

This brochure was prepared and printed before the announcement, on 8 May 1989, of the agreement to sell ISC Technologies Inc.

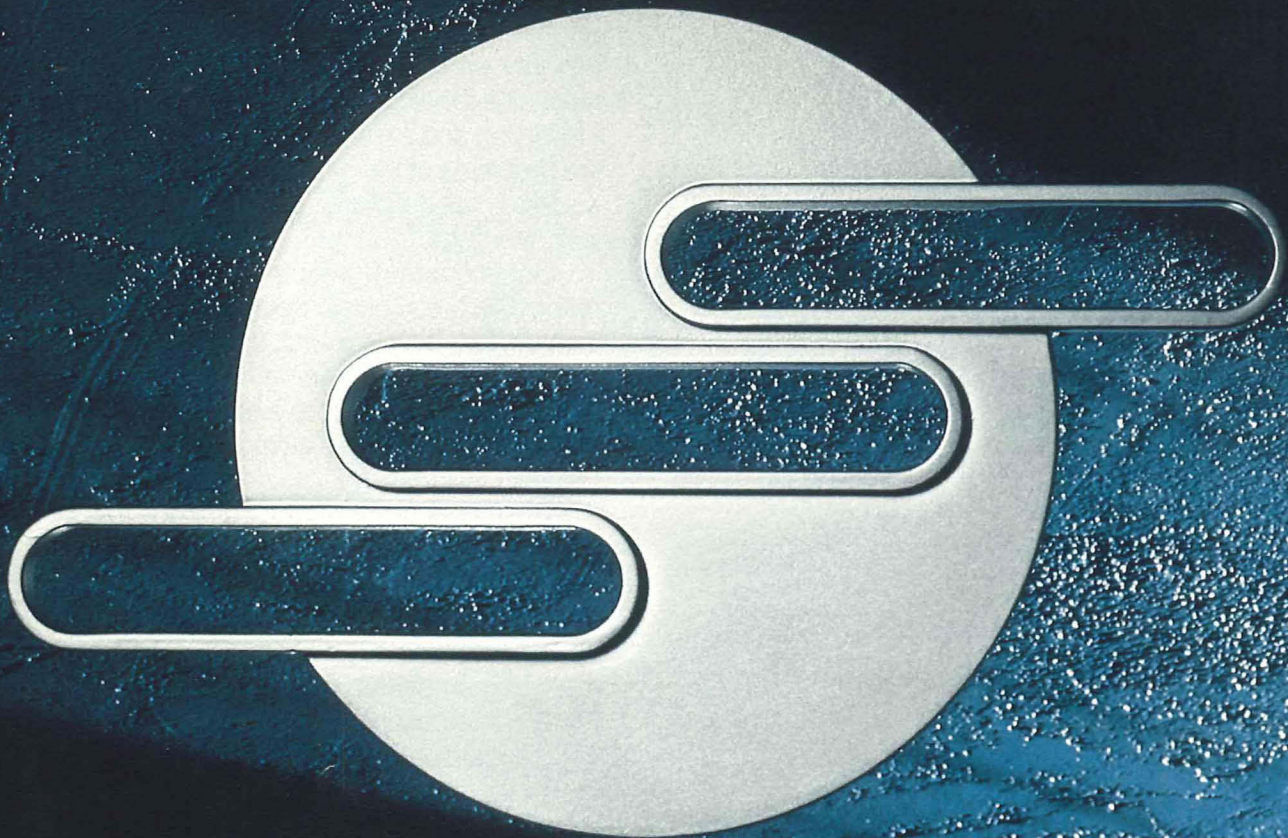
As an interim measure, pending a completely new edition due later in the year, the contents should be read in conjunction with the revised Page 5 which has been inserted.

There will be some further changes to individual company names but the brochure may be used with confidence as a guide to the extensive product range and technology of Ferranti International.

 **FERRANTI  
INTERNATIONAL**

*Ferranti International Signal*

Ferranti International – in outline





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## Ferranti International Signal plc

Created by the merger of Ferranti plc and International Signal & Control Group PLC the company is a major international technology systems contractor supplying world defence, space and civil markets. Annual sales in excess of \$1.5 billion are achieved by more than 24,000 employees, a high proportion with professional and scientific qualifications, working in plants and facilities around the world.

Ferranti has its origins in the business formed in 1882 by Sebastian Ziani de Ferranti FRS, who designed and built the world's first high voltage, alternating current power station at Deptford in England. International Signal & Control was founded in 1971 by James H. Guerin as a manufacturer of digitally synthesised radios in Lancaster, Pennsylvania. Both companies, one with a century of experience mirroring the development of the electrical industry from steam power generation to microelectronics, the other with a remarkable success story of growth from more recent small beginnings to become a prominent turnkey systems provider with a worldwide reputation, achieved and maintained their pre-eminence by successfully identifying and exploiting new technologies to solve the problems of the day. Engineering excellence and international marketing competence are their joint strengths.

Eight company groupings operate in their respective areas of technology, responsible for their own design, development, project management and manufacture, reporting direct, or in one case through a proxy board, to a main board headed by Sir Derek Alun-Jones, Chairman and James Guerin, Deputy Chairman.

The recent history of the company has been a record of sustained growth, profitability, investment and new technology development based on the application of computers, microelectronics, electro-optics, precision engineering and project management skills in many disciplines. The name of Ferranti International Signal represents achievement in defence, space and civil markets.

The company believes that advanced technology must earn its keep and is of lasting value only if it is successfully applied and profitably sold. Technology should create new wealth, new businesses, new investment and new jobs. This brochure is a brief guide to Ferranti International Signal, its companies, products and locations. It is intended to help enquirers to find out more about how this belief is put into practice – selling technology.



### Head Office

Head Office of Ferranti International Signal is at Bridge House, Gatley in a southern suburb of Manchester, near the international airport.

**Ferranti International Signal plc, Head Office,**  
Bridge House, Park Road, Gatley,  
Cheadle, Cheshire SK8 4HZ, England  
Telephone: 061-428 3644 Telex: 666326  
Fax: 061-428 7233



### London Office

The tenth floor of Millbank Tower houses the London Office. The Chairman and Managing Director operates from here.

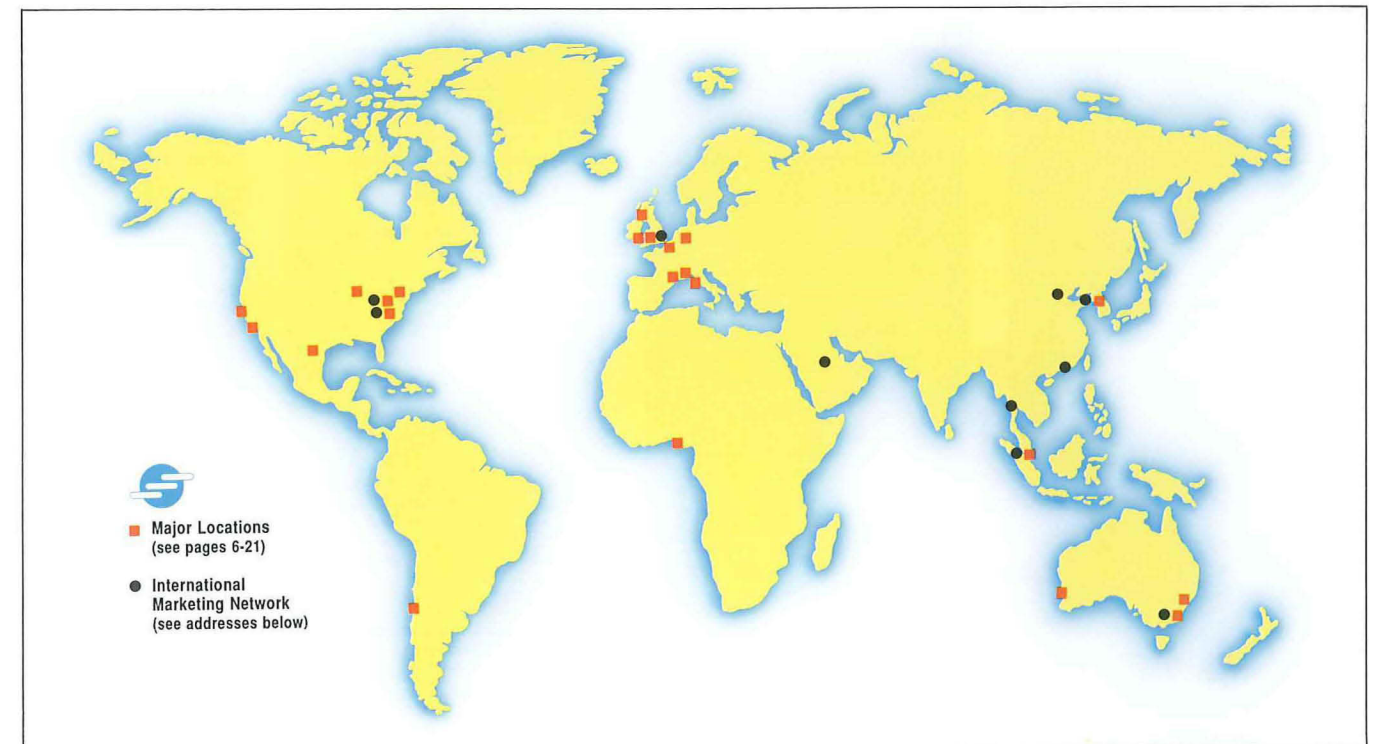
**Ferranti International Signal plc, London Office,**  
Millbank Tower, Millbank,  
London, SW1P 4QS, England  
Telephone: 01-834 6611 Telex: 264055  
Fax: 01-834 1137



### Lancaster Office

Lancaster, Pennsylvania, headquarters in the United States for the ISC companies. The Deputy Chairman operates from here.

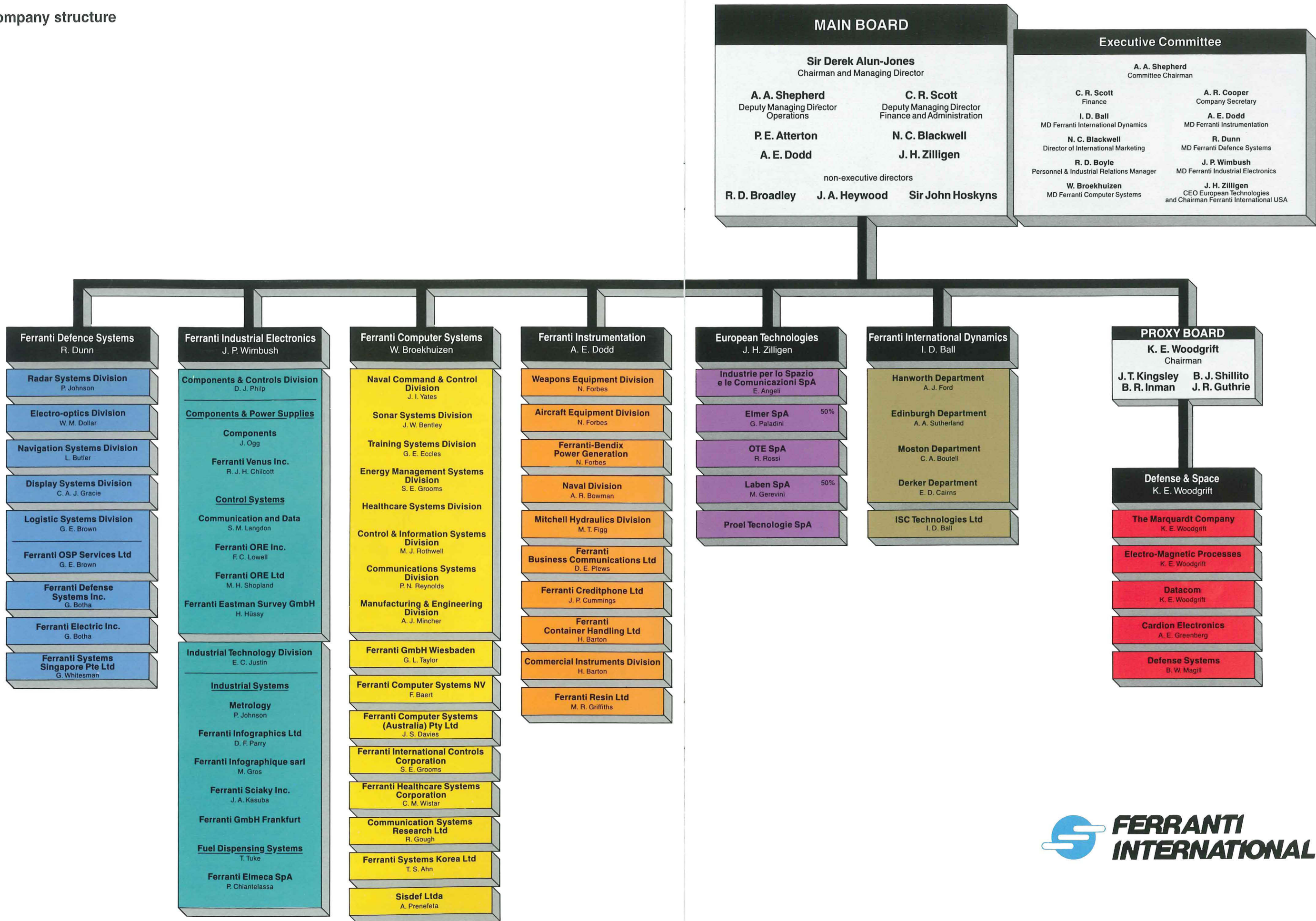
**Ferranti International Signal Inc, Lancaster Office,**  
3750 Electronics Way, P.O. Box 3040,  
Lancaster, PA 17604-3040, USA  
Telephone: (717) 285 3113  
Telex: 150196 ISCENTL UT  
Fax: (717) 285 4226



