



INCLUDING SUPPLEMENTARY PAPERS

APRIL 1973

THE
aeronautical
JOURNAL



THE ROYAL AERONAUTICAL SOCIETY

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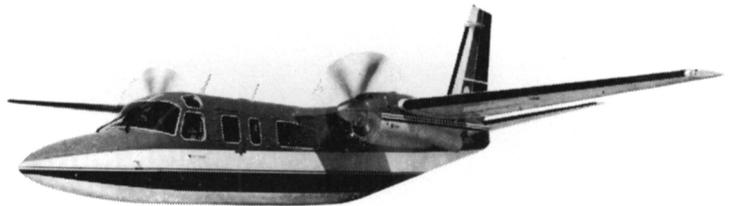
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The Sabre Series of business jets (shown below). There's one with the perfect combination of payload, performance and price for your company.



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Distributorships are available in selected countries throughout the world.

British exhibitors at the Paris Air Show

The 30th Paris Air Show will be held at Le Bourget from 25th May to 3rd June. The following pages list all the British companies known to be participating at the time of going to press. Further details, including a map of the exhibition and a plan of the British stands in Hall E, are on page 16.

Hall Stand

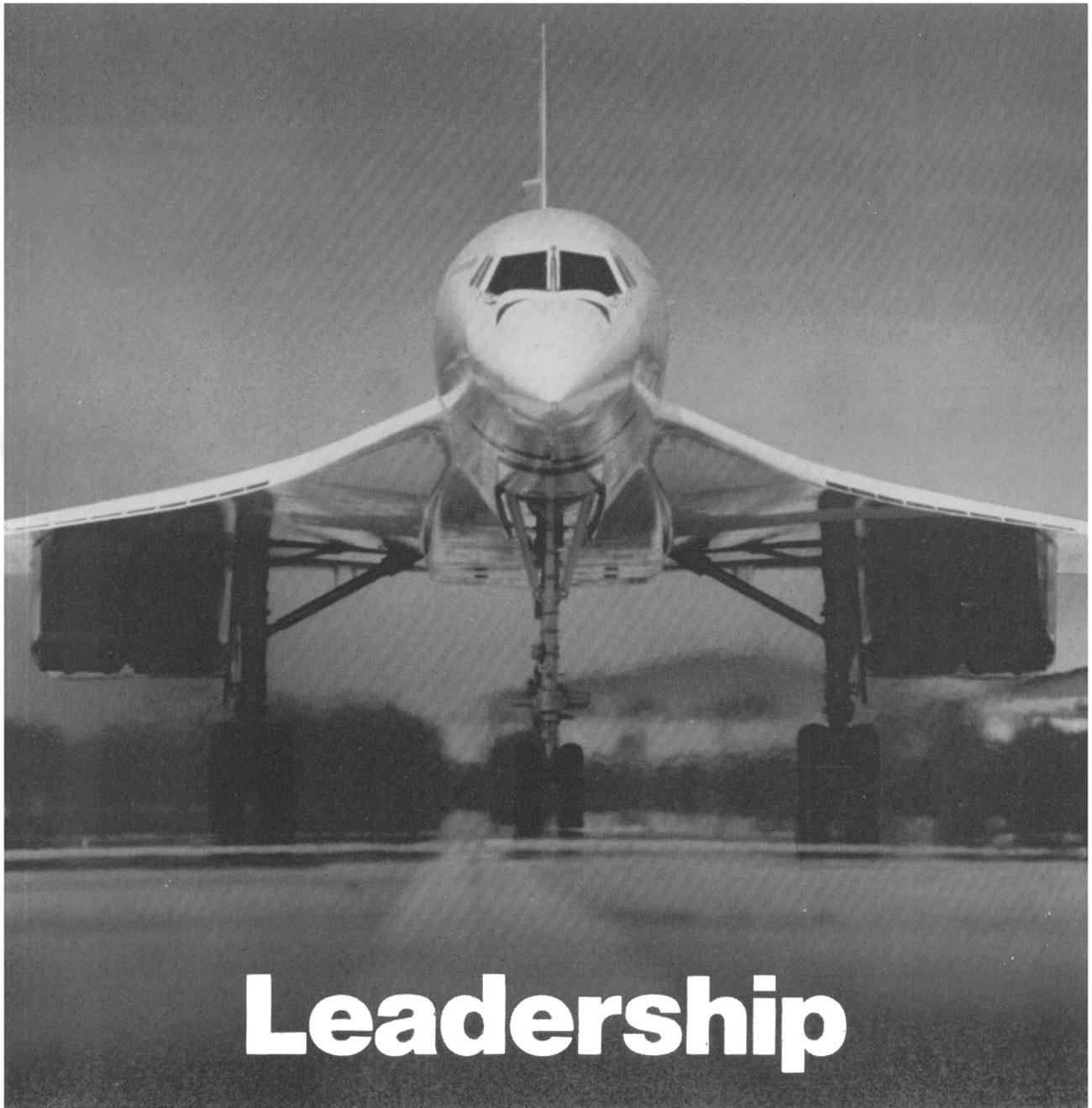
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|--|--|
| E632 ABBEY PANELS LTD., BAYTON ROAD, EXHALL, COVENTRY CV7 9DX.
Bedworth (0203-) 311311. 311427 Abbey Panel Cov. | Aeronautical sheet metal fabrications, toolmakers and aeronautical precision engineering. |
| E240 AIRCRAFT FURNISHING LTD., HERSHAM STATION WORKS, WALTON-ON-THAMES, SURREY.
Walton-on-Thames (093 22) 26261. 262310 Airfurn Walton.
(Also at: MOOR ROAD, KILKEEL, CO. DOWN, N. IRELAND.
Kilkeel (069-374) 471. 74390 Airfurn Kilkeel.) | Seating manufacturers. |
| E512 AIRCRAFT POROUS MEDIA EUROPE LTD., WALTON ROAD, FARLINGTON, PORTSMOUTH PO6 1TD.
Cosham (070 18) 70901. 86251 Pall Portsmouth. | Aerospace and ground support filtration equipment for hydraulic, lubrication fuel, air and water systems. Associated sensing, indicating and sampling equipment. Particle separation systems for turbine engine air intakes. Laboratory services for fluid sample contaminant analysis and element cleaning. |
| E630 AIRSCREW FANS LTD., WEYBRIDGE, SURREY.
Weybridge (0932-) 45599. 27415 Airscrew weybg. | Fans and blowers (axial flow, mixed flow and centrifugal— <i>Airscrew</i> and <i>Plannair</i> types) for all aircraft applications and allied ground equipment. |
| E540 AIRTOUR FLIGHT EQUIPMENT LTD.
(<i>Airtour Products</i>),
ELSTREE AERODROME, BOREHAM WOOD, HERTS.
01-953 4870.
(<i>Factory: MILL ROAD, CRANFIELD, BEDS.</i>) | Manufacturers of flying and navigational equipment for general and commercial aviation. Largest range of flight navigational equipment manufactured in Europe. Special products for aircraft manufacturers and airlines also undertaken. |
| E610 AUTO DIESELS BRABY LTD., COWLEY MILL ROAD, UXBRIDGE, MIDDLESEX.
Uxbridge (0895-) 38262. 263835 Braby Ldn. | Aircraft electrical ground power units and turbine or diesel jet air starter units for all aircraft. Turbine or diesel powered automatic standby and no-break generating sets for emergency power supplies. |
| E533 AVERY-HARDOLL LTD., DOWNLEY ROAD, HAVANT, HANTS PO9 2NW.
Havant (070 12) 6422. 86144 Hardolpump Hvnt. | Designers and manufacturers of aviation fuelling equipment; quick-release self-sealing couplings (ground and aircraft), hydrant fuelling equipment bulk-meters; flow meters for fuel test rigs and calibration purposes. |
| E612 AVICA EQUIPMENT LTD., MARK ROAD, HEMEL HEMPSTEAD, HERTS.
Hemel Hempstead (0442-) 4711. 82256 Avica Hemel. | Piping and ducting systems and components; metallic flexible hose lines; bellows sealed flexible duct joints (restrained and unrestrained, fixed and tolerance take-up); "V" flange couplings; static metallic face seals; hydraulic swivel joints; support clips and bracket assemblies; thin gauge tubing; magnetic plugs and self-closing valves; all in stainless steel and other high temperature alloys. |
| E701 BOC-AVIATION.
<i>British Oxygen Co. Ltd.</i> ,
THE PINNACLES, ELIZABETH WAY, HARLOW, ESSEX.
Harlow (027 96) 29692. 81497 Oxygen Harlow. | Design and manufacture of complete liquid and gaseous oxygen systems for military and civil aircraft. Cryogenic systems for aircraft including peak load and infra-red detector head cooling, fuel system explosion suppression, etc. Ground support equipment, liquid and gaseous oxygen and nitrogen producing plants, insulated storage tanks, dispensers. |
| E641 BAKELITE XYLONITE LTD.,
(<i>Expanded Rubber & Plastics Division</i>)
MITCHAM ROAD, CROYDON, SURREY CR9 3AL.
01-684 3622. | <i>Rubazote</i> soft expanded rubber in sheets and gaskets. <i>Plastazote</i> cross linked expanded polyethylene in sheets for sealing strips and gaskets, anti-vibration and sound absorption. |
| E442 BAXTER WOODHOUSE & TAYLOR LTD., WOODSIDE, POYNTON, CHESHIRE SK12 1AH.
Poynton (099 67) 2261. | High altitude pressure suits and helmets, aircraft electric heating, insulation, soundproofing and ducting. |
| E520 J. R. BRAMAH & CO. LTD., HOLBROOK WORKS, HALFWAY, SHEFFIELD S19 5GZ.
Eckington (0246 83) 2251. 54181 Bramah Sheffld. | Suppliers to the aerospace industry of precision fabrications in titanium, nickel alloys, stainless and light alloys. Development and design service. |
| E215 THE BARDEN CORPORATION (U.K.) LTD., WESTERN ROAD, BRACKNELL, BERKS RG12 1QU.
Bracknell (0344-) 24511. 848250 Barden Bracknell. | Manufacturers of precision ball bearings. |

