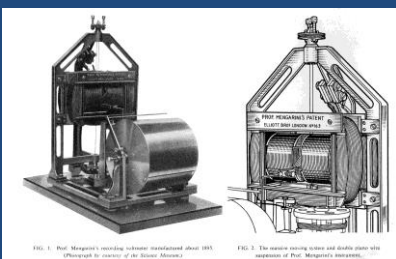
Elliotts made a broad range of steam engine indicators—including Richards, Darke, Wayne and Simplex patterns. This Simplex design consists of a small diameter brass piston; a vented brass cylinder; an internal, single wound spring, which can be changed; a small drum with a coil spring; a roll of paper inside the drum, which is hand fed; and a heavy brass slide and stylus.

An engine indicator is an instrument for graphically recording the pressure versus piston displacement through an engine stroke cycle. Engineers use the resulting diagram to check the design and performance of the engine.

Two sizes were made: 'Pattern A' for normal speed ranges, and this unit, a 'Pattern B', with a small drum, for high-speed use.

The Indicator is stored in a solid wooden box with a number of compartments for springs rulers etc.

The Simplex was not particularly successful and production was comparatively small, apparently confined to just 1897–1901.



This is Professor Mengarini's Recording Voltmeter designed in the 1890s. A number of these were supplied by Elliott Bros. The Voltmeter was of the suspended dynamometer type with a movement comprising a moving coil on a brass frame. The chart was for 24 hours and was scaled 0-120Volts, lithographed on a sheet of paper which was wound round a brass drum containing a clockwork mechanism. The instrument was very susceptible to vibration and with a current consumption of around ¼ Amp was prone to overheat.

## The Queens Awards-1971



THE QUEEN'S AWARD FOR EXPORT ACHIEVEMENT

In 1971 the Company was awarded yet another Queen's Award to Industry for Export. The EFA News of December 1970 records the event:

*'The morning of April 21, the Queen's actual birthday, brought the good news that EFA has won its fourth consecutive Queen's Award to Industry for export achievement.*

*The Award was made for the company's export performance in 1969-1970 and recognises the continuation of our export success for yet another year. No other avionics manufacturer has been able to achieve this level of performance in these increasingly competitive times. In fact, only two other companies in the country have yet won more than three Awards in the last five years.'*

Presentation of the emblem and the scroll bearing the Grant of the Appointment for this year's Queen's Award to Industry went off smoothly at a ceremony in the Towers conference rooms on October 13th, 1971. The event is recorded in two company newspapers but neither describes the products which achieved such outstanding export success. The awards were handed over to a Mrs Violet Rudd of Instrument Systems and Mr John Pointer of Division and Flight Controls Division. There were many products at that time but particularly Fuel Flow equipment, Air Data Computers, VC10 Autopilot and Gyros may have been in list of products from those two Divisions.

The Company was given a glass

block engraved with the category of the award. In this case "The Queen's Award to Industry 1970". Note that as in the early award the 'E' for Export' or 'T for Technology' is not placed in the centre of the logo.

A certificate or scroll is also awarded but has not survived into the RAA archive.



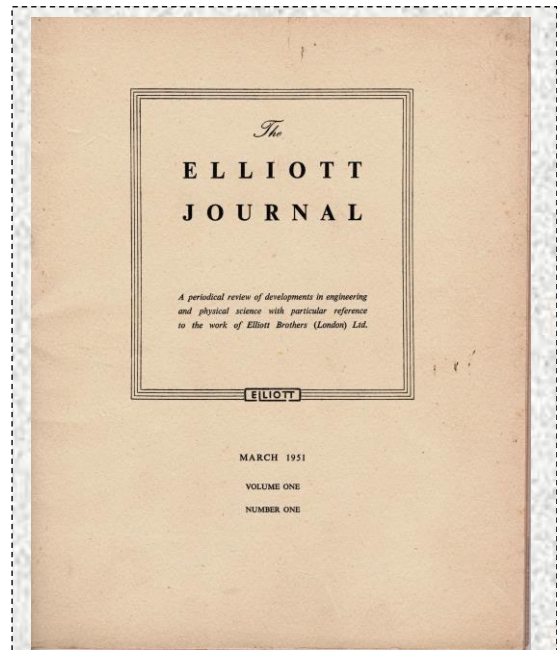
May 1971

# The Lodger Dined Out

From a field engineer's report .....

