

### **Rotax (1913 – 1971)**

**Rotax** went through several name changes and manufacturing locations, the last of these being the former premises of the Edison Phonograph Company in Willesden, west London in 1913. Initially a motor cycle accessory business, Rotax began to specialise in aircraft components after the First World War (the company had built small quantities of aircraft switchgear between 1917 and 1921). After an initial proposal for Lucas and Rotax to jointly take over CAV, Lucas decided in 1926 to take over both companies. Rotax continued under its own name until the 1971 reorganisation

Rotax became increasingly involved with the aviation market in 1931 when, at the suggestion of the Government of the day, Lucas directed it to concentrate on the design and manufacture of aircraft electrical-generation equipment. This was part of the efforts made by industry and the Government to bring some standardisation into a rather chaotic components industry. From that time on the name Rotax has been synonymous with motors, generators, starters, starter generators and the varied and comprehensive control and protection equipment needed to generate and manage the huge quantities of electrical power required by large commercial and military aircraft. In 1956 Lucas Rotax opened a new plant in the new town of Hemel Hempstead to the north of London.

Rotax itself has gradually been strengthened by the acquisition of a number of companies. In 1968 it bought AEI's Aircraft Equipment Group and followed this with the acquisition of Vactric Control Equipment in 1969. Vactric brought an expertise in the design and manufacture of servos and control systems, having been concerned with synchros, small motors and encoders. Aeroplanes at the time swallow vast quantities of such components; there are more than 100 Vactric units on Concorde, for example. Other Vactric products which do not fit into this classification include the licence-manufacture of the Tedeco magnetic chip detectors used in the BEA and BOAC fleets.

Also in 1969, Lucas Rotax bought out the English Electric Special Products Group based in Bradford, which had also been fielding a strong power-generation team, heavily based on R&D. Rotax continued under its own name until the 1971 reorganisation which formed Lucas Aerospace, and Rotax is the Electrical Group of Lucas Aerospace.

### **Lucas Aerospace (1971 – 1996)**

**Lucas Aerospace** was founded as a company in 1971 when the rationalisation of the UK airframe and aero-engine industries spread into the aerospace equipment sector. However, the company's roots in aerospace can be traced as far back as 1910. Some of the household names of the aviation industry that were amalgamated into Lucas Aerospace include: AEI Aircraft Components, English Electric, H M Hobson, Lucas Gas Turbine Equipment, and Rotax.

Lucas Aerospace employs 14,000 people in 18 centres throughout the length and breadth of Britain. It represents the aviation interests of Joseph Lucas (Industries) Ltd, which employs 80,000 people. The two other major activities of the group are automotive and industrial companies and overseas manufacturing subsidiaries and associates. Lucas Aerospace comprises five main product groups: **Hydromechanical, Electrical, Fabrication, Industrial and Product Support**. Another subsidiary, G. & E. Bradley, continues to operate under its own name.

The largest single unit is the Hydromechanical Group, with headquarters at Shaftmoor Lane, Birmingham. It comprises largely elements of Lucas Gas Turbine Equipment and H. M. Hobson, and was a logical geographical and product association. Joseph Lucas entered the infant jet-engine field in 1940 when prototype engines were being built. Nine years later it became Joseph Lucas Gas Turbine Equipment; subsequently it became LGTE in 1960. By getting in on the ground floor, so to speak, this firm built up an enviable background of experience across virtually the entire field of turbine-component technology, fuel-control and combustion systems, flame tubes, thrust reversers and many others.

The Electrical Group of Lucas Aerospace was considered to be the market leader in electrical equipment. It had put into series production the first 12,000 r.p.m. generator in the world, the first oil-cooled and oil-lubricated machine in Europe, and to have secured the first integral-drive generator system in Europe. Other important outlets are the Harrier main generation system (with its new mechanical constant-speed drive, a development of the Perbury drive); generators, drives and control and protection equipment for Russia's Tu-144 supersonic transport; generators for Germany's V AK 191 B experimental V/Stol fighter; and the complete generation system for Britain's Nimrod sub-hunter. Another significant line is the design and manufacture of gas-turbine starter I APUs and mechanical and pneumatic equipment. Examples are the direct-shaft-drive starter with automatic translation to APU mode for the Harrier, high-temperature air-control valves for aircraft and propulsion systems, and diaphragmtype flexible drives.

The two other manufacturing groups, **Fabrication and Industrial**, are primarily concerned with components and hardware manufacture. The first organisation has two main plants, both ex-Lucas Gas Turbine Equipment, at Hargher Clough (the headquarters) and Wood Top near Burnley. The Hargher Clough plant deals principally with high-precision production and assembly, while the Wood Top factory is concerned with machining manufacture but also contains extensive R&D facilities related to combustion processes. Among the Fabrication Group's products is the 9ft cold-thrust reverser for the RB.211, while Dart flame-tubes represent some of the long-standing products. The Industrial Group is also centred on Hemel Hempstead and includes Vactric Control Equipment at Morden, Surrey, and Cybac Industrial Actuators at the Luton site; Rotax Precision Products, also at Hemel Hempstead, supply ballscrews to the aviation industry.

In January 1988, the former Lear Siegler Power Equipment Corporation, based in Aurora, Ohio, was purchased by Lucas Aerospace and became known as Lucas Aerospace Power Equipment Corporation. During the 1980's Lucas Aerospace also acquired Power Transmission Corporation (based in Utica) which manufactures power transmission shafts and flexible drive couplings. In France, Bronzavia Air Equipment was also acquired. More recently, two UK engine controls businesses have been acquired: Dowty Fuel Systems and Smiths Engine Controls. Smiths Engine Control is based at York Road and specialised in FADEC. Now is taken over by Rolls-Royce.