Telephone numbers: STD code numbers are shown in brackets after the exchange name.

Telex numbers: Telex numbers and Answer-back Codes are shown following telephone numbers where applicable.

Hall Stand

- E012** BESTOBELL AVIATION PRODUCTS LTD., FARNHAM ROAD, SLOUGH, BUCKS SL1 4UY. Slough (0753-) 23921. 84107 Bestobell Sl.
- A14** BRITISH AIRCRAFT CORPORATION LTD., 100 PALL MALL, LONDON SW1Y 5HR. 01-930 1020. 24353 Britair London.
- COMMERCIAL AIRCRAFT DIVISION, BROOKLANDS ROAD, WEYBRIDGE, SURREY. Weybridge (0932-) 45522. 27111 Britair Weybridge. (and at: FILTON HOUSE, FILTON, BRISTOL. Bristol (0272-) 693831. 44163 Britair Bristol.)
- GUIDED WEAPONS DIVISION, SIX HILLS WAY, STEVENAGE, HERTS SG1 2DA. Stevenage (0438-) 2422. 825125 Britair Stevage.
- MILITARY AIRCRAFT DIVISION, WARTON AERODROME, PRESTON, LANCS PR4 1AX. Preston (0772-) 633333. 67627 Britair Warton.
- 631** BRISTOL COMPOSITE MATERIALS ENGINEERING LTD., AVONMOUTH ROAD, AVONMOUTH, BRISTOL BS11 9DU. (027 52-) 4821. 44207 Rolcom Avmth.
- 623** BRITISH HOVERCRAFT CORPORATION OSBORNE, EAST COWES, ISLE OF WIGHT. Cowes (0983-82) 4121. 86190 Brithover Cowes.
- D560** BRITISH INSULATED CALLENDER'S CABLES LTD., P.O. Box No. 5, 21 BLOOMSBURY STREET, LONDON WC1B 3QN. 01-637 1300. 23463 Bicc London. (Also: Prescot, Lancs.)
- Chalet A17** BRITTEN-NORMAN (BEMBRIDGE) LTD., BEMBRIDGE AIRPORT, ISLE OF WIGHT. Bembridge (098 387) 2511. 86277 Britnor Bembridge.
- Cabin pressure and anti-icing components; silicon/glass connectors and bellows; hoses; *Bestobell* and *Janitrol* duct couplings; *General Connectors* products including *Periseal* connectors and *Vibreaker* units; metal ducting; stainless *Iconel* and titanium spinnings; fire-seals; p.t.f.e.-asbestos components; silicon extrusions and mouldings; thermal and acoustic insulation materials.
- Design and development of the Anglo-French *Concorde* supersonic airliner with structural components of the British aircraft being built at the Weybridge plant and final assembly at the Filton plant. Flight testing is carried out from the Flight Test Centre, Fairford, Gloucestershire.
- Design and production of the *BAC One-Eleven 500* and *475* short/medium haul jet airliner with final assembly at the Hurn (Bournemouth) plant. World-wide service and spares support for these types, the *VC 10*, *Viscount* and *Vanguard* aircraft is provided from Weybridge and from BAC (USA) Inc., Arlington, Virginia, U.S.A. *Strikemaster* wing sub-assemblies are manufactured at Hurn for the Military Aircraft Division. Service and spares support is provided for the *Britannia* aircraft from the Filton plant. Research into civil projects and member of Europlane consortium.
- Stevenage:*
Production of *Rapier* and *Thunderbird 2* anti-aircraft weapon systems; *Swingfire* and *Vigilant* anti-tank systems; and *Seawolf* naval and anti-missile/anti-aircraft system. Service support of *Rapier*, *Thunderbird*, *Swingfire* and *Vigilant*.
Manufacturers of a range of precision gyroscopes for inertial navigation and other land, sea and air applications; specialised plastics components for microwave electronic installations; and automatic test equipment for guided weapon systems and industrial applications.
- Bristol:*
Designers and manufacturers of scientific and communications satellites, sounding rockets, space systems and high speed data handling systems for aircraft. Advanced avionics for civil and military aircraft including notch aerials and electronically steerable phased arrays.
Manufacturers of sub-systems and their assembly, integration and test for *Intelsat IV* communication satellites. Designers and manufacturers of all *Intelsat IV* handling, alignment and transportation equipment. Prime contractors for *Ariel IV (UK-4)* satellite and co-contractors for *PROSPERO (X-3)* satellite. Attitude sensing systems and electronics for *HEOS-A1* and *A2* satellites. Industrial agents for *Skylark* research rockets. Preparation, launch and data analysis services.
Data handling systems for *Concorde*, *Phantom*, *C130*, Tracked Hovercraft etc.
Service support for *Rapier*, *Swingfire* and *Seawolf* weapon systems launch equipment, the *Bloodhound* weapon system and the *Jindivik* target aircraft system.
- Refurbishing of *Canberra* interdicator/reconnaissance aircraft for export. Refurbishing of *Lightning* supersonic ground attack fighter for the R.A.F. Sub-assembly and final assembly of the *Jet Provost T. Mk. 5* basic trainer for the R.A.F. and *BAC 167 Strikemaster* strike/trainer for export. Major sub-assembly and final assembly and production of the Anglo-French *Jaguar* supersonic tactical fighter. Joint design and development of Anglo-German-Italian Panavia *Multi-Role Combat Aircraft*.
- Manufacturers of aircraft overload fuel tanks, aero engine components, radar scanners, practice bombs, aircraft structures, light weight armour, glass wound *Epoch* pipe and other components in reinforced composite materials including carbon fibre.
- Design, development and production of a wide range of hovercraft from 3 to 200 tons, special ACV applications such as hoverpallets and off and on the road transporters and *Black Arrow* satellite launchers. Specialised electronics and experimental research.
- Aluminium rods, strands, strips and wires; copper wires, bars and strips; electrical insulating materials, wires, cables and flexibles; solders, fluxes, radio masts and towers.
- Design, development and production of *BN-2A Islander*, *BN-2A Defender* and *BN-2A Mk III Trislander* aircraft.