- **Canada**  
4 Crystal Park,  
2345 Crystal Drive,  
Suite 913,  
Arlington, VA 22202, USA  
Telephone: 703-418-0770  
Fax: 703-418-2273
- **U.S.**  
4 Crystal Park,  
2345 Crystal Drive,  
Suite 913,  
Arlington, VA 22202, USA  
Telephone: 703-418-0770  
Fax: 703-418-2273
- **South America**  
3700 Electronics Way, P.O. Box 3040,  
Lancaster, PA 17604-3040, USA  
Telephone: 717-285-7911  
Telex: 150197 and 150196  
Fax: 717-285-4226
- **Far East**  
Suite 705, Houston Center,  
63 Mody Road, Tsimshatsui East,  
Kowloon, Hong Kong  
Telephone: 852-36-92698  
Telex: 31592 ISC HX  
Fax: 852-37219052
- **Beijing**  
Beijing Hotel, Room 4051, Beijing,  
People's Republic of China  
Telephone: 86-1-558331  
Telex: 210018 ISCPK CN  
Fax: 86-1-5137860
- **Europe, Middle East, Africa**  
Signal House, Hanworth,  
Middlesex TW13 6LL, England  
Telephone: 01-894 5533  
Telex: 929498  
Fax: 01-898 9866
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Signal House, Hanworth,  
Middlesex TW13 6LL, England  
Telephone: 01-894 5533  
Telex: 929498  
Fax: 01-755 0131
- **Middle East**  
P.O. Box 3416, Al Musa Building Olaya,  
Riyadh, Saudi Arabia  
Telephone: 966-1-4030339/4024516  
Telex: 401325 NESCO  
Fax: 966-1-4033020
- **Africa**  
Signal House, Hanworth,  
Middlesex TW13 6LL, England  
Telephone: 01-894 5533  
Telex: 929498 Fax: 01-755 0131
- **Asia Pacific**  
One Scotts Road, #16-02-03,  
Shaw Centre,  
Singapore 0922,  
Republic of Singapore  
Telephone: 65-733-8177  
Telex: 37580 ISCTAP Fax: 65-737-5242
- **North East Asia Pacific**  
2nd Floor Hyung Jin Building,  
607-16 Yoksan-Dong, Kangnam-Ku,  
Seoul, 135-80, Korea  
Telephone: (82-2) 562-2053/4/5/6  
Telex: K33326 FISNEAP  
Fax: (82-2) 555-0130
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Shaw Centre,  
Singapore 0922,  
Republic of Singapore  
Telephone: 65-733-7133  
Telex: 37580 ISCTAP  
Fax: 65-737-5242
- **Western Asia Pacific**  
219/21 Sukhumvit 21, Soi Asoke,  
7th Floor, Asoke Towers,  
Bangkok 10110, Thailand  
Telephone: 259 1170/1
- **Australasia**  
99 Northbourne Avenue,  
G.P.O. Box 582,  
Canberra, A.C.T. 2601,  
Australia  
Telephone: (062) 57 1022  
Fax: (062) 48 0097

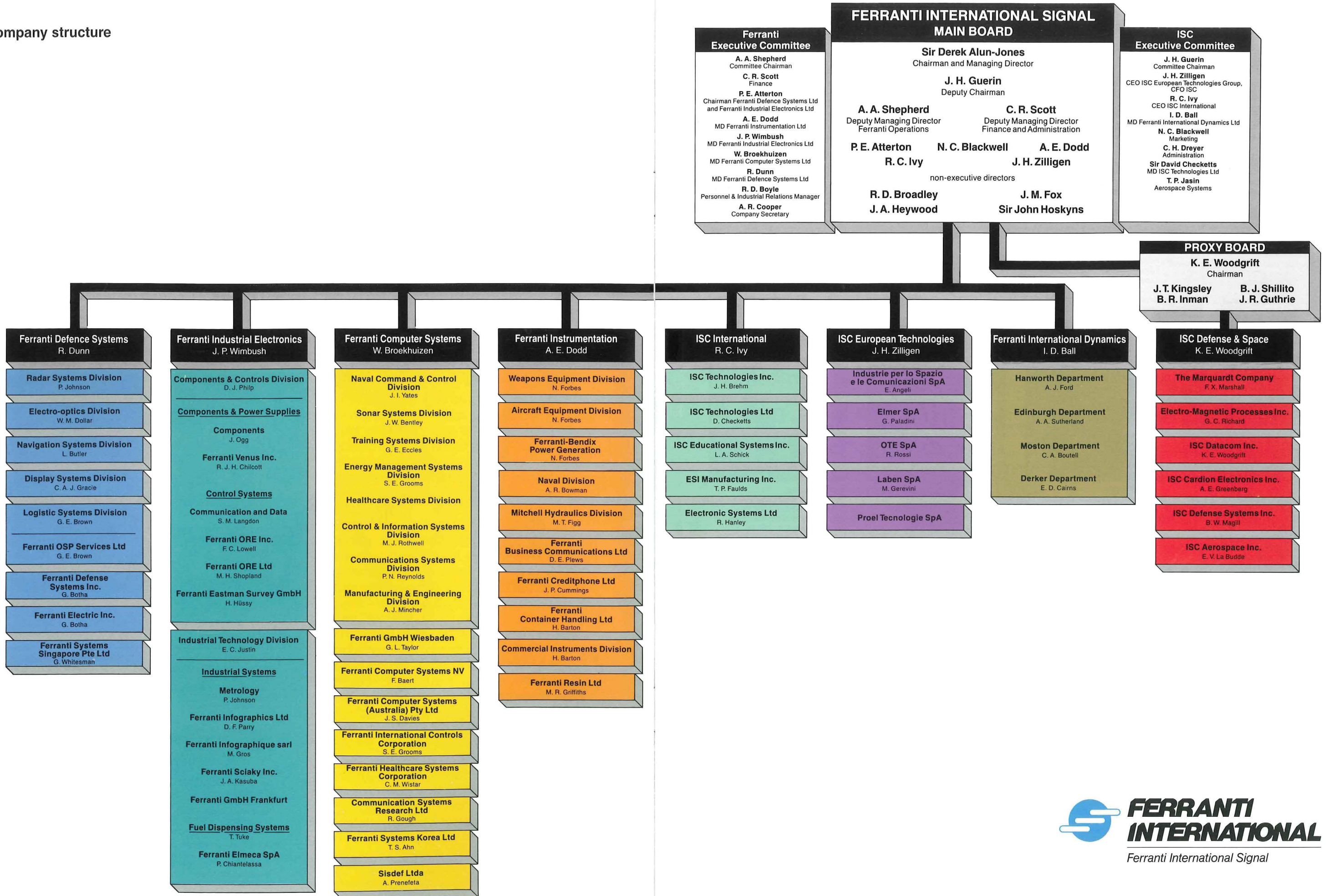


Company structure



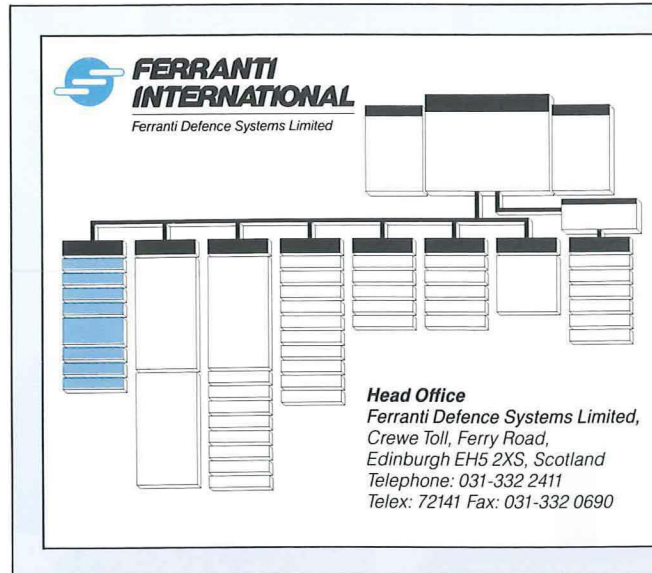


Company structure





## Ferranti Defence Systems Limited



Ferranti Defence Systems Limited produces a wide range of inertial navigation systems, displays, radars and electro-optical systems for the armed services. The products are supported by one of Europe's biggest product support operations.

In the USA the company operates through a subsidiary, Ferranti Defense Systems Inc. Another subsidiary, Ferranti Electric Inc., provides support services in the USA for several Ferranti International UK operating companies.

### WORLDWIDE



#### Ronkonkoma, New York

The Ferranti Defense Systems Inc administrative offices and Display Systems Division are based here.



#### Edinburgh, Crewe Toll, Ferry Road

The laboratory block houses the R & D groups of Radar Division. The main factory provides extensive production facilities for military electronic systems together with the general management and administration for Ferranti Defence Systems Limited.



#### Edinburgh, Robertson Avenue

This factory houses production and test facilities of the Electro-optics Division. It is also the location of a fully equipped calibration and test centre.



#### Bellshill

Navigation Systems Division manufactures automatic test equipment in this factory near Glasgow.



#### Huntington Beach, California

Ferranti Electro-optics Inc provides marketing and engineering support services for military electro-optical products in the USA.



#### Edinburgh, Silverknowes

This location has laboratories and extensive clean room production and test facilities for Navigation Systems Division. The site also has a comprehensive environmental test laboratory.



#### Edinburgh, South Gyle

Logistic Systems Division provides the full range of after-sales services for products produced by Ferranti International and other major international companies. South Gyle is also the location for Ferranti O.S.P. Services Ltd.



#### Edinburgh, South Gyle

This building houses the Display Systems Division which produces a wide range of aircraft displays, video recording systems and mission planning systems.



#### Commack, New York

Ferranti Electric Inc provides US support services to Ferranti International companies based in the UK.

#### 1010 Radar systems

Advanced multi-mode fire control radar for fighter aircraft  
 Maritime surveillance radar for military or exclusive economic zone protection  
 Radar systems for specialised applications

*Ferranti Defence Systems Limited, Radar Systems Division, Ferry Road, Edinburgh EH5 2XS, Scotland*  
 Telephone: 031-332 2411 Telex: 72141 Fax: 031-332 0690



A Blue Parrot radar for the Buccaneer aircraft undergoing inspection prior to modification to update the radar for the Royal Air Force.