#### Lucas Aerospace Historical Locations

- Burnley
  - Hargher Clough, fabrication group, specialize in Thrust Reversers, now part of Safran Nacelles

- Wood Top, fabrication group, specialize in combustion system, contains extensive R&D facilities related to combustion processes. Supplied combustors to Electrical group who designed the gas turbine APUs for Harrier/AV8B (still in service, aftermarket managed by Ontic), Saab Jas 39 auxiliary unit combustor. The Wood Top site was taken over by MB Aerospace.
- Wolverhampton
  - Fordhouses, specialise in actuation system, now part of UTC
- Hemel Hempstead
  - Maylands Avenue, Electrical Group, main facility for Rotax, consolidated from many Rotax facilities in the country including Willesden Junction, Conventry, Beaconsfield, Park Royal, Bradford facility of English Electric Special Products Group. Rotax specialise in motors and generators and associated controls.
- Honiley
  - Honiley Airfield, specialise in engine management, now the site is disused
- Huyton, Liverpool
  - Huyton, specialise in actuation systems, manufacturing facility for Fordhouses, was taken over by UTC as part of Goodrich, factory closed in 2014. Used to manufacture and overhaul CSDs made under license from Sundstrand and Lucas traction drive.
- Luton
  - Used to be part of English Electric Special Products Group, specialise in ice protection equipment and aircraft lighting systems. Sold in 1993
- Birmingham – Shaftmoor Lane
  - Shaftmoor Lane, Headquarter of Lucas Gas Turbine Equipment, Specialise in engine control, fuel systems. Part of the joint venture called Aeroengine controls between Goodrich and Rolls-Royce in later years. The site is closed and the design and manufacturing activity now moved to a new facility in Solihull and owned by Rolls-Royce.
- York Road
  - Taken over from Dowty-Smith Engine Control in 90s. Again part of AEC in later years. The site is closed the design and manufacturing activity now moved to a new facility in Solihull and owned by Rolls-Royce.

### **Lucas Varity – TRW (1996 – 2002)**

In September 1996, **LucasVarity plc** was formed by the merger of Lucas Ltd and Varity Corporation, and in October 1996 cargo systems manufacturer Boeing Georgia was acquired.

May 1999: LucasVarity was acquired by **TRW Inc.** The aerospace business of LucasVarity became the **TRW Aeronautical Systems (AS)**.

TRW moved from Hemel Hempstead to **Pitstone Green** on **22-7-02**.

### **Goodrich – UTC (2002 – 2013)**

October 2, 2002: TRW Aeronautical Systems (AS) became part of **Goodrich Corporation**. The Pitstone site became **Goodrich Power Systems** (an SBU, Strategic Business Unit), part of Goodrich Control Systems Ltd.

September 21, 2011: Goodrich announced that our Board of Directors unanimously approved an agreement to combine with United Technologies. Under the agreement, United Technologies will acquire all of the outstanding common shares of Goodrich for \$127.50 per share in cash - a transaction valued at approximately \$18.4 billion.

July 26, 2012: Received regulatory approval from the United States, the European Union and Canada for the acquisition of Goodrich by **United Technologies Corporation**. However, Goodrich Power Systems must be divested to avoid competition issues with Hamilton Sundstrand.

October 16, 2012: Safran announced today that it has entered into a definitive agreement with Goodrich Corporation, a subsidiary of United Technologies, to acquire the electrical power systems activities of Goodrich (Goodrich Electric Power Systems).

### **Safran (2013 – present)**

March 26, 2013, 1pm: **Safran** bought Goodrich Electrical Power Systems Business in Pitstone, UK, becoming **Safran Power UK Ltd**. Twinsburg site becomes Safran Power USA.

Safran Power is a new operating entity, created as part of Hispano-Suiza, the Group subsidiary specialized in onboard electrical power applications. This new structure is dedicated to power electronics, an essential part of the Group's drive to become a world leader in enabling technologies for more and all-electric aircraft.

On 6<sup>th</sup> Jan 2014, Safran combined its electrical-system activities into one business to provide planemakers with lighter powering technology and strategically positioned for future more electric aircraft. The new business unit is named **Labinal Power Systems (LPS)** with five operating divisions and circa 12,000 employees. The activities of Safran Power (Hispano-Suiza), Safran Power UK and Safran Power USA were combined to form one of the five operating divisions named Power Division with more than 900 employees.

**Power division** specialises on electrical-system (ATA24) activities including power generation, distribution, system integration and associated support services. The other divisions within LPS include aeronautic EWIS (electrical-wiring interconnection systems) Americas and EWIS Eurasia (both formerly Labinal); global engineering services (Safran Engineering Services); aeronautic ventilation system equipment (Technofan). On 12<sup>th</sup> May 2014, Safran took over the Power Distribution Management division of Eaton Aerospace, and merged its activities into Power division.

On 2nd March 2016, LPS CEO Alain Sauret announced to all employees that as part of Safran rebranding, the names of Safran businesses will change. This will align the names of all businesses under the Safran group and will increase the brand recognition with our customers. For Pitstone, this means our name changed to **Safran Electrical & Power UK, Ltd.** The new name was deployed on 19th May 2016.