Leadership

British Aircraft Corporation designs and builds leaders in every field of Aerospace. **Concorde** – with Aérospatiale France – will halve the world in size with supersonic services; **One-Eleven 475** brings mainline jet services to the small fields; **Europlane** – with Saab of Sweden, MBB of Germany and Casa of Spain – will bring the boon of Quiet Take-Off and Landing to the world's airports; **Jaguar** – with Dassault/Breguet – is the most cost-effective tactical support aircraft in production today; **MRCA** – with MBB and Aeritalia – is Europe's most important military aircraft, while **Strikemaster** has already been chosen by nine nations for ground attack and training. **Rapier** has revolutionised the concept of missile defence against tree-top aircraft attacks, just as **Swingfire** has changed the balance of power in the ground fight against tanks. We can say little of the surface-to-air **Seawolf** and helicopter-borne air-to-surface **CL834** weapon systems, save that each is a world leader in its class. BAC's **Space** programmes are, beyond challenge, the most successful in Europe and include BAC teamwork on **Intelsat IV** with Hughes Aircraft and on the **Space Shuttle** with North American Rockwell.



BRITISH AIRCRAFT CORPORATION

100 FALL MALL LONDON SW1

H.D.A....modern

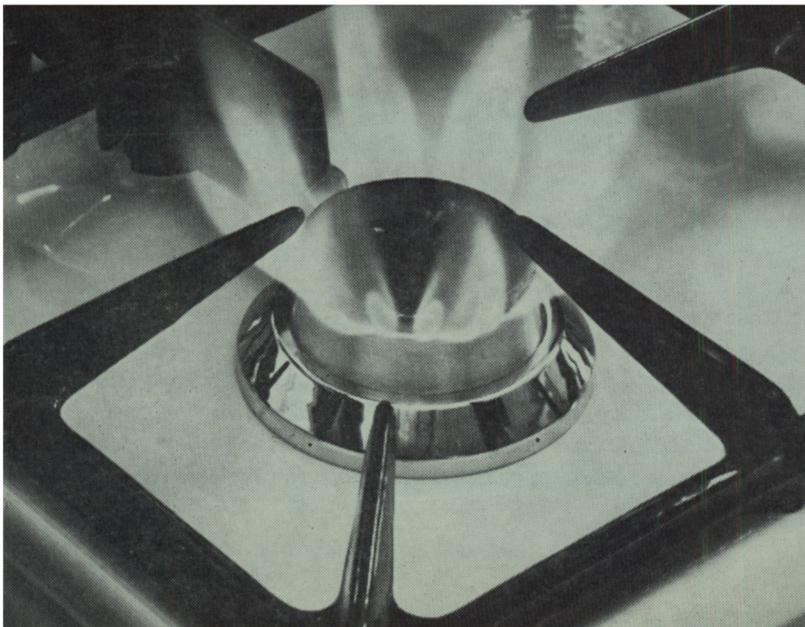
H.D.A. make modern metals remarkably versatile.

We forge, cast and extrude components for practically every industry, from the homely gas cooker to the sophisticated Concorde.

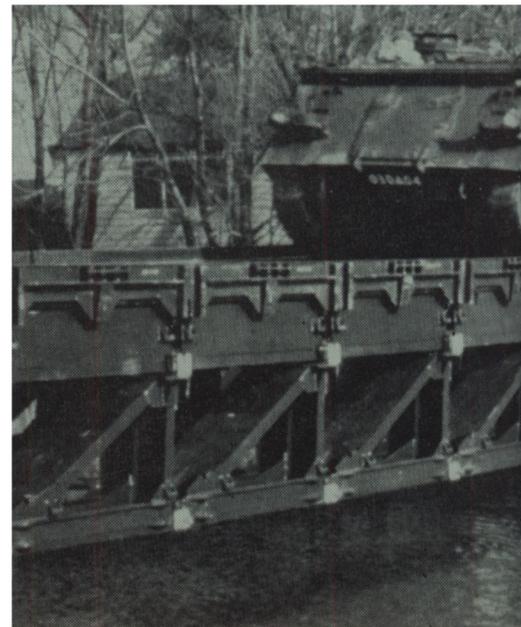
In most of the advanced developments where metal is used, you will find that the technical skills and metallurgical expertise of H.D.A. have been applied.



H. D. A. aluminium alloy gravity and pressure die castings are used in the engine of the Vauxhall Viva.



The burners on this new gas cooker are pressure die cast in an H. D. A. aluminium alloy.



metals for industry

All this experience can be working for you — advising on design, the correct metal and, above all, the most economical use of our processes for your particular application.