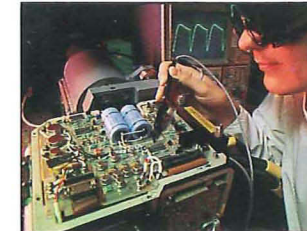
#### 1020 Electro-optics

Battlefield surveillance systems  
 EO for air, ground and naval use  
 CO<sub>2</sub> rangefinders  
 CO<sub>2</sub> transmitters  
 Laser beacons  
 Laser designators (markers)  
 Laser rangefinders  
 Marked target seekers  
 Neodymium Yag transmitters and transceivers

EO sightline stabilization and steering systems  
 EO targeting pods  
 Gunners training aids  
 Multiple EO sensor systems  
 EO GW receiver systems  
 EO warners  
 Special laser communicators  
 Pointing and displays  
 Helmet mounted systems  
 Night vision goggles  
 Recorders - remote photo recording  
 Scan converters - analogue and digital  
 Universal Electronic Head Down Display (UNIHEDD)

Test equipment calibration service  
 Weapon aiming systems  
 Aircraft equipments (ISIS)  
 Anti-aircraft gun sights (GSA)  
 Gyroscopic Gun Sight, airborne (GGS)

*Ferranti Defence Systems Limited, Electro-optics Division, St. Andrew's Works, Robertson Avenue, Edinburgh EH11 1PX, Scotland.*  
 Telephone: 031-337 2442  
 Telex: 72529 Fax: 031-337 8329



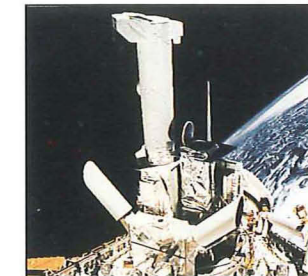
Development testing for the Type 118 laser designator/ranger now in production for helicopter mast-mounted sights for the USA.

#### 1030 Navigation systems

Airborne computing systems  
 Armament control systems  
 Data bus controller  
 Mission computing  
 Attitude reference systems for marine airborne and space applications  
 Automatic system test equipment  
 Avionic systems integration  
 Borehole directional survey equipment (FINDS)  
 Digital inertial navigation  
 Land navigation and attitude reference system  
 Land survey system (FILS)  
 Navigation and nav-attack systems for aircraft  
 Position and Azimuth Determining System (PADS)  
 Ship inertial navigation system  
 2-gimbal inertial navigation system  
 Gyroscopes  
 Floated gyros type 121,122,125,126  
 Laser gyros  
 Oscillogyro type 142  
 High Accuracy Submersible Inertial Navigation System (HASINS)  
 Rotary mirror scanners  
 Space

Inertial guidance control  
 Satellite attitude sensors  
 Terrain Reference Navigation Systems (TERCOM)

*Ferranti Defence Systems Limited, Navigation Systems Division, Silverknowes, Edinburgh EH4 4AD, Scotland.*  
 Telephone: 031-332 2411  
 Telex: 727101 Fax: 031-343 5050



The gyro package for the precision instrument pointing system on the successful Spacelab 2 mission. Spacelab 2 is shown being deployed from the shuttle equipment bay.

#### 1040 Display systems

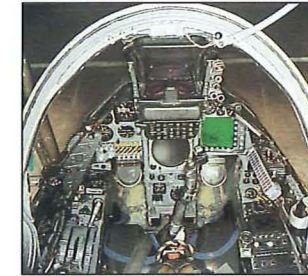
Computer symbol generation  
 Cursive in raster playback generator  
 Cursive symbol generator  
 Raster symbol generator (colour and monochrome)  
 Real time perspective image generator

Covert mission system  
 Displays - military and commercial  
 Head down colour, monochrome  
 Head up  
 Maps  
 Multifunction  
 Perspective  
 Vehicle

Map film production  
 Map rectification machine  
 Optical film measuring equipment  
 Map generation - airborne and ground  
 COMED (Combined Map and Electronic Display)  
 Digital (vector data)  
 Digitised (paper chart data)  
 Optical disc rugged data storage  
 Perspective

Projected (film medium)  
 Mission planning  
 Advanced  
 Conventional  
 Data transfer  
 Video recording  
 Cameras colour, monochrome  
 Ground replay  
 Multiplexors  
 Recorders  
 Scan converters  
 Weapon aiming/Mission computer  
 HUDWAC  
 1553 Bus controller and interface management

*Ferranti Defence Systems Limited, Display Systems Division, 1 South Gyle Crescent, Edinburgh EH12 9HQ, Scotland*  
 Telephone: 031-316 4545  
 Telex: 727101  
 Fax: 031-314 8237



RAE Nightbird Harrier fitted with Head Up Display, Video Camera, Head Down Display Video Recorder and HUD Electronics Unit.

#### 1050 Logistic systems

Licensed manufacture and support  
 Post design services  
 Product development  
 Publications  
 Repair and spares manufacture  
 Technical advice and assistance  
 Technical training and field representation  
 Turnkey repair and maintenance facilities

*Ferranti Defence Systems Limited, Logistic Systems Division, 6 South Gyle Crescent, Edinburgh EH12 9EA, Scotland*  
 Telephone: 031-337 2442  
 Telex: 727896 Fax: 031-334 8836

#### 1051 Procurement factoring

Procurement factoring  
*Ferranti O.S.P. Services Ltd., 6 South Gyle Crescent, Edinburgh EH12 9EA, Scotland*  
 Telephone: 031-337 2442  
 Telex: 727896 Fax: 031-334 8836

### WORLDWIDE

**Ferranti Defense Systems Inc,**  
 Display Systems Division  
 2210 Smithtown Avenue,  
 Ronkonkoma,  
 New York 11779-7329, USA  
 Telephone: (516) 467-6663  
 Telex: 4972405  
 Fax: (516) 467-6810

Electro-optics Division  
 P.O. Box 5000  
 Binghamton, New York 13902, USA  
 Telephone: (607) 770-2270  
 Fax: (607) 770-3301

Washington Office  
 2300 M Street NW, Suite 800,  
 Washington, DC 20037, USA  
 Telephone: (202) 293 3201  
 Telex: 3725517  
 Fax: (202) 293-0384

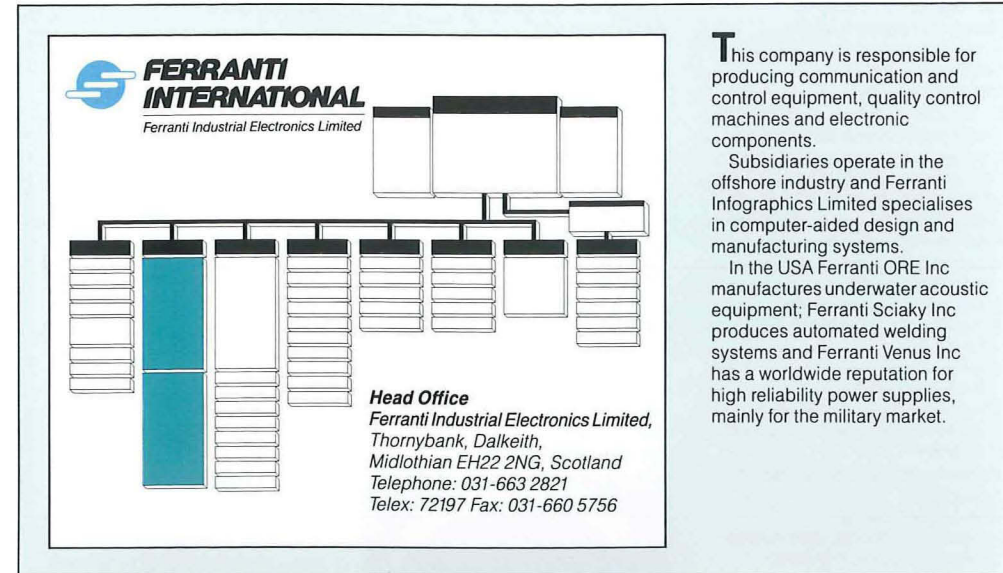
**Ferranti Electro-optics Inc,**  
 16812 Gothard Street,  
 Huntington Beach, CA 92647, USA  
 Telephone: (714) 841 6812  
 Telex: 655477 TWX: 910 596-2625  
 Fax: (714) 841 2088

**Ferranti Electric, Inc.**  
 2210 Smithtown Avenue,  
 Ronkonkoma,  
 New York 11779-7329, USA  
 Telephone: (516) 543-0200  
 Telex: 6852104  
 Fax: (516) 543-0118

**Ferranti Systems Singapore Pte Limited,**  
 1 Scotts Road # 16-02/04,  
 Shaw Centre, Singapore 0922  
 Telephone: 65-732-8044  
 Telex: 42969 Fax: 65-737-8955



## Ferranti Industrial Electronics Limited



This company is responsible for producing communication and control equipment, quality control machines and electronic components.

Subsidiaries operate in the offshore industry and Ferranti Infographics Limited specialises in computer-aided design and manufacturing systems.

In the USA Ferranti ORE Inc manufactures underwater acoustic equipment; Ferranti Sciaky Inc produces automated welding systems and Ferranti Venus Inc has a worldwide reputation for high reliability power supplies, mainly for the military market.



### Dalkeith

The new extension to the Dalkeith factory, head office of Ferranti Industrial Electronics Limited and the home of its five product groups.



### Livingston

This is the headquarters of Ferranti Infographics Limited, Europe's leading manufacturer and supplier of CAD/CAM systems.



### Dundee

The Dundee factory produces microwave components and sub-systems, power tubes, wound magnetic components and power supplies, connectors and connection systems, CO<sub>2</sub> lasers – industrial, military and scientific.



### Great Yarmouth

This factory in Great Yarmouth is the UK location for Ferranti ORE, which specialises in acoustic systems for use offshore.

## WORLDWIDE



### Farmingdale, Long Island, New York

Ferranti Venus Inc, with production plants in Farmingdale, Long Island, New York is a major world manufacturer of custom-designed military power supply systems.



### Chicago, Illinois

From this location Ferranti Sciaky Inc designs and manufactures a range of high-technology welding systems and equipment for customers all over the world.

### 2011 Communication systems

Analogue and digital microwave radio relay systems in the 1.5GHz – 23GHz bands for telephony, television, broadband data and radar remoting  
Telecommunication systems (radio, multiplex, network management, antenna systems etc.) for PTT authorities, public utilities and private users.  
Turnkey communications contracting, system planning and project management

### 2012 Data systems

Digital data communication and control systems  
Distributed process-control input/output equipment  
SCADA systems for power transmission and distribution  
Telecontrol systems for oil and gas production and pipeline control  
Telemetry systems for the water supply industry  
Traffic signal control and monitoring systems

### 2013 Metrology systems

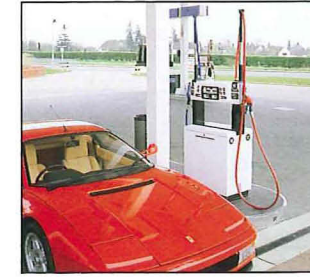
Co-ordinate measuring machines (manual, power assist and direct computer controlled)

### 2014 Industrial components

Blowers – miniature AC cross flow  
Encoders – optical absolute  
Encoders – optical incremental  
Motors – external rotor AC  
Motors – precision AC shaft  
Potentiometers – precision conductive plastic  
Potentiometers – precision wirewound

### 2015 Fuel dispensing (Autocourt)

Pump – blender, mono, duo, twin, quad and multi-product dispensers  
Pump – hydraulics  
Pump – installation and maintenance  
Forecourt management systems  
Ferranti Industrial Electronics Limited,  
Thornybank, Dalkeith,  
Midlothian EH22 2NG, Scotland  
Telephone: 031-663 2821 Telex: 72197  
Fax: 031-660 5756



Ferranti Autocourt electronically advanced fuel dispensing systems.