"Due to the operator's removing the Pitot Static Test Set Mark 3 from the cabinet from time to time, thus leaving a large open space in the front, a rat had adopted the Test Set as a rather comfortable home and toilet; fortunately the lodger dined out."

"However, in consequence of the rodent's deposits and general environmental dirt, the insulation resistance of the external connections to chassis was down to 1 meg."



The Elliott Journal was first published in March 1951 and the RAA holds four editions. The publication was produced half-yearly at Lewisham to be a periodical review of developments in engineering and physical science with particular reference to the work of Elliott Brothers (London) Ltd. It is not known when publication ceased but the most recent edition we hold is May 1953.

The first edition has the history of the Company '150 Years of Instrument Making' followed by a number of technical articles such as 'Magnetic Amplifiers and their application to industrial purposes' and 'Application of the Force-Balance principle to Pneumatic Instruments for Process Control'.

## The Rochester Airport site of BAE Systems- Elliotts move to Rochester

The salvation of the Company and new jobs on the Airport site were due to the entrepreneur Leon Bagrit. (earlier editions of the Newsletter have his story in more detail). In 1935 he left Herbert and Sons., manufacturers of weighing machines, and formed the Swift Scale Company to exploit his own patents and designs. Swift soon became a serious competitor of Herberts with a large factory on the North Circular Road and in 1939 they established a factory on the Rochester Airport site. During the Second World War the manufacturing company, styled B & P Swift Limited turned to war work, and manufactured aircraft equipment for the Ministry of Aircraft Production. One of their contracts was for the provision of geared controls for Short's Stirling bomber. With the end of the war a new more modern factory was sought.

Leon Bagrit was interested in electronics and particularly the field of electronic control or automation. In June 1946 the London and South Eastern Regional Board for Industry announced that it was in discussion with several 'good' firms to take over the Shorts factory at Rochester. In October 1946 it was announced that B & P Swift Ltd and Elliott Bros (London) Ltd had acquired space at Rochester. Elliotts undertook to employ 500 men on the manufacture of electrical and mechanical instruments. In May 1947 Leon Bagrit acquired control of Elliott Bros London and became joint Managing Director, and not long afterwards, when Geoffrey Lee retired, sole Managing Director.

It was around this time that Leon Bagrit determined that there were two dominant technologies emerging. One was atomic energy and the other related business was in control engineering particularly automatic operation. These ideas were applied to Elliott Brothers; that it should grow to offer a full range of automation from detailed equipment to advice. Leon Bagrit increased his personal investment in the Company and began to encourage electronic design.

Leon Bagrit immediately set about overhauling the company finances and seeking both new work in existing areas and new directions for growth. One approach that Leon Bagrit instigated was to open a research laboratory in October 1946 at Borehamwood to try to obtain Government money to pay for the technological developments required.

Leon Bagrit recognised the sheer scale of the new technologies needed and that the United States was already far ahead in this field. So, in 1948 he began to travel to the USA and forge contacts for licensing technology in accordance with his policy of '*Don't re-invent*'. The first of these was an agreement in 1949 with the Fisher Governor Company of Iowa for the manufacture of oil control valves .and production commenced at Rochester in 1950. An important agreement was established with Bendix Aviation Corporation of Delaware U.S.A. in 1953 and range of aircraft instruments this brought into the company was a major asset.

The Company Report of 1953 states that the factory at Rochester was a modern single storey building of 185,000 sq ft and was under tenancy from the Ministry of Supply. Modern machine tools were installed to handle quantity production with much of this equipment provided by the Government on a rental basis.