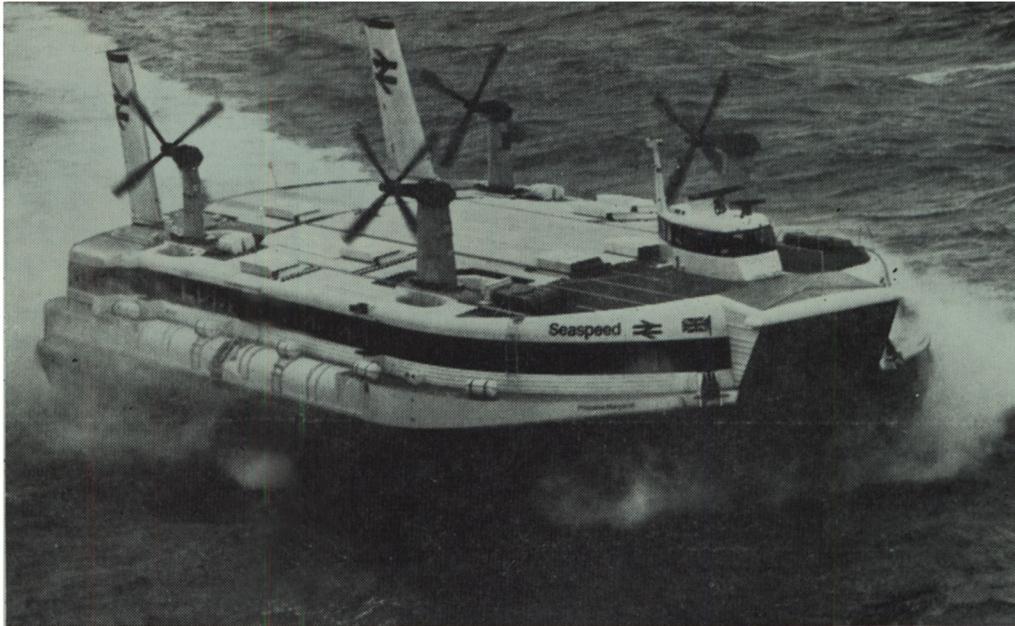
 **HAWKER SIDDELEY
HIGH DUTY
ALLOYS LTD.**

89 BUCKINGHAM AVENUE, SLOUGH, BUCKINGHAMSHIRE.

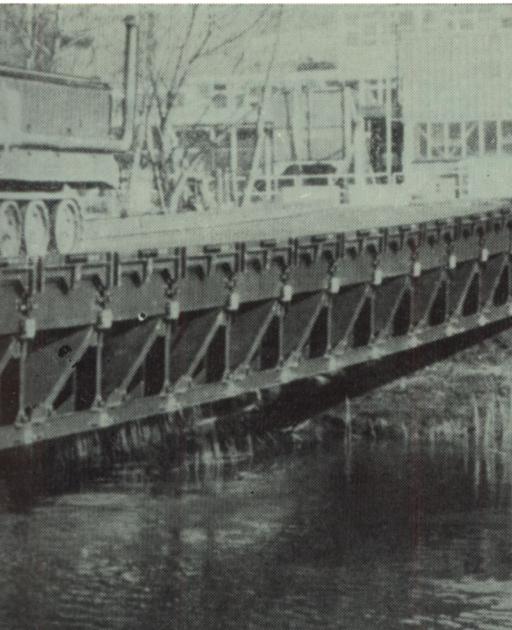
Hawker Siddeley Group supplies mechanical, electrical and aerospace equipment with world-wide sales and service.



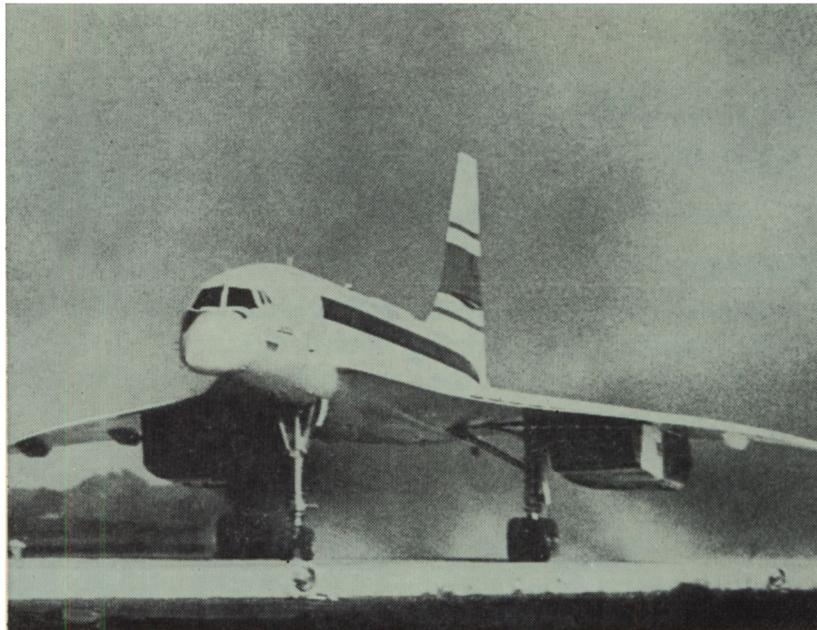
The rotor of the M.S.E. high speed centrifuge is forged by H.D.A. in a titanium alloy.



H.D.A. forgings in aluminium alloy and stainless steel are used in the construction of the SR.N4 Hovercraft.



H.D.A. are major suppliers of aluminium alloy forgings and extrusions for the military Medium Girder Bridge.



H.D.A. forgings in aluminium, titanium, steel and nickel base alloys and H.D.A. aluminium alloy extrusions are used extensively throughout Concorde.

£Millions can be saved in industry by knowledge now available

-progress in practical application

The drive to link new Industrial Technologies with Management

Tribology

‘Probably £500 million per year can be saved by the application of existing knowledge. This is significant both for the economic well-being of the nation and the reputation of UK engineering products.’

H. Peter Jost, CBE,
(Chairman, DTI Committee on Tribology)

Tribology is the science and technology of interacting surfaces, i.e. rubbing, sliding and rolling, and includes the design of bearings, the

application of lubricants and the environments in which surfaces interact.

By bringing together the expertise of the mechanical engineer, the metallurgist, the lubrication engineer, the physicist and the chemist, tribology enables greater reliability and durability to be built into any product.

Tribology Centres at Leeds, Risley and Swansea, in addition to the National Engineering Laboratory at East Kilbride, have already successfully assisted more than 1000 industrial firms, in many cases to increased profitability.

Data sheets and a comprehensive handbook are in preparation, to make easily digested information available to designers, draughtsmen, operational and maintenance staff. Many courses in the subject have also been created at universities and technical colleges.

Terotechnology

‘On maintenance alone £550 million per year can be saved’

Major-General Sir Leonard Atkinson, KBE,
(Chairman, DTI Committee for Terotechnology)

Terotechnology is concerned with the installation, commissioning, maintenance, replacement and renewal of plant, machinery and equipment, and the feedback of information to design and operation.

Corrosion

It has been estimated (*Hoar Report*) that about £300 million a year could be saved if existing corrosion protection technology were more widely applied in design and operation.

Materials handling

Is the technology of economically and safely moving and storing materials. It is of vital concern to the manufacturing, service and distribution industries.

The National Materials Handling Centre at Cranfield provides courses, information, advice and research for equipment manufacturers and users.

‘A common feature of these industrial technologies is that for each of them there is a large stock of existing knowledge arising from past research, much of it funded by Government. Increased application of this knowledge offers the prospect of very considerable improvements in industrial efficiency. The total potential savings to industry could amount to £1500 million a year.’

Gilbert A. Hunt, CBE,
(Chairman, DTI Committee for Industrial Technologies)

EVENTS

Terotechnology Conference (theme – New Ideas for Industrial Cost Reduction), Bristol, May 9-12, 1973. Tickets from the Institution of Plant Engineers.

5th International Materials Handling Exhibition, Kelvin Hall, Glasgow, May 14-19, 1973.

Corrosion and Corrosion Protection Conference (with emphasis on pressure vessels). The Institution of Mechanical Engineers, London, May 16-17, 1973. Admission by ticket. Open to all.

Tribology Exhibition (in conjunction with publication of designers' Tribology Handbook), Design Centre, London, July 11 – August 4, 1973.

EUROTRIB 73 – Tribology and Reliability, First European Tribology Congress, September 25-27, 1973. Details from the Institution of Mechanical Engineers.

International Conference – Packages, Pallets and Containers in International Trade, Royal Garden Hotel, London, November 8-9, 1973. Details from The Institute of Materials Handling.

Department of Trade and Industry (M4) Room 540, Abell House, John Islip Street, London SW1P 4LN

Name _____ (BLOCK CAPITALS PLEASE)

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Please send me information on:

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THE COMMITTEE FOR

Industrial Technologies

C.C.

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Hall Stand

- E540** BURNDEPT ELECTRONICS (E.R.) LTD., ST. FIDELIS ROAD, ERITH, KENT. Erith (032 24) 39121. UHF and VHF personal and flotation search and rescue beacons. *SARBE*, UHF and VHF mobile radio telephone equipment.
- E410** BURNLEY ENGINEERING PRODUCTS LTD., WIDOW HILL ROAD, HEASANDFORD INDUSTRIAL ESTATE, BURNLEY, LANCs. Burnley (0282-) 20111. 63157 Bep Burnley. Sheet metal fabrication engineers. Manufacturers of components for gas turbine and rocket motors; manufacturers of honeycomb and fibrous metal type seals and noise attenuation equipment for gas turbines. Specialists in high temperature brazing.
- E515** CANNON & STOKES LTD., VIKING WORKS, LYON CLOSE, AYLESTONE LANE, WIGSTON, LEICESTER LE8 1BN Leicester (0533-) 881181 341341 Canstokes Lstr Nozzle guide vanes
- E531** CHELTON (ELECTROSTATICS) LTD., MARLOW, BUCKS. Marlow (0628-4) 2464. Suppliers of antenna systems and static discharges and antenna test equipment.
- E622** COURTAULDS LTD., *Carbon Fibres Unit*, P.O. BOX 16, COVENTRY CV6 5AE. Coventry (0203-) 88771. 31538 Courtaulds Cov. Manufacturers of *Grafil* high performance carbon fibres and derived products. Material supplied in three modulus ranges as continuous fibre, long staple and short staple fibre, preimpregnated unidirectional tape and sheet, moulding and extrusion products.
- E731** THE DECCA NAVIGATOR CO. LTD., DECCA HOUSE, ALBERT EMBANKMENT, LONDON SE1 7SW. 01-735 8111. 28588 Decca Ldn. Patentees and manufacturers of Decca Navigator system; ground transmitters for aerial navigation and survey; airborne radio navigation equipment for fixed wing and rotor aircraft. Non-directional beacons, ground and air ILS, Doppler equipment, fixed-wing airborne VHF Nav/Comm equipment.
- E731** DECCA RADAR LTD., DECCA HOUSE, ALBERT EMBANKMENT, LONDON, SE1 7SW. 01-735 8111. 28588 Decca Ldn. Manufacturers of all types of radar equipment for aviation, defence, marine and air traffic control applications.
- E525** DELANEY GALLAY LTD., EDGWARE ROAD, CRICKLEWOOD, LONDON NW2 6LD. 01-452 6491. 263499 Delanair London. (*Also: TRENT WORKS, DERBY STREET, BURTON-ON-TRENT, STAFFS.* Burton-on-Trent (0283-) 66661. 34400 Delanair Burton. Cabin air conditioning heat exchangers; fuel and air cooled oil coolers; fuel heaters; stainless steel and nickel alloy engine honeycomb seals; honeycomb structures; air, fuel and hydraulic ducting and pipe work systems; high temperature acoustic insulation; anti-vibration mounts and mounting systems; vacuum and salt bath brazing; heat exchangers overhauled and repaired. Cooling systems for electronic equipment.
- E525** DELANEY GALLAY LTD., MARKET SQUARE, BIGGLESWADE, BEDS. Biggleswade (076 73) 2094. 82419 Delanair Bwd. Thermal insulation blankets; tantalum—*Microbestos*—fire/flame breakout shields; hot creep formed titanium products; light gauge fabrications in titanium alloy/stainless steel and Inconel: fluid formed pressings; custom built tadpole seals; development of acoustic panelling.
- E444** DONCASTERS BLAENAVON LTD., FORGE SIDE, BLAENAVON, MONS. NP4 9XG. 049 535345. 497124. Forged, rolled, profiled and machined rings and other forgings in stainless steel, nickel-based alloys and titanium.
- E444** DONCASTERS MONK BRIDGE LTD., WHITEHALL ROAD, LEEDS LS1 1PE. Leeds (0532-) 32066. 557414. Precision forged turbine and compressor blades and other precision forgings in stainless steel, nickel-based alloys and titanium.
- E730** DOWTY GROUP LTD., ARLE COURT, CHELTENHAM, GLOS. Cheltenham (0242-) 21411. 43176 Dowty Cheltnm. Aircraft equipment.
- DOWTY ROTOL LTD., CHELTENHAM ROAD, GLOS. Gloucester (0452-) 21511. 43246 Dowtyrotol Glos. Aircraft equipment including propellers, variable-pitch fans, under-carriages, air turbines, gearboxes, winches, hovercraft fans, fuel proportioners and various hydraulic and electro-hydraulic units.
- DOWTY BOULTON PAUL LTD., WOLVERHAMPTON WV9 5EW. Fordhouses (0902 78) 3191. 338220 Dowty Wton. Designers and manufacturers of power operated flying controls and systems; industrial hydraulic pumps, motors and systems; specialised electronic test equipment.
- DOWTY ELECTRICS LTD., CHELTENHAM ROAD, GLOUCESTER GL2 9QH. Churchdown (0452-) 712424. 43246 Dowtyrotol Glos. Manufacturers of aircraft electrical equipment, including switches, solenoids and indicators.
- DOWTY FUEL SYSTEMS LTD., ARLE COURT, CHELTENHAM, GLOS. Cheltenham (0422-) 21411. 43176 Dowty Cheltnm. Design and manufacture of fuel systems and fuel control system and system components for turbo-jet and turbo-prop engines for aircraft.
- DOWTY SEALS LTD., ASHCHURCH, TEWKESBURY, GLOS. Tewkesbury (0684-2) 2271. 43163 Seals Ashchurch. Bonded seals for hydraulic pipe couplings and flange sealing; "O" and "U" and square section seals, all-metal seals and anti-extrusion rings; rotary shaft seals; *Strud* and *Seloc* leakproof bolts and lock washers; grommets, rubber mouldings and rubber to metal bonding, etc.

Hall Stand

- E620** DUNLOP LIMITED, DUNLOP HOUSE, RYDER STREET, ST. JAMES'S, LONDON, S.W.1. 01-930 6700. 21451 Dunlop London.
- AVIATION DIVISION,
HOLBROOK LANE, FOLESHILL, COVENTRY CV6 4AA.
Coventry (0203-) 88733. 31677 Dunlop Coventry.
- POLYMER ENGINEERING DIVISION,
EVINGTON VALLEY ROAD, LEICESTER LE5 5LY.
Leicester (0533-) 730281. 34397 Polyeng Lestr.
- PRECISION RUBBERS DIVISION,
ASHBY ROAD, SHEPshed, LOUGHBOROUGH, LEICS.
Shepshed (050 95) 2151. 34461 Pr Shepshed.
- E555** E.M.I. ELECTRONICS LTD., BLYTH ROAD, HAYES, MIDDLESEX. 01-573 3888. 22417 EMI Hayes.
- A28** EUROPLANE LTD., BROOKLANDS ROAD, WEYBRIDGE, SURREY. Weybridge (0932-) 45522.
- E623** F.P.T. INDUSTRIES LTD., THE AIRPORT, PORTSMOUTH PO3 5PE. Portsmouth (0705-) 62391. 86106 FPT Portsmouth.
- E640** FAIREY HYDRAULICS LTD., CRANFORD LANE, HESTON, HOUNSLOW, MIDDLESEX. 01-759 2666. 22230 Fairey Heston.
- E542** FERRANTI LTD.,
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031-332 2411. 72114 Ferranti Edin.
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- E510** FINE TUBES LTD., ESTOVER WORKS, CROWNHILL, PLYMOUTH PL6 7LG. Plymouth (0752-) 75851. 45252 Finetube Plymth.
- E642** FIRTH BROWN LTD., ATLAS WORKS, SHEFFIELD S4 7US. Sheffield (0742-) 20081. 54279 Firth Brown Shefd.
(Also: 11 HAMILTON PLACE, PICCADILLY (HYDE PARK CORNER), LONDON W1V 9FG.)
- E642** THE FIRTH-DERIHON STAMPINGS LTD., DARLEY DALE, NR. MATLOCK DE4 2JB. Darley Dale (062 983) 3621. 37137 Firth-Dron Mtlk.
- E554** FLIGHT REFUELLING LTD., WIMBORNE, DORSET EH21 2BJ. Wimborne (020 122) 2121. 41247 Refuelling Wim.
- Manufacturers of components for the aerospace industry.
- Aircraft landing wheels, tyres and brakes; anti-skid systems, hydraulic components, windscreen clearance, pneumatic systems, engine components, flexible pipes, de-icing systems including cockpit floor heating; electrical components and ground equipment.
- Metalastik* rubber-bonded-to-metal flexible bearings, flexible couplings, anti-vibration and shock mountings; convoluted and shaped hose, brake hose.
- "O" rings, cabin and door seals, sleeves, bushes, diaphragms, gaskets, rubber mouldings and extrusions in synthetic and silicon rubbers, rubber to metal bonded parts, inflatable seals, radio seals, silicon hose couplings, coated fabrics, fire seals; specialists in prototype work.
- Designers and manufacturers of radar, radio and electronic equipment, all types, for use in aircraft and guided weapons, army field use and naval operations. Airborne television equipment.
- Four nation consortium comprising British Aircraft Corporation (U.K.), Casa (Spain), Messerschmitt-Bolkow-Blohm (West Germany) and Saab-Scania (Sweden). QSTOL airliner project powered by two high bypass ratio engines and of 180-200 passenger capacity.
- Flexible crash-resistant fuel tanks; self-sealing coverings for flexible and rigid tanks; synthetic rubber moulded components; light-weight flame-proof coverings; *Hy-Clad* and *Hycadamp* rubber/metal bonded laminates; collapsible containers for air freight; helicopter pontoons and waterproof floors. Fuel/oil and oxygen couplings, helicopter flotation equipment installations and inflatable fabrications. Member firm of the Westland Group.
- Aircraft hydraulic powered flying control systems; hydraulic filters and servo-valves.
- Inertial navigation and attack systems; angle of attack systems; automatic chart displays; integrated display systems; multi-mode radars for strike and interception; gyroscopic weapon aiming systems; airspace inertial references; electronic components. Laser for ranging and marked target seeking.
- Air traffic control systems; aircraft instruments; inverters; helicopter and VTOL flight systems; guidance control and data processing systems for guided weapons; airborne digital computer systems; air training simulators; cathode ray tube display systems; integrated circuits.
- Overhaul, repair and maintenance of corporate, executive medium and heavy aircraft (major modifications and conversions, components and assemblies); Rolls-Royce *Dart* engines, Dowty Rotol and Hamilton Standard propellers; instruments and ancillaries; sale of aircraft, engines, propellers, etc; on-site technical support and general aircraft/airport consultants.
- Stainless steel, nickel alloy and titanium tubing for aircraft hydraulic lines, fuel lines, engine components and heat exchangers.
- Forgings in carbon, alloy, stainless and heat resisting steels; billets and black and bright bars; rolled rings; vacuum and electroslag remelted steels; vacuum induction melted alloys.
- Drop and press forgings in alloy, stainless heat resisting and creep-resisting steels, nickel based alloys and titanium alloys.
- Inflight refuelling; airborne towed target systems; drone aircraft; special purpose airborne winches. Fuel, air, hydraulic and water systems components including; shut-off, control, relief, vent and non-return valves; actuated and motorised cocks and ball valves; level sensors, couplings (flexible and rigid); also for missiles, test equipment and ground installations. Dry contact magnetic reed switches, solid-state relays, timers, proximity devices and keyboard components.

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- E600** GEC-MARCONI ELECTRONICS LTD., MARCONI HOUSE, CHELMSFORD, ESSEX.
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- MARCONI RADAR SYSTEMS LTD., CROMPTON WORKS, CHELMSFORD, ESSEX.
Chelmsford (0245-) 67111.
- MARCONI COMMUNICATIONS SYSTEMS LTD., MARCONI HOUSE, CHELMSFORD, ESSEX
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- MARCONI-ELLIOTT AVIONIC SYSTEMS LTD., AIRPORT WORKS, ROCHESTER, KENT.
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Gloucester (0452-) 67411. 43134 Glosaro Gloucester.
- E601** GRASEBY INSTRUMENTS LTD., KINGSTON BYPASS ROAD, SURBITON, SURREY.
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262795 Graseby Surbiton.
- A7** HAWKER SIDDELEY GROUP LTD., 18 ST. JAMES'S SQUARE, LONDON SW1Y 4LJ.
01-930 6177. 919011 Hawsidly Ldn.
- HAWKER SIDDELEY AVIATION LTD., RICHMOND ROAD, KINGSTON-UPON-THAMES, SURREY KT2 5QS.
01-546 7741. 23726 HSA Kingston.
- The principal operating company of GEC-Marconi Electronics Ltd., is The Marconi Company Ltd., uniting the following companies:
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- Complete h.f. point-to-point, microwave and tropospheric scatter communications systems; complete space communications earth stations; message switching systems and digital and data transmission systems; mobile communications systems; complete sound and vision broadcasting systems; specialised components.
- Airborne navigation and communication systems; electro-optical systems; special-purpose radars; intruder detection systems; neutron and X-ray devices; aircraft tracking systems; flight control, engine control, fuel management and flight instrumentation automatic test equipment.
- Research, development and production of advanced electronic equipment. Satellite communication. Spacecraft, satellite electronics and launch vehicle systems. Simulators and trainers. Military communications. Weapons guidance systems. Fighting vehicle equipment. Microwave and Electronic Counter Measure (ECM) systems. Underwater weapons.
- Advanced project and system studies and management for defence, space and industry.
- A wide range of electronic measuring instrumentation from d.c. to microwave frequencies. Signal generators, response analysers, counters, volt-meters, power meters, bridges and oscilloscopes. Programmable automatic test systems. TV image intensifiers.
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- Accelerometers; centrifuges; gauges; gears; gyro test tables; gyroscopes and gyroscopic apparatus; pressure transducers and stroboscopes.
- With more than 80,000 employees, the Group is one of the largest industrial organisations in the world, with a turnover of more than £450 million per year. Capital employed is nearly £200 million. Products of the Group companies include a wide range of civil and military aircraft, missiles, aerospace equipment, diesel engines, light and heavy electrical equipment, light and heavy engineering products and equipment and metals. Hawker Siddeley has major manufacturing companies in Canada, Australia, India and Southern Africa.
- Hawker Siddeley Aviation, with nearly 30,000 employees, is responsible for design, development, production and supply of a wide range of civil and military aircraft. Current civil aviation products include the *Trident*, the world's first passenger aircraft designed for automatic landing; the *HS-125* twin-jet business aircraft; and the *HS-748* turbo-prop feeder liner. H.S.A. are in collaboration with S.N.I.A.S., Fokker VFW and Deutsche Airbus in the production of the European *A300B Airbus*. Military aircraft currently in production include the *Nimrod* maritime reconnaissance aircraft; the *Dominie* navigational trainer; the *Harrier*, V/STOL strike fighter; and the *Buccaneer* low-level strike and reconnaissance aircraft. H.S.A. has been selected to produce the new R.A.F. jet trainer, the *P1182*. In addition, the company is actively engaged in supplying spares and maintaining such operational aircraft as the *Comet*, *Argosy*, *Shackleton*, *Andover*, *Hunter*, *Gnat*, etc. They are Sister Design Authority for the *Phantoms* ordered in the U.K.

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A7 (cont'd.)

HAWKER SIDDELEY DYNAMICS LTD., MANOR ROAD,
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06-22128.

E615 HEPWORTH & GRANDAGE LTD., ST. JOHN'S
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Bradford (0274-) 29595. 51466 Pistons Bradfd.

E530 HIGH DUTY ALLOYS LTD.,
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Slough (0753-) 23901. 84134 Alloys Slough.

E523 HIGH TEMPERATURE ENGINEERS LTD., LOWER
QUAY ROAD, FAREHAM, HANTS.
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E541 THE HUGHES-JOHNSON STAMPINGS LTD., OLD-
BURY, WARLEY, WORCS.
021-552 1361. 336581 Engfor Warley.

Hawker Siddeley Dynamics, a company of 8,000 employees, was formed in 1963 as a result of the amalgamation of the guided weapons and electronic interests of Hawker Siddeley Group. From its guided weapons activities, the company has developed infrared *Linescan* and fuze systems. It has been responsible for the design and development of the first satellite in the European Space Research Organisation programme, and is prime contractor for *Blue Streak* first stage of the European Launcher Development Organisation's launcher, *Europa I*. It is also designed and manufactured with others, *ESRO TD*, *Intelsat III* and *ESRO IV* satellites. The Company also manufacture aircraft propellers, a range of aircraft air conditioned systems including that for the SST *Concorde* and a variety of industrial products.

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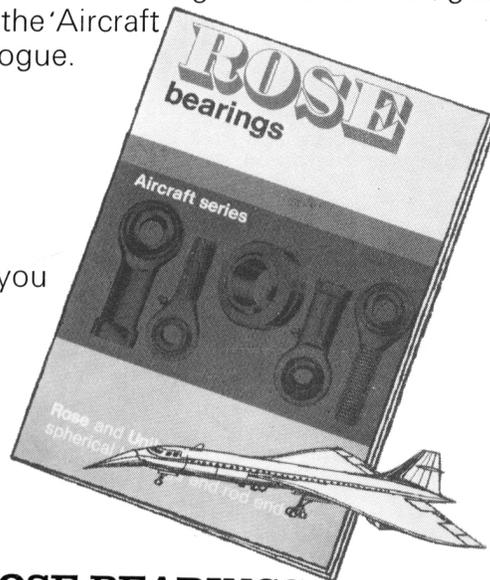
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- E522** INTERNATIONAL AERADIO LTD., AERADIO HOUSE, HAYES ROAD, SOUTHALL, MIDDLESEX.
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KT2 5PS.
01-546 1234. 27527 Pinchin Kingst.
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Hemel Hempstead (0442-) 2233. 82110 Rodynalite Heml.
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- Actuation Group*
FORDHOUSES, WOLVERHAMPTON
0902-78-2381. 338217 Lucasaero Wpton.

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E511 (cont'd.)

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021-744 8522. 336749 Lucasaero Shrlly.
Also: Industrial Group,
MAYLANDS AVENUE, HEMEL HEMPSTEAD, HERTS.
Hemel Hempstead (0442-) 2233 82110 Rodynalite
Heml.

And: Product Support Group,
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E648 THE M.E.L. EQUIPMENT CO. LTD., MANOR ROYAL,
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Crawley (0293-) 28787, 87267 MEL Crawley.

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E543 M.L. AVIATION CO. LTD., WHITE WALTHAM AERO-
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E532 MAGNESIUM ELEKTRON LTD., NORFOLK HOUSE,
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Yeovil (0935-) 5181. 46132 Normalair Yeovil.

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Leicester (0533-) 881192.

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A22 PANAIA AIRCRAFT GmbH, D 8 MUNICH 86,
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08 11-9 21 71.

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E534 PATEREX LTD., CRAY AVENUE, ST. MARY CRAY,
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E451 THE PLESSEY COMPANY LTD., ILFORD, ESSEX.
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Plessey Aerospace Dynamics Division,
EASTERN AVENUE W, ROMFORD, ESSEX RM7 7NL.
01-478 3040. 262484 Plessey Romford.

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Weybridge (0932-) 47282. 262329 Plessey Weybdge.

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E552 REYNOLDS TUBE CO. LTD., HAY HALL WORKS,
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Sheffield (0742-) 40371. 59707 Stampings Sheffield.

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E144 L. A. RUMBOLD LTD., OLD OAK COMMON LANE,
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01-629 6201. 263371 Rollhead London.
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P.O. BOX 31, DERBY DE2 8BJ.
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Bristol Engine Division,
P.O. BOX 3, FULTON, BRISTOL BS99 7QE.
Bristol (0272-) 693871. 44185 Brisidair Bristol.

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Small Engine Division,
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Garston (092 73) 74000. 23296 Rollsad Watford.

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(Also: *Industrial & Marine Division,*
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Walsgrave-on-Sowe (020 332) 3211. 31637 Roycov
Coventry).

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E535 ROLLS-ROYCE MOTORS LTD., PYMS LANE, CREWE,
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E644 ROSEMOUNT ENGINEERING COMPANY LTD.,
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E441 SERCK HEAT TRANSFER,
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A24 SHORT BROTHERS & HARLAND LTD.,
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Belfast (0232-) 58444. 74688 Shorts Belfast.

Development and production of *Skyvan* and *Skyliner* STOL aircraft. Production of wings for *Fokker F28 Fellowship*. Service support for *Belfast* and *Skyvan*. Production of *RB-211* engine pods and airframe components for *L-1011 TriStar*. Design and manufacture of engine *M45* pods for *VFW 614*. Modification of target drones and launching aircraft. Design and manufacture of aircraft components and light engineering products. Flying and maintenance services for Ministry of Defence (Procurement Executive), Department of Trade and Industry, and Overseas Governments. Operation of target aircraft services in U.K. and Overseas.

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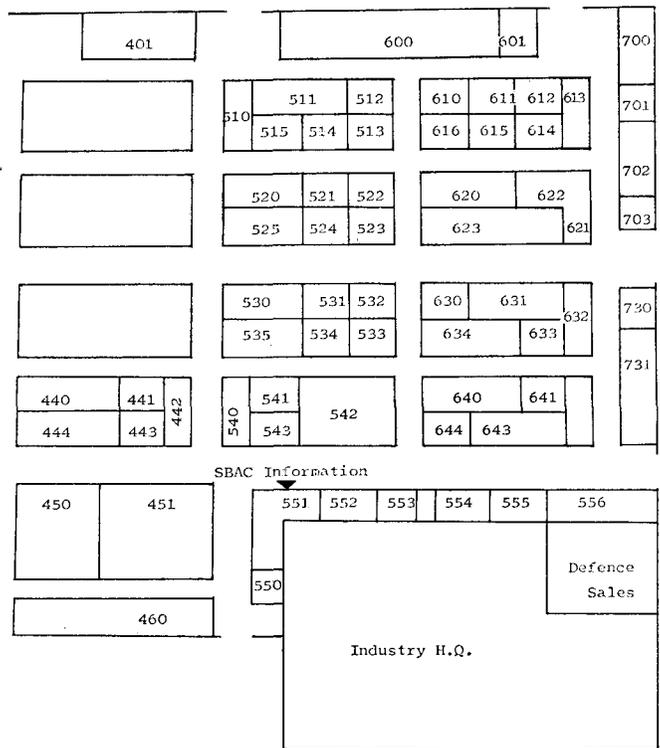
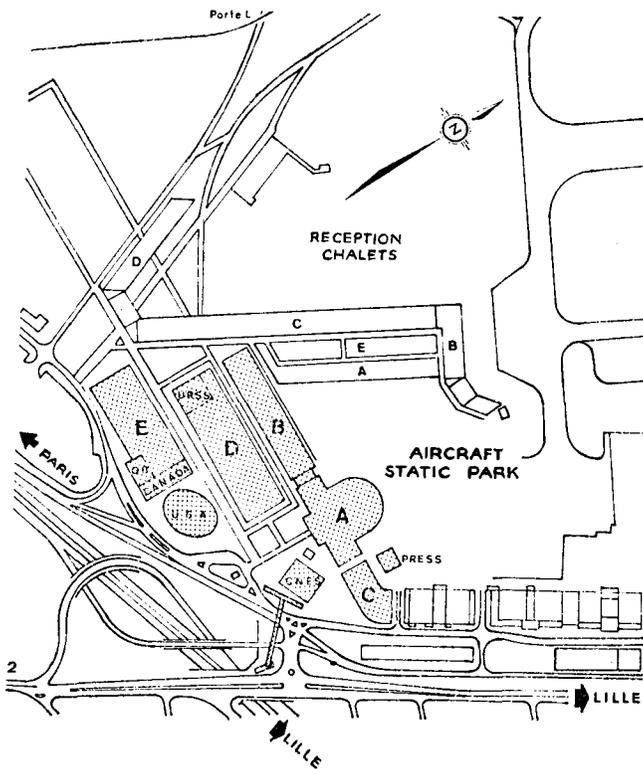
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Left: The layout of the exhibition area at Le Bourget. The British Joint Venture exhibit is in Hall E.

Right: Stand numbers of companies exhibiting in the British Joint Venture exhibit in Hall E.

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Cover picture:

One of the most important events in the aviation calendar has always been the Paris Salon. The cover shows the scene at Le Bourget in 1971 when 17 countries were represented by 661 exhibitors. This year will see over a hundred British companies at the Air Show, the largest participation to date by this country at any overseas exhibition.

BRITISH EXHIBITORS AT THE PARIS AIR SHOW

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The peace keepers of the seventies

Three of the world's most advanced military aircraft, designed and built by Hawker Siddeley, are now in service with the Royal Air Force.

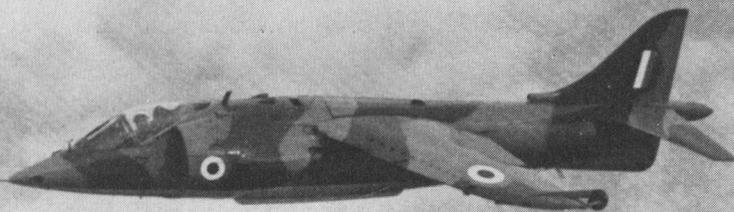
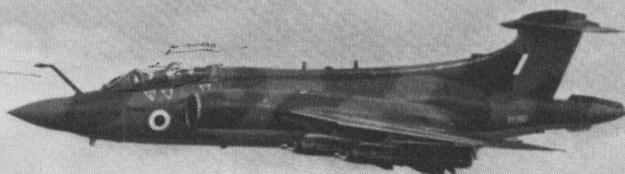
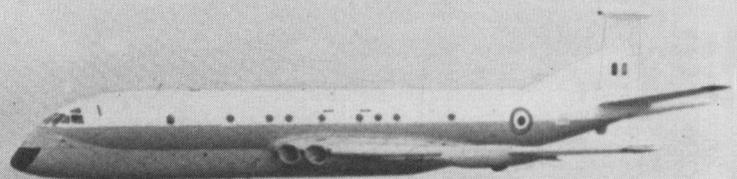
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