### 2016 Connectors and connection systems

Cable harness  
Edge-connectors for printed circuit board  
Press fit connection system  
Two part connectors

### 2017 Wound components

Core types  
Ferrite  
C/E core  
Laminated  
Toroidal  
Construction  
Varnished

Resin cast  
High temperature  
Potted assemblies  
High voltage transformer rectifier units  
Power supplies – high voltage CRT

### 2018 Microwave components

Circulators  
Diodes, cold cathode  
Duplexers  
Filters  
Isolators  
Limiters  
Loads  
Microstrip  
Phaseshifters  
Shutters  
Sub-systems  
Switches (semiconductor)  
TR cells and TR limiters

### 2019 Power tubes

Klystrons  
Power supplies  
Travelling wave-tube amplifiers

### 2020 Lasers

CO<sub>2</sub> sealed waveguide lasers  
1-50 watts  
CO<sub>2</sub> flowing gas lasers 400-10,000 watts for industrial, military and scientific applications

Ferranti Industrial Electronics Limited,  
Dunsinane Avenue, Dundee DD2 3PN,  
Scotland  
Telephone: 0382-89311 Telex: 76166  
Fax: 0382-89555

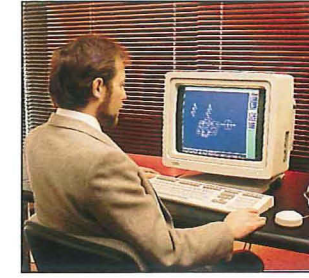
### 2021 Ferranti Infographics

CAM-X Computer-Aided Design and Manufacturing systems including:

- InfoCAD – 2D design and draughting
- InfoSCHEM – Schematic drawing and data capture
- InfoSOLID – 3D solid modelling
- InfoMESH – Finite element meshing
- InfoSURF – Sculptured surface design
- InfoCAM – Numerical control module
- InfoBASE – Database system
- ERMS – Engineering records management system
- GLUE – Graphics libraries for user extensions
- IGES – Initial graphic exchange specification
- Interleaf – DTP system

Pro/ENGINEER – 3D Parametric solid modelling  
Interface programs to a range of proprietary applications software  
DRIVE – In-house photoplotting system

Ferranti Infographics Limited,  
Bell Square, Brucefield, Livingston,  
West Lothian EH54 9BY, Scotland  
Telephone: 0506 411583 Telex: 727898  
Fax: 0506-412336



Pro-Engineer software is an interactive, parametric solid modelling package.

### 2022 Ferranti Eastman Survey

Inertial borehole directional survey equipment rental (FINDS)  
Ferranti Eastman Survey GmbH,  
Grienbachstrasse 11, PO Box 360,  
CH-6301, Zug, Switzerland  
Telephone: 42 31 75 55  
Telex: 868966 Fax: 42 31 70 75

### 2023 Ferranti ORE

ACCUSONIC acoustic flowmeters  
ARGOS platform transmitter terminals  
GEOPULSE sub-bottom profiler  
Pingers  
Responders  
TRACKPOINT acoustic underwater tracking/positioning systems with telemetering options

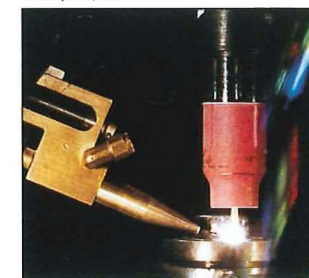
Transponders  
Ferranti ORE Limited,  
Shuttleworth Close,  
Gapton Hall Industrial Estate,  
Great Yarmouth, Norfolk NR31 0NQ,  
England  
Telephone: 0493-600666 Telex: 97208  
Fax: 0493-651100

and  
Ferranti ORE Inc,  
PO Box 709, Falmouth,  
Massachusetts 02541, USA  
Telephone: (508) 548-5800  
Telex: 6817399  
Fax: (508) 540-3835

### 2024 Ferranti Sciaky

Automated manufacturing systems  
Electron beam welding systems  
Fusion arc welding systems  
Laser welding and cutting systems  
Resistance welding systems  
Welding system controls

Ferranti Sciaky, Inc,  
4915 West 67th Street,  
Chicago, Illinois 60638, USA  
Telephone: (312) 594 3800  
Telex: 254099  
Fax: (312) 594 9213



Ferranti Sciaky produces the AcuWeld system 500, a moderately priced fusion arc system for welding and hard-facing.

### 2025 Ferranti Venus

High voltage applications  
Low voltage multi output (mil spec)  
Magnetron radar system HV power supplier  
Power conversion systems for military and industrial applications  
TWT power supply applications  
Ferranti Venus Inc,  
399 Smith Street, Farmingdale,  
New York 11735, USA  
Telephone: (516) 293-4100  
Telex: 6852246 TWX: 510 224 6492  
Fax: (516) 752-7976

## WORLDWIDE

### Ferranti Infographique sarl,

La Bastide Blanche,  
Carrefour du Griffon,  
13127 Vitrolles, France  
Telephone: 42 89 54 29  
Telex: 440984  
Fax: 42 79 56 57

### Ferranti Elmecca SpA,

Via Torino 50,  
Frazione Palazzo Grosso,  
10070 – Vauda Canavese (To),  
Italy  
Telephone: (011) 9251697 &  
9251777/8/9  
Fax: (011) 9251685

### Ferranti GmbH,

D6000 Frankfurt/Main 71,  
Hahnstrasse 70,  
Federal Republic of Germany  
Telephone: 69 6666 141  
Telex: 4152710  
Fax: 69 6666 146

### Ferranti Sciaky, Inc,

4915 West 67th Street,  
Chicago, Illinois 60638, USA  
Telephone: (312) 594-3800  
Telex: 254099  
Fax: (312) 594-9213

### Ferranti Venus Inc,

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New York 11735, USA  
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Telex: 6852246 TWX: 510 224 6492  
Fax: (516) 752-7976

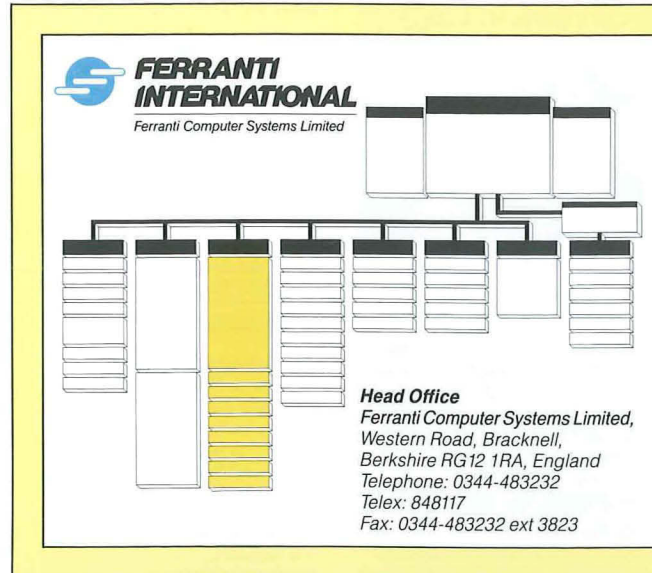
### Ferranti ORE Inc,

PO Box 709, Falmouth,  
Massachusetts 02541, USA  
Telephone: (508) 548-5800  
Telex: 681 7399  
Fax: (508) 540-3835

and  
525 Julie Rivers Drive,  
Sugar Land, Texas 77478-2835, USA  
Telephone: (713) 240-3153  
Telex: 774 248  
Fax: (713) 240-0951



# Ferranti Computer Systems Limited



One of the largest system houses in Europe, Ferranti Computer Systems provide a world wide range of real-time systems and associated products for both military and civil applications. Specialities include operational and simulation systems for industrial control and the armed forces, information technology, communications, energy management and healthcare. The company also has responsibility for the Ferranti International investment in computer activities overseas, through associated or subsidiary companies in Australia, Belgium, Federal Republic of Germany and the USA.



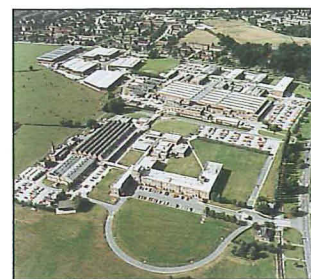
**Bracknell**  
Head office of Ferranti Computer Systems Limited and location of the research, development and pre-production facilities for defence business with emphasis on naval systems, advanced systems research and special projects.



**Cheadle Heath**  
Cheadle Heath produces a range of computer-based systems for use in military and public service applications and is the centre for trainer and simulator activities.



**Oldham**  
Waterhead is the location of the main manufacturing facility for systems and associated products.



**Wythenshawe**  
Designs, supplies and supports systems for the civil market. Specialities include control, monitoring, communications and information technology systems.



**Poynton**  
Low noise parametric amplifiers, microwave generators and systems for microwave applications and satellite communication terminals are designed and manufactured at Poynton.



**Cwmbran**  
Provides further facilities for design and development mainly involving computer products, engineering and advanced software expertise.

## WORLDWIDE



**Antwerp**  
For Benelux, the Antwerp-based operation for Ferranti Computer Systems provides computer-based systems for the industrial control, information technology and communication markets.



**Sydney**  
Ferranti Computer Systems Australia, provides project management, design, development and support for military and civil computer based systems.



**Sugar Land, Houston, Texas**  
Headquarters of Ferranti International Controls Corporation, suppliers of computer-based supervisory control and energy management systems to the electricity supply, pipeline and petroleum industries.

**3010 Air transport systems**  
Bracknell  
Airspace management  
Air traffic control  
Wythenshawe  
AFTN message switching (AERONET)  
Air transport information  
Airport management and aircraft maintenance information  
Flight information and display (AMIDS)  
Passenger handling information

**3011 Communication systems**  
Wythenshawe  
Cable and fibre optic networks (Cablenet)  
Ethernet, LANS  
Hospital data communications  
Cheadle Heath  
Air defence data and display  
Automatic message handling and electronic mail  
Communications monitoring and management  
Fire service mobilising and communications  
Integrated data and voice communications  
Message switching (TARE)  
Offshore communications  
Police command, control and communications  
Resource management  
Safety surveillance and control  
Secure, dependable communications  
VSAT

**3012 Naval systems**  
Bracknell  
Command and control  
Land-based  
Sub-surface  
Surface  
Data distribution and transfer  
Data links  
Mine countermeasures  
Ship weapon system engineering  
Weapon control  
Cheadle Heath  
Sonar systems  
High frequency surveillance and mine hunting  
Naval consoles and displays (colour and monochrome)  
Passive/active/narrowband/broadband/intercept  
System performance and assessment  
Towed arrays  
Transducers and arrays  
Vibration monitoring

**3019 Information systems**  
Bracknell  
Office automation  
Personal computer workstations  
Word processing and personal computer networks  
Ferranti Computer Systems Limited, Simonsway, Wythenshawe, Manchester M22 5LA, England  
Telephone: 061-499 3355  
Telex: 668084 Fax: 061-499 2848

A computer-assisted command system is installed in HMS Beaver, a Type 22 frigate.

**3013 Equipment and products**  
Bracknell  
Computers  
Microprocessors  
Printed circuits  
Relational processor  
68000 VME products

**3014 System & software services**  
Bracknell  
Artificial Intelligence  
Calibration test & repair services  
Combat system integration  
Data fusion  
Electronic warfare  
Expert systems  
Software engineering  
Strategic defence studies

**3015 Energy management and control systems**  
Bracknell  
Electrical power transmission and distribution monitoring and control systems (Ranger)  
Public utility monitoring and control  
SCADA  
3016 Data technology systems  
Equipment supply to end users, OEMs and system houses  
High performance graphics controllers (VARs)  
Motorway control and communication  
Road transport control, monitoring and communication  
SCOOT urban traffic control  
Traffic census  
Traffic signal controllers and monitoring  
Tunnel plant monitoring and control  
Vehicle electrical testing  
Voice messaging (Voice Manager)

**3017 Healthcare systems**  
Bracknell  
Hospital diagnostic services computer systems (Delphi-Phoenix)  
Hospital patient management systems (Leadership)

**3018 Industrial systems**  
Bracknell  
Control, monitoring and communication  
Distributed control  
Industrial process control (continuous and batch)  
Oil and gas production, storage and pipeline control  
Power generation monitoring and control  
Process management (PMS)

**3019 Information systems**  
Bracknell  
Clustered and remote terminal networks for IBM and ICL mainframes  
Data processing terminals and office mainframe access terminals (IT2000)  
Networked terminals  
Office automation  
Personal computer workstations  
Word processing and personal computer networks  
Ferranti Computer Systems Limited, Simonsway, Wythenshawe, Manchester M22 5LA, England  
Telephone: 061-499 3355  
Telex: 668084 Fax: 061-499 2848

**3021 Training simulators and systems**  
Bracknell  
Action speed tactical trainers  
Aircraft control  
Air defence tactical training theatres  
Air traffic control  
ASW

Bracknell  
Cockpit procedures  
Command team  
Communications  
Computer-based training  
Fire control  
Liquid cargo handling  
Maintainer  
Mine control measures  
Navigation  
Periscope/visual  
Radar procedures  
Radar simulation  
Rifle/small arms/Anti-tank/Marksman indoor firing ranges  
Sonar operator  
Submarine command team  
Surface ship operations room  
Weapon systems

Ferranti Computer Systems Limited, Bird Hall Lane, Cheadle Heath, Stockport, Cheshire SK3 0XQ, England  
Telephone: 061-428 0771  
Telex: 666803 Fax: 061-428 9121

**3022 Microwave**  
Bracknell  
Customised subsystems  
Components, supercomponents and integrated assemblies  
Agile oscillators  
Broadband amplifiers  
Low noise FET amplifiers  
Microwave power amplifiers  
Millimeter-wave high stability oscillators  
Miniature low power amplifiers  
Parametric amplifiers  
Phase locked oscillators  
Varactor tuned oscillators  
YIG tuned filters  
YIG tuned oscillators

**3023 Satellite communication systems**  
Civil  
Frequency converters  
LNA subsystems  
RF-IF rack equipments  
Systems studies  
Test loop translators  
Turnkey Eutelsat ground stations  
Turnkey Intelsat ground stations

Military  
Frequency converters  
Handheld data terminals  
Handheld tactical teleprinters  
LNA subsystems  
SHF combat net radio satcom adaptor  
SHF man-portable satellite terminal  
Test loop translators  
Transportable/tactical ground stations  
UHF handheld terminals

Ferranti Computer Systems Limited, First Avenue, Poynton Industrial Estate, Stockport, Cheshire SK12 1NE, England  
Telephone: 0625-871611  
Telex: 666786 Fax: 0625-879999

**UK**  
Ferranti Computer Systems Limited, Western Road, Bracknell, Berkshire RG12 1RA, England  
Telephone: 0344-483232  
Telex: 848117 Fax: 0344-861003

Simonsway, Wythenshawe, Manchester M22 5LA, England  
Telephone: 061-499 3355  
Telex: 668084 Fax: 061-499 2848

Bird Hall Lane, Cheadle Heath, Stockport, Cheshire SK12 1NE, England  
Telephone: 061-428 0771  
Telex: 666803 Fax: 061-428 9121

First Avenue, Poynton Industrial Estate, Stockport, Cheshire SK12 1NE, England  
Telephone: 0625-871611  
Telex: 666786 Fax: 0625-879999

**WORLDWIDE**  
Ferranti Computer Systems (Australia) Pty Limited, 2a Mavis Street, Revesby, Sydney, NSW 2212, Australia  
Telephone: 2 708 6655  
Telex: 25383 Fax: 2 708 6440 and 99 Northbourne Avenue, (GPO Box 582), Canberra, ACT 2601, Australia  
Telephone: 62 57 1022  
Fax: 62 48 0097

Ferranti Computer Systems NV, Noorderlaan 111, B-2030, Antwerp, Belgium  
Telephone: 3540 4911  
Telex: 35325 Fax: 3542 6328

Ferranti GmbH, D6200 Wiesbaden 1, Taurusstrasse 52, Federal Republic of Germany  
Telephone: 6121 58010  
Telex: 6121 838  
Fax: 6121 580128

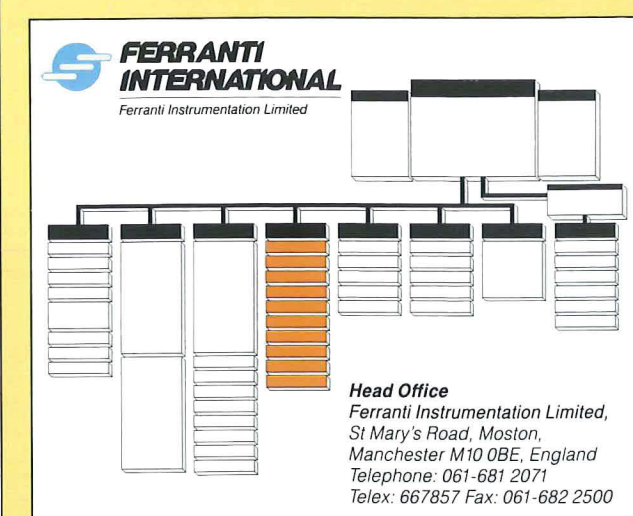
Ferranti International Controls Corporation, 12808 W Airport Blvd, P.O. Box 5012, Sugar Land, Texas 77487-5012, USA  
Telephone: (713) 274 5000  
Telex: 762444 TWX: 910 881 3726  
Fax: (713) 274 5577

Ferranti Healthcare Systems Corporation, Timonium Corporate Center 1, 9515 Deereco Road, Suite 900, Timonium, MD 21093, USA  
Telephone: (301) 252 4111  
Fax: (301) 252 8765

Sisdef Ltda, Los Fresnos 400, Miraflores, Vina del Mar, Chile  
Telephone: 010-56-32 685821 & 683266  
Telex: 432060 SISDE CL



## Ferranti Instrumentation Limited



**FERRANTI INTERNATIONAL**  
Ferranti Instrumentation Limited

**Head Office**  
Ferranti Instrumentation Limited,  
St Mary's Road, Moston,  
Manchester M10 0BE, England  
Telephone: 061-681 2071  
Telex: 667857 Fax: 061-682 2500

Ferranti Instrumentation offers a wide range of high technology products to customers in the aerospace, defence and civil business markets. Products include weapon systems, submarine control, energy management systems, precision hydraulics and aircraft instrumentation.

Ferranti Business Communications Limited is a major independent telecommunications supplier.

Ferranti Creditphone Limited is involved in the digital portable telephone service.

Ferranti Container Handling Limited provides marketing and support for container handling equipment and on-load tapchangers; and Ferranti Resin Limited manufactures GRP products.



### Moston

This factory accommodates production facilities for mechanical and electronic fuze systems, aircraft instrumentation, energy management systems and the telecommunications products of Ferranti Business Communications Limited and Ferranti Creditphone Limited.



### Newport Pagnell

Naval Division is primarily concerned with the design, development and manufacture of systems for the control and management of all aspects of submarine manoeuvring and provides a research facility for submarine dynamics and control analysis.



### Bournemouth

Mitchell Hydraulics Division has additional manufacturing facilities including CNC machining, based at its Wallisdown factory.



### Oldham

The marketing and support activities for container handling, tapchangers and control equipment are housed here.



### Bracknell

Aircraft Equipment Division design and marketing activities are based here on the outskirts of Bracknell town centre.



### Woking

Mitchell Hydraulics Division supplies specialist hydraulic control equipment for industrial and MoD systems.



### Moston

The reception area of Ferranti Business Communications Limited head office at Moston.



### Peterlee

Manufacture of GRP products is carried out at this location which also houses the management and marketing activities of Ferranti Resin Limited.

### 4010 Weapons equipment

Anti-tank mine fuze (ATIS)  
Compressed air launchers  
LOCAT - artillery trainer  
50mm shoulder fired trainer  
80/160mm vehicle mounted launchers  
Fuzes for all munitions, ordnance missiles and rockets  
Anti disturbance  
Laser and infra-red proximity  
Point detonating  
Pressure activated  
Target selective/target activated  
Timing, electronic and mechanical  
HB876 area denial submunition  
JP233 distributor electronics  
Passive helicopter identification equipment (PICKET)  
Safety and arming devices  
Sensor assessment  
Sensor research  
Sensors and signal processing for weapons systems

Ferranti Instrumentation Limited,  
Aircraft Equipment Division,  
St Mary's Road, Moston,  
Manchester M10 0BE, England  
Telephone: 061-681 2071  
Telex: 667857 Fax: 061-682 2500



LOCAT - a very low cost artillery observer training system

### 4020 Aircraft equipment

Accelerometers for inertial navigation, flight control, weapon systems and precision sensing  
Aircraft instruments - attitude, direction, turn and slip, and bearing and heading indicators.  
Air data probes and systems  
Attitude and heading reference systems  
Autopilot approach monitors  
Ceramic Seals Product Group  
Cable terminators  
Electrical, high pressure and liquid gas feedthroughs  
High voltage plugs and sockets  
Insulators  
Isolators  
Digital engine control units  
Directional gyros  
Electrical power conversion and control  
Battery chargers and monitors  
Current and voltage sensors  
Equipment power supplies  
Transformer rectifier units  
Hybrid microcircuits  
Airborne power supplies  
Solid state relay  
Helicopter equipment  
Automatic stabilisation systems  
Stabilised sights  
Ice detectors  
Optical communications systems  
Radar warning systems  
Utility management systems

Ferranti Instrumentation Limited,  
Aircraft Equipment Division,  
Lily Hill House, Lily Hill Road,  
Bracknell, Berkshire RG 12 2SJ,  
England  
Telephone: 0344-424001  
Telex: 848117 Fax: 0344-860797  
and

St Mary's Road, Moston,  
Manchester M10 0BE, England  
Telephone: 061-681 2071  
Telex: 667857 Fax: 061-682 2500  
and

Ferranti Instrumentation Limited,  
Ceramic Seals Product Group,  
Westwood Industrial Estate,  
Arkwright Street, Oldham,  
Lancashire OL9 9LZ, England  
Telephone: 061-627 2353  
Fax: 061-627 2356

**4021 Commercial instruments**  
Disturbance recorder system (LinDAR)  
Central archiving  
Complementary Data Analysis station  
High voltage monitoring equipment  
Interrogation unit  
Energy management systems (CEDREC)  
Cyclic time control  
Load control  
Maximum demand control  
Fault recorder (VoCuL)  
Single or 3-phase  
Voltage and current monitoring  
Viscometers  
Ferranti-Shirley cone and plate  
Portable co-axial cylinder

Ferranti Instrumentation Limited  
Commercial Instruments Division,  
St Mary's Road, Moston,  
Manchester M10 0BE, England  
Telephone: 061-681 2071  
Telex: 667857 Fax: 061-682 2500



LinDAR high voltage monitoring systems.

### 4030 Submarine systems

Submarine performance and control analysis  
Submarine platform control systems  
Depth data  
Hover  
Hydraulic valves for reducing noise  
Hydroplane and rudder  
Trim and compensation

Ferranti Instrumentation Limited,  
Naval Division,  
North Crawley Road, Newport Pagnell,  
Bucks MK16 9HT, England  
Telephone: 0908-613746 Telex: 826264  
Fax: 0908-613596



Ferranti AP and manual control system installed in the new Upholder class submarine.

### 4040 Precision hydraulics

Electrical enclosures and consoles  
High pressure air systems  
Hydraulic components  
Hydraulic control systems  
Hydraulic shock and vibration dampers  
Precision machining  
Refurbishment

Ferranti Instrumentation Limited,  
Mitchell Hydraulics Division,  
Albert Drive, Sheerwater, Woking,  
Surrey GU21 5SF, England.  
Telephone: 04862-4941 Telex: 859614  
Fax: 04862-5263  
From April 1989  
Telephone: 0483 714941  
Fax: 0483 715263

### 4050 Ferranti Business Communications

Telecommunications equipment  
Business telephones  
Call management systems  
Digital private branch exchanges, (PABX), for voice and data  
Facsimile equipment  
Financial terminals  
Manager/secretary communication systems  
Telephone key systems  
Voice messaging

Ferranti Business Communications Limited,  
Moston, Manchester M10 0BE, England  
Telephone: 061-682 4000 Telex: 667857  
Fax: 061-683 4378  
and  
110 Euston Road, London NW1 2DQ,  
England.  
Telephone: 01-387 9771 Telex: 265161  
Fax: 01-388 4655



The OMNI digital PABX handling up to 2,000 extensions, is designed to switch voice and data with equal effectiveness.

### 4060 Ferranti Creditphone

PHONEZONE public telephone service  
ZONEPHONE digital portable telephone systems

Ferranti Creditphone Limited,  
St. Mary's Road, Moston,  
Manchester M10 0BE, England  
Telephone: 061-683 4696 Telex: 667857  
Fax: 061-683 4610



The compact ZONEPHONE handset: Easy to carry in a handbag, briefcase or pocket, uses advanced digital electronics and runs on a permanent rechargeable battery.

### 4070 Ferranti Container Handling

Marketing of, and support for:  
Container handling equipment  
On-load tapchangers  
Control equipment

Ferranti Container Handling Limited,  
PO Box 90, Unit F,  
Westwood Industrial Estate,  
Arkwright Street, Oldham,  
Lancashire OL9 9NN, England  
Telephone: 061-626 4888 Telex: 667818  
Fax: 061-624 9925



Ferranti Kairitainer diesel/electric rubber tyred gantry crane, Halifax, Nova Scotia, Canada.

### 4080 Ferranti Resin

GRP  
Filament wound and hand laid storage/process vessels and hoppers  
General and custom fibre reinforced engineering  
Underground petroleum storage tanks  
Insulation  
Prepregs using paper, cotton fabric and woven glass fabric impregnated or coated with thermo-setting resins  
Resin-bonded cylinders

Ferranti Resin Limited,  
Whitehouse Way, South West Industrial Estate, Peterlee,  
Co. Durham SR8 2HZ, England  
Telephone: 091-586 5311 Telex: 53546  
Fax: 091-586 1274

### 4090 Ferranti-Bendix Power Generation

Airborne power generation and control systems  
VSCF generation systems  
Solid state power conversion systems

Ferranti-Bendix Power Generation Limited,  
St Mary's Road, Moston,  
Manchester M10 0BE, England  
Telephone: 061-681 2071  
or 0344-424001  
Telex: 667857 or 848117  
Fax: 061-682 2500 or 0844-424008



**ISC International Group**

**FERRANTI INTERNATIONAL**  
The ISC International Group designs, implements, and integrates products and systems worldwide. It provides the technology, resources, and support for many of the world's leading defense contractors. Areas of expertise include military, industrial, medical systems, educational systems, and professional services.

**Head Office**  
ISC International Group  
3700 Electronics Way, P.O. Box 3040  
Lancaster, PA 17604-3040, USA  
Telephone: (717) 285-4226  
Telex: 150196 ISCINTL UT  
Fax: (717) 285-4226



**Lancaster, Pennsylvania**  
The ISC headquarters complex of buildings includes installations for the ISC Group, the ISC International Group headquarters and related offices and facilities for ISC Defense & Space Group Companies.



**Hanworth, Signal House**  
ISC Technologies Ltd., based at Hanworth, Middlesex, manages those international contracts which do not form part of the domestic markets of Ferranti International in the United States, the United Kingdom and Italy.



**Lagos, Nigeria**  
Electronic Systems Limited is a joint venture company, based in Lagos, Nigeria, as a partnership between Ferranti International Signal House and Abudu Industries Plc, a Nigerian company wholly owned by the Government of Nigeria.

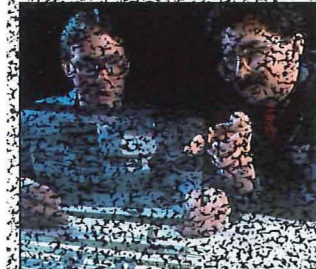


**Lancaster, Pennsylvania**  
ISC Educational Systems provides clients with generic and customized courseware and training services encompassing management, industrial and equipment operation, military systems and general education.



**Lancaster, Pennsylvania**  
ISC Educational Systems provides a comprehensive range of instructional services for the Federal, State and local governments and private organizations in the United States.

**ISC Technologies, Inc.**  
**5010 Electronic systems**  
Communication systems  
Control systems  
Security systems  
**5011 Ordnance systems**  
Air defense weapon systems  
Aircraft weapons  
Cluster weapons  
Electronic fuzes  
Launchers and carriers  
Munitions and submunition fuzes  
Inertial navigation systems  
**5012 Weapon modernization**  
Anti-aircraft systems  
Small calibre systems  
Machine control  
Target control  
**ISC Technologies Ltd.**  
3700 Electronics Way, P.O. Box 3040  
Lancaster, PA 17604-3040, USA  
Telephone: (717) 285-4226  
Telex: 150196 ISCINTL UT  
Fax: (717) 285-4226



Control room, established in 1982, for the operation of the system, which is a variant of the original system.

**5020 ISC Technologies Limited**  
Control systems  
International contract management  
Support equipment  
Systems engineering  
*ISC Technologies Limited,*  
Signal House, 203 Swan Road,  
Hanworth, Middlesex TW13 6LL,  
England  
Telephone: 01-894 5533  
Telex: 929498 Fax: 01-755 1083

**5030 ISC Educational Systems, Inc.**  
Instructional design  
Linear and interactive video  
courseware  
Needs analysis  
User documentation  
Video production  
Computer graphics  
Scriptwriting  
Sound tracks  
Video  
*ISC Educational Systems, Inc.,*  
3700 Electronics Way, P.O. Box 3040,  
Lancaster, PA 17604-3040, USA  
Telephone: (717) 898-0890  
Telex: 150196 ISCINTL UT  
Fax: (717) 285-4226



ISC Educational Systems' complete video production facilities supports its quick response to customer needs.

**5040 ESI Manufacturing, Inc.**  
Bundles test assemblies  
Component equipment and materials handling  
Expert testing  
Inspection testing equipment  
Packaging equipment  
Packaging  
Warehousing inventory control  
Ongoing support for existing contracts  
After delivered software  
Automatic order picking  
Radio frequency identification  
Est. Manufacturing  
500 Commerce Road, P.O. Box 550  
Merrillville, PA 17053-0550  
Telephone: (717) 285-4226  
Telex: 150196 ISCINTL UT  
Fax: (717) 285-4226

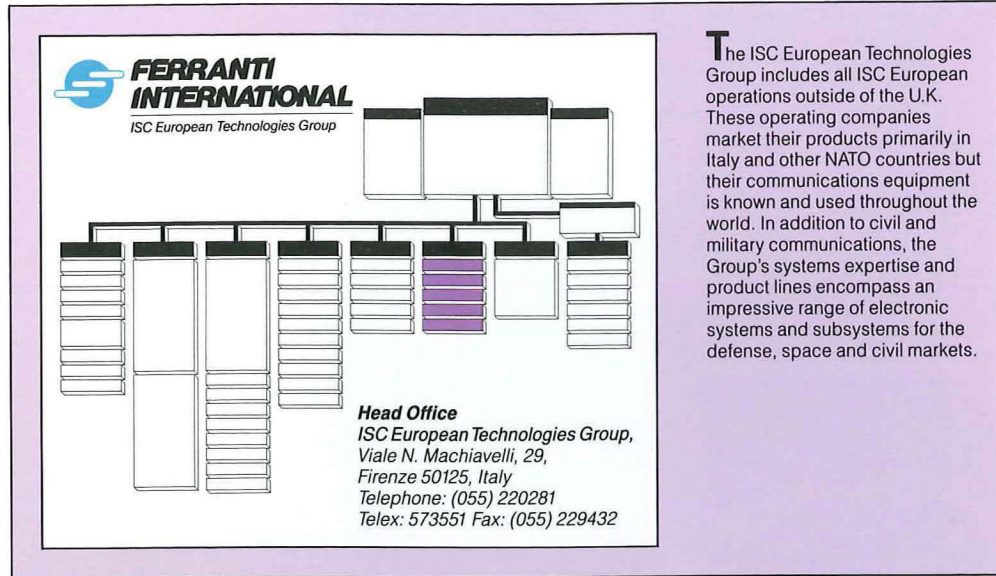


Manufacturing equipment for the production of test assemblies.

**5050 Electronic Systems Limited**  
Communication systems  
Security systems  
Special systems  
Radio transfer  
Electronic Storage Unit  
Signal House, 203 Swan Road,  
Hanworth, Middlesex TW13 6LL,  
England  
Telephone: 01-894 5533  
Telex: 929498 Fax: 01-755 1083



## ISC European Technologies Group



The ISC European Technologies Group includes all ISC European operations outside of the U.K. These operating companies market their products primarily in Italy and other NATO countries but their communications equipment is known and used throughout the world. In addition to civil and military communications, the Group's systems expertise and product lines encompass an impressive range of electronic systems and subsystems for the defense, space and civil markets.



### Firenze, Italy

The ISC companies operating in Italy are part of the Industrie per lo Spazio e le Comunicazioni group headquartered in this landmark building in Firenze.



### Firenze, Italy

The effective development and management of technology is the focus of Proel's research and development activities directed out of the ISC offices in Firenze.



### Firenze, Italy

OTE produces high-technology communications systems for civilian and paramilitary applications. Facilities include design capabilities, manufacturing operations, and a printed circuit card center.



### Pomezia, Italy

Elmer is a diversified electronics company producing high-technology equipment and systems for military applications. Facilities include 150,000 sq. feet of engineering offices and laboratories, and manufacturing and test equipment.



### Vimodrone (Milano), Italy

Laben specialises in instrumentation and systems for space and nuclear applications including on-board data handling systems, altitude and orbit control instrumentation, on-board payloads, electrical ground support equipments and low noise electronics for high energy physics experiments.

### 6010 Elmer

Radio communication electronic warfare  
Computer aided E.W. system for ground, naval and airborne platforms  
VLF to HF  
Analysis and interception receiver systems  
V/UHF  
Search receivers  
V/UHF  
Analysis receivers  
Radio communication equipment  
VLF to HF/SSB receiver systems  
HF/SSB transmitter systems up to 10 KW,  
Manpack, vehicular, airborne, naval, ground-based transceivers  
VHF and UHF ground based, naval and airborne transceivers  
ECCM, frequency hopping, and data link capabilities in the HF, VHF and UHF frequency ranges.  
Radio communication systems  
Airborne integrated communication and radio navigation systems for aircraft and helicopters  
Ground based communication systems  
Design and test organization for EMP-EMI and Tempest requirements.  
Naval integrated radio communication and radio navigation systems including Link 11 and Link ES data link  
Radio navigation  
GPS receiver  
Omega transit receiver

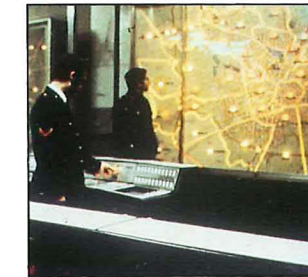
**Elmer,**  
Industrie per lo Spazio e le Comunicazioni SpA,  
Viale dell'Industria, 4,  
Pomezia 00040, Italy  
Telephone: (06) 912971 Telex: 610112  
Fax: (06) 912971



Elmer is a recognized leader in the provision of military communications systems such as that for the Italian Navy's Giuseppe Garibaldi.

### 6020 OTE

Air traffic control communications systems  
Communication control centers  
Ground-to-air, single/multi-channel UHF/VHF  
Military telecommunications systems  
On-board telemetry and systems for missiles  
Telemetry tracking and on-board instrumentation  
Police-military communications systems  
Command and control mobile radio systems  
Integrated radio-telephone systems  
**OTE,**  
Industrie per lo Spazio e le Comunicazioni SpA,  
Via E. Barsanti, 8,  
Firenze 50127, Italy  
Telephone: (055) 438111 Telex: 570276  
Fax: (055) 4381321



OTE's complete radio systems include integrated command networks.

### 6030 Laben

Aircraft and robotics  
Avionics systems and instrumentation for on-board data acquisition  
Real-time data processing systems for inflight tests  
Telecontrol/telecommand systems for submarine robots  
Telecontrol systems for meteorological buoys  
Nuclear instrumentation  
Low noise electronics for high energy physics experiments with particle accelerators  
Radioactive pollution monitoring networks  
Space applications  
Attitude and orbit control instrumentation  
Decommuration and processing instrumentation  
Electrical ground support equipment for launchers  
Fault tolerance systems  
Hybrid microcomputers  
On-board data handling systems and trouble shooting  
On-board microgravity payloads  
On-board remote sensing payloads  
On-board scientific payloads  
Payload simulators  
Reliable on-board software  
Satellite electrical ground support equipment  
Signal conditioning instrumentation  
Software for ground support equipment  
Spacecraft platform simulators  
Tailored software languages including artificial intelligence for system autonomy  
Telemetry & telecommand systems and instrumentation  
Very large scale integrated circuits  
**Laben,**  
Industrie per lo Spazio e le Comunicazioni SpA,  
SS Padana Superiore, 290,  
Vimodrone (Milano) 20090, Italy  
Telephone: (02) 250751 Telex: 312616  
Fax: (02) 2505515



Solution Growth Facility (SGF) experiment for the EURECA program during the assembling phase at Laben facilities.

### 6040 Proel Tecnologie

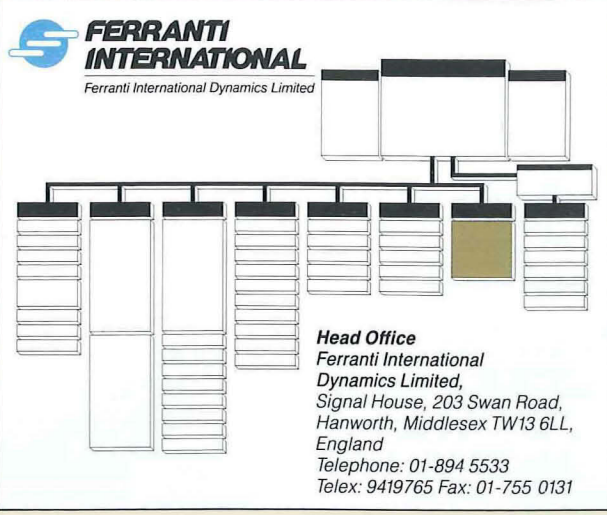
Electron sources and accelerators  
Instrumentation and measurement  
Research and development  
Production machinery  
Research and development  
**Proel Tecnologie,**  
Industrie per lo Spazio e le Comunicazioni SpA,  
Viale N. Machiavelli, 29  
Firenze 50125, Italy  
Telephone: (055) 2298514  
Telex: 574152  
Fax: (055) 229432



Proel Tecnologie focuses its research and development capabilities on space applications of leading edge technologies.



# Ferranti International Dynamics Limited



**Ferranti International Dynamics Limited**  
 Ferranti International Dynamics Limited

**Head Office**  
 Ferranti International Dynamics Limited,  
 Signal House, 203 Swan Road,  
 Hanworth, Middlesex TW13 6LL,  
 England  
 Telephone: 01-894 5533  
 Telex: 9419765 Fax: 01-755 0131

**F**erranti International Dynamics Limited is a prime contractor, turnkey weapon system company, operating in the UK, Europe and other areas of the world.

It specialises in guided weapons and supporting technologies, conceptual studies, operational analysis, systems configuration, logistic support, advanced technology studies, guidance and control, engagement and scenario modelling, project management, reliability modelling, warheads and warhead design.

Facilities are available for build-to-print of weapon and missile systems.



**Hanworth, Signal House**  
 The head office of Ferranti International Dynamics Limited. Project management, operational analysis, systems design, marketing and support activities are carried out here.



**Moston**  
 Provides fuzing sub-system design and production facilities.



**Oldham, Derker Street**  
 System integration and test facilities are housed here, together with system design and sub-system production.



**Edinburgh, Robertson Avenue**  
 Seeker sub-system design and production facilities are located here.



**Edinburgh, Telford House**  
 Licensing, contract and procurement management activities are carried out from here.

**7010 Dynamics**  
 Systems design  
 Systems engineering  
 Operational analysis  
 Programme management  
 Logistics support  
 Marketing & support



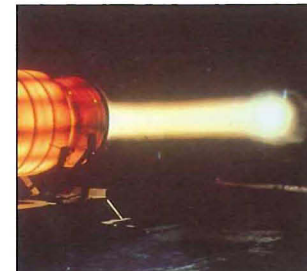
Extensive computer simulation and CAD/CAM facilities.  
 Photo: The Marquardt Company

**Aerodynamics**  
 Aircraft separation dynamics  
 Ballistic trajectories  
 Finite element analysis  
 Wind tunnel testing



Aerodynamic design is a critical element for all missiles and missile carrying systems.

**Propulsion**  
 Rocket motors  
 Launch motors  
 Ramjets  
 Integral rocket ramjets



Ramjet testing.  
 Photo: The Marquardt Company

**Warheads**  
 Air-to-air missiles  
 Anti armour  
 Airfield attack  
 Blast



Warhead design, development and production.  
 Photo: The Marquardt Company

**Missiles & Weapons**  
 Munitions dispensers  
 Cluster bombs  
 Precision guided missiles  
 Air-to-air missiles  
 Surface-to-air missiles  
 Integration and test  
 Product support  
 Modification & update



Bloodhound MkII missile on integration test at Derker

**Fuzing**  
 Laser & IR proximity  
 Anti disturbance  
 Pressure activated  
 Point detonating  
 Target selective  
 Target activated  
 Electronic & mechanical timing  
 Safety and arming



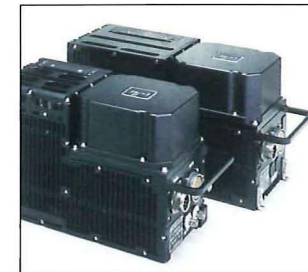
Proximity fuze undergoing test.

**Seekers**  
 Laser  
 IR  
 TV  
 MMW  
 Dual mode



Laser seeker.

**Navigation Systems**  
 Gympal  
 Strapdown

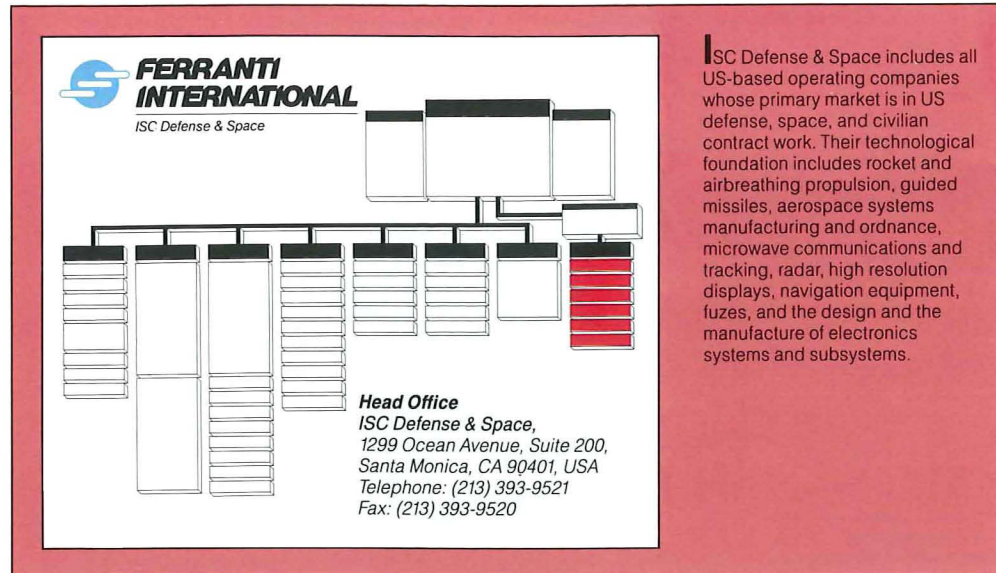


Inertial navigation equipment.

**Data Links**  
 Airborne Pods  
 Telemetry  
 Airborne & ground station  
 Ferranti International Dynamics Limited,  
 Signal House, 203 Swan Road,  
 Hanworth, Middlesex TW13 6LL,  
 England  
 Telephone: 01-894 5533  
 Telex: 9419765 Fax: 01-755 0131



## ISC Defense & Space



ISC Defense & Space includes all US-based operating companies whose primary market is in US defense, space, and civilian contract work. Their technological foundation includes rocket and airbreathing propulsion, guided missiles, aerospace systems manufacturing and ordnance, microwave communications and tracking, radar, high resolution displays, navigation equipment, fuzes, and the design and the manufacture of electronics systems and subsystems.



**Santa Monica Office**  
The second floor houses the head offices of ISC Defense & Space in suburban Los Angeles.



**Lancaster, Pennsylvania**  
ISC Defense Systems manufactures electronic systems and assemblies for the US Department of Defense and major aerospace corporations. Fifty-five acres house 190,000 sq. feet of engineering offices and laboratories, manufacturing facilities, an in-house prototype shop and environmental test capability.



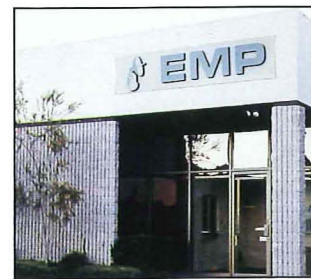
**Van Nuys, California**  
The Marquardt Company is a major US producer of propulsion technology and ordnance products. Fifty-six acres house more than 581,000 sq. feet of engineering offices and laboratories, manufacturing and test facilities and one of the largest ramjet testing facilities in the world.



**Woodbury, New York**  
ISC Cardion Electronics, a US-based defense electronics company, is a worldwide manufacturer of radar, nav aids, display and communications equipment for civil and military customers. Its facilities are in Woodbury and Holtsville, New York.



**Westlake Village, California**  
ISC Aerospace designs and manufactures advanced tactical guided missiles, weapon control systems, and support equipment. The R & D center is located in Westlake Village, California.



**Chatsworth, California**  
Electro-Magnetic Processes (EMP) designs and manufactures numerous advanced antennas, tracking systems, microwave components and threat emitters for military applications and training.

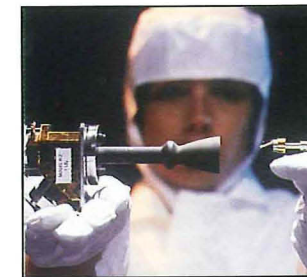


**Sunnyvale, California**  
ISC Datacom designs, develops and manufactures RF modems and RF data link communications products.



**Washington, D.C. Office**  
The eighth floor suite is the primary location of the domestic marketing activities of ISC Defense & Space.

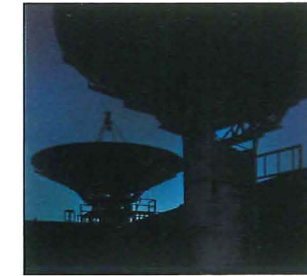
**8010 The Marquardt Company**  
Aerospace structures fabrication and assembly  
Air-breathing propulsion systems  
Subsonic and supersonic ramjets  
Air vehicle and space craft propulsion integration and test  
Anti-armor weapons  
Attitude control rockets  
Cluster munitions  
Finite element analysis  
Fuzing  
Integral rocket ramjets  
Munitions dispensers  
Ordnance systems and components  
Air-delivered cluster weaponry  
Anti-armor munitions  
Ramjets  
Rocket systems  
Rocket engines and components for major US space programs including the Space Shuttle and Strategic Defense Initiative  
Turbo products  
Air-powered turbine configurations  
Ram air turbines  
Target tow reels  
Warheads  
Wind tunnel testing  
The Marquardt Company,  
16555 Saticoy Street,  
Van Nuys, CA 91409, USA  
Telephone: (818) 989-6400  
Telex: 6511420  
Fax: (818) 994-2947



The Marquardt Company's miniature SDI thruster is compared with a previous configuration.

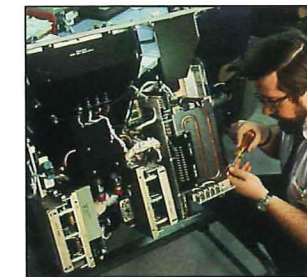
**8020 Electro-Magnetic Processes**  
Advanced low-angle tracking antenna systems  
Advanced VHF, UHF, and microwave antennas and components for military and commercial applications  
Electronic News Gathering (ENG) antennas  
Low-cost, lightweight graphite composite tracking antenna systems  
Microwave relay link systems  
Radar antennas  
Remotely-piloted vehicle telemetry, tracking and control systems  
Telemetry ground stations  
Telemetry tracking antenna systems  
Aircraft  
Missiles  
Satellites  
Threat emitter antennas and systems  
Simulation of enemy radars for US and Allied powers military training

Electro-Magnetic Processes Inc,  
9616 Owensmouth Avenue,  
Chatsworth, CA 91311, USA  
Telephone: (818) 882-6333  
Telex: 4992240 Fax: (818) 709-4668



A wide latitude of performance and budget requirements are satisfied by EMP tracking antenna systems.

**8030 ISC Defense Systems**  
Electronic fuzing  
Engineering services  
Data processing equipment maintenance  
Simulator systems support  
Sensors  
Target detecting  
Underwater mine  
Simulation and training systems  
ASW  
Navigation  
Periscope/visual  
Rifle/small arms  
Tactical electronics  
Combat support systems  
Communications systems  
Contract manufacturing  
Foliage penetration radar systems  
ISC Defense Systems Inc,  
3725 Electronics Way, P.O. Box 3025,  
Lancaster, PA 17604-3025, USA  
Telephone: (717) 285-7151  
Telex: 910250-6068  
Fax: (717) 285-3468



ISC Defense Systems designs and produces electronic systems and subsystems for the US Military and major defense contractors.

**8040 ISC Datacom**  
Radio frequency data communications products for civil & military applications  
Radio modems for wireless data links  
RF data link terminals for data/video transmission in ground and airborne vehicles  
RF modems for broadband cable networks  
ISC Datacom Inc,  
1288 Reamwood Avenue,  
Sunnyvale, CA 94089, USA  
Telephone: (408) 747-0300  
Fax: (408) 747-1873



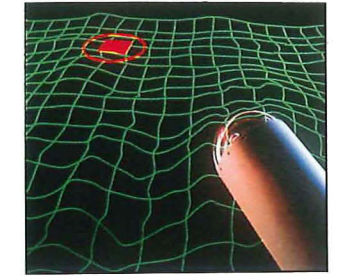
ISC Datacom's RF modem model 1019 for data communications on coaxial cable networks. Models are available for data rates up to 2 Mbps.

**8050 ISC Cardion Electronics**  
Aircraft identification systems  
Radar and beacon equipment  
Air traffic control systems and navigational aids  
Coastal surveillance radar  
Ground based navigational aids  
Format conversation display systems  
Display signal processing for shipborne and ground based radar and air traffic control  
Microwave communication equipment  
Radio equipment  
Shipboard surface search radar  
ISC Cardion Electronics Inc,  
Long Island Expressway,  
Woodbury, NY 11797, USA  
Telephone: (516) 921-7300  
Telex: 221683 Fax: (516) 921-7330



ISC Cardion Electronics supports the radar, high resolution display and navigation equipment requirements of clients such as the US Navy.

**8060 ISC Aerospace**  
Advanced tactical guided missiles  
Air to ground  
Anti-ship  
Anti-tank  
Airframe and propulsion systems  
Field engineering support  
Flight test and evaluation  
Follow-on logistic support/training  
Guidance and control, navigation, test equipment  
Instrumented test ranges  
Mission planner systems  
Operations research  
Pods - communication and ECM  
Program management/prime contracting  
Seekers/guidance sensors (TV, laser, IR)  
Systems/aircraft integration  
Systems analysis  
Technical assistance  
Technology transfer  
Warheads/payloads  
Weapon control systems  
ISC Aerospace Inc,  
5703 Corsa Avenue,  
Westlake Village, CA 91362, USA  
Telephone: (818) 991-1752  
Fax: (818) 991-4668



Advanced weapons systems for international clients are the specialty of ISC Aerospace.

**Washington D.C. Office**  
ISC Defense & Space  
1111 Jefferson Davis Highway,  
Suite 800,  
Arlington, Virginia 22202, USA.  
Telephone: (703) 979-0005  
Fax: (703) 979-6116



## Product list

Code numbers refer to relevant company section.

### A

AFTN message switching (AERONET) – 3010  
ASW – 3021  
Accelerometers for inertial navigation, flight control weapon systems and precision sensing – 4020  
Acoustic flowmeters (ACCUSONIC) – 2023  
Acoustic underwater tracking/positioning systems – 2023  
Action speed tactical trainers – 3021  
Advanced VHF, UHF and microwave antennas and components for military and commercial applications – 8020  
Advanced low-angle tracking antenna systems – 8020  
Advanced multi-mode fire control for fighter aircraft – 1010  
Advanced tactical guided missiles – 8060  
Aerodynamics – 7010  
Aerospace structures fabrication and assembly – 8010  
Agile oscillators – 3022  
Air data probes and systems – 4020  
Air defence data and display – 3011  
Air defence tactical training theatres – 3021  
Air traffic control – 3010  
Air traffic control training simulators and systems – 3021  
Air traffic control communications systems – 6020  
Air traffic control systems and navigational aids – 8050  
Air transport information – 3010  
Air transport systems – 3010  
Air-breathing propulsion systems – 8010  
Air-delivered cluster weaponry – 8010  
Air-delivered weapon systems – 5011  
Air-powered turbine configurations – 8010  
Air-to-air missiles – 7010  
Airborne and ground displays – 1040  
Airborne and ground station telemetry – 7010  
Airborne computing systems – 1030  
Airborne datalinks – 3011  
Airborne integrated communication and radio navigation systems for aircraft and helicopter – 6010  
Airborne pods – 7010  
Airborne power generation and control systems – 4090  
Aircraft and robotics – 6030  
Aircraft control training simulators and systems – 3021  
Aircraft equipment – 1020 and 4020  
Aircraft identification systems – 8050  
Aircraft instruments - attitude, direction, turn and slip, and bearing and heading indicators – 4020  
Aircraft separation dynamics – 7010  
Airfield attack warheads – 7010  
Airframe and propulsion systems – 8060  
Airport management and aircraft maintenance information – 3010  
Airspace management – 3010  
Air vehicle and space craft propulsion integration and test – 8010  
Analogue and digital microwave radio relay systems in the 1.5GHz-23GHz bands for telephony, television, broadband data and radar remoting – 2011  
Anti-aircraft gun sights (GSA) – 1020  
Anti-aircraft systems – 5012  
Anti-armor munitions – 8010  
Anti-armor weapons – 7010 and 8010  
Anti-disturbance fuzes – 4010  
Anti-disturbance fuzing – 7010  
Anti-tank mine fuze (ATIS) – 4010  
Area denial weapons – 4010 and 5011  
Armament control systems – 1030  
Artificial intelligence – 3014  
Attitude and orbit control instrumentation – 6030  
Attitude and heading reference systems – 4020  
Attitude control rockets – 8010  
Attitude reference systems for marine airborne and space applications – 1030  
Automated manufacturing systems – 2024  
Automatic message handling and electronic mail – 3011  
Automatic system test equipment – 1030  
Autopilot approach monitors – 4020  
Avionic systems integration – 1030  
Avionics systems and instrumentation for on-board data acquisition – 6030

### B

Ballistic trajectories – 7010  
Battery chargers and monitors – 4020  
Battlefield surveillance systems – 1020  
Blast warheads – 7010  
Blowers - miniature AC cross flow – 2014  
Borehole directional survey equipment (FINDS) – 1030  
Broadband amplifiers – 3022  
Business telephones – 4050

### C

CO<sub>2</sub> flowing gas lasers 400-10,000 watts for industrial, military and scientific applications – 2020  
CO<sub>2</sub> rangars – 1020  
CO<sub>2</sub> sealed waveguide lasers 1-50 watts – 2020  
CO<sub>2</sub> transmitters – 1020  
Cable and fibre optic networks (Cablenet) – 3011  
Cable harness – 2016  
Calibration test and repair services – 3014  
Call management systems – 4050  
Ceramic Seals Product Group – 4020  
Cable terminators  
Electrical, high pressure and liquid gas feedthroughs  
High voltage plugs and sockets  
Insulators  
Isolators  
Circulators – 2018  
Cluster munitions – 8010  
Cluster weapons – 5011 and 7010  
Clustered and remote terminal networks for IBM and ICL mainframes – 3019  
Coastal surveillance radar – 8050  
Co-ordinate measuring machines (manual, power assist and direct computer controlled) – 2013  
Cockpit procedures training simulators and systems – 3021  
Combat support systems – 8030  
Combat system integration – 3014  
Combined Map and Electronic Display (COMED) – 1040  
Command and control – 3012  
Land based  
Sub-surface  
Surface  
Command team training simulators and systems – 3021  
Commercial instruments – 4021  
Communication systems – 2011, 3011, 5010, 5050 and 8030  
Communications monitoring and management – 3011  
Communications training simulators and systems – 3021  
Components, supercomponents and integrated assemblies – 3022  
Compressed air launchers – 4010  
LOCAT - artillery trainer  
50 mm shoulder fired trainer  
80/160 mm vehicle mounted launchers  
Computer symbol generation – 1040  
Computer-Aided Design and Manufacturing system (CAM-X) – 2021  
Computer-based training – 3021  
Computers – 3013  
Connectors and connection systems – 2016  
Container handling equipment – 4070  
Contract manufacturing – 8030  
Control equipment – 4070  
Control systems – 5020  
Control, monitoring and communication – 3018  
Covert mission system – 1040  
Core types – 2017  
Ferrite  
C/E core  
Laminated  
Toroidal  
Current and voltage sensors – 4020  
Cursive in raster playback generator – 1040  
Cursive symbol generator – 1040  
Customised subsystems – 3022

### D

Data bus controller – 1030  
Data distribution and transfer – 3012  
Data fusion – 3014  
Data links – 3012 and 7010  
Data processing terminals and office mainframe access terminals (IT2000) – 3019  
Data systems – 2012  
Data technology systems – 3016  
Decommutation and processing instrumentation – 6030  
Design and draughting - 2D (InfoCAD) – 2030  
Design and test organization for EMP-EMI and Tempest requirements – 6010  
Digital data communication and control systems – 2012  
Digital engine control units – 4020  
Digital inertial navigation – 1030  
Digital portable telephone systems (ZONEPHONE) – 4060  
Digital private branch exchanges, (PABX), for voice and data – 4050  
Digital (vector data) map generation – 1040  
Digitised (paper chart data) map generation – 1040  
Diodes, cold cathode – 2018  
Directional gyros – 4020  
Display signal processing for shipborne and ground based radar and air traffic control – 8050  
Display systems – 1040  
Distributed control – 3018  
Distributed process-control input/output equipment – 2012  
Disturbance recorder system (LinDAR) – 4021  
Dual mode seekers – 7010  
Duplexers – 2018  
Dynamics – 7010  
Systems design  
Systems engineering  
Operational analysis  
Programme management  
Logistics support  
Marketing and support

### E

EO GW receiver systems – 1020  
EO for air, ground and naval use – 1020  
EO sightline stabilization and steering systems – 1020  
EO targeting pods – 1020  
EO warners – 1020  
Edge-connectors for printed circuit board – 2016  
Electronic systems – 5010  
Electronic warfare – 3014  
Electrical enclosures and consoles – 4040  
Electrical ground support equipment for launchers – 6030  
Electrical power conversion and control – 4020  
Electrical power transmission and distribution monitoring and control systems (Ranger) – 3015  
Electro-optics – 1020  
Electron beam welding systems – 2024  
Electron sources and accelerators – 6040  
Electronic and mechanical timing fuzing – 7010  
Electronic fuzes – 4010 and 5011  
Electronic fuzing – 