The Main approach and Front Entrance in about 1960

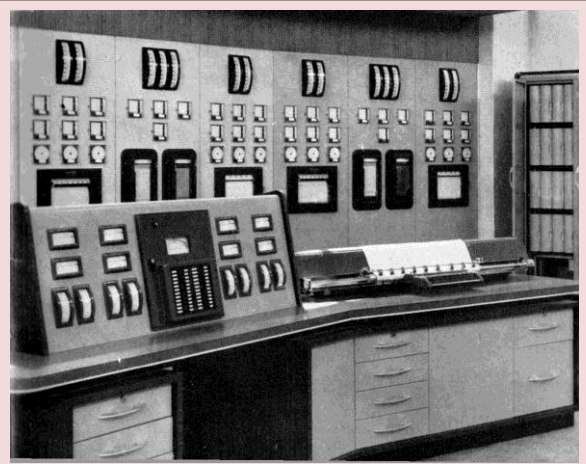
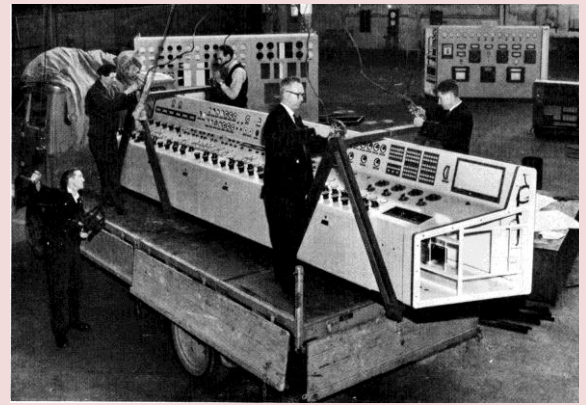
©BAE Systems 2023

This building was the long brick factory building to the West of the Hangars. The office building fronting the airfield, incorporating the entrance known for a time as the William Elliott entrance, was made into its present two storeys in about 1961. In 1948 the first Apprentices were taken on at Rochester. In 1954 there were four or five Divisions at Rochester. The Fisher Governor Division made fluid control valves, the Naval Division continued Elliott's navy work on gunnery directors and Swift & Swallow were making weighing machines. There was a small Radar Division and the Aviation Division whose work included some of the early analogue computers.

**The Rochester Airport site of BAE Systems will be continued in the next Newsletter.**

## The Sheet Metal and Panel Division

E-A Automation Services Ltd was created in 1960 and originally situated at Lewisham. It was established to handle the manufacture of instrument control cubicles and associated sheet metal work. In 1961 the Company was moved to the Airport Works to occupied around 70,000sq ft of the old factory within the Hangars. Naturally the process of making the control cubicles requires much heavy machinery such as power folding machines and Turret Press for forming the cabinets. E-A Automation Services Ltd carried out the whole design and manufacturing with their own contracts Department ,Drawing Office through to painting and lettering and installation. The electrical and piping work for the instruments and controls was fitted and various makers instruments were fitted such as from Ferranti and of course Elliotts. Some very substantial panels were produced for Power Stations , Steel Works, Oil Refineries, Paper Mills etc throughout the world. The pictures show a control panel being packed for delivery and an installation at the Isle of Grain Gasification Plant. The picture below shows part of the Panel Fabrication Floor.



Panel Fabrication Floor, assembly assisted by overhead travelling crane for ready movement of the materials and completed fabrications

## Open Day 1961

In 1961 an Open Day was held at the Rochester site. At that time the Airport Works housed fifteen of the sixty Elliott-Automation companies and divisions. Visitors were able to walk around the various Divisions and special exhibitions were set up. Where possible demonstrations of working models were arranged to illustrate the way that the various products are used in control applications. Visitors were also able to see an Exhibition arranged by the Elliott Sports and Social Club at Airport Works. It illustrated the activities of the Club which had 20 different sections catering for all tastes. Particularly popular were the Auto Club, Swimming, Football, Cricket and Judo Sections. A new sports ground was being prepared at Featherby Road, Gillingham and would eventually have football and cricket pitches and tennis courts. A pavilion was also being built there. The new factory going up alongside the existing buildings was to have a spacious canteen for all employees. The first of the Tower blocks was well underway at this time but of the seven towers shown only three were ever constructed. Nevertheless it was anticipated that the payroll would be expanded to nearly 5000 people on completion of the new buildings. The Divisions were showing the expansion into the new area of avionics with Aircraft Engine Instrument Division, Military Aircraft Controls Division, Inertial Navigation Division but there is no mention of Airborne Display Division as that business did not commence for a few more years. The Radar Division was also well established. Many of the other departments were supporting the manufacture such as the Tool Room and Gear Division.



The cover of the Open Day booklet. A route map to show visitors around the site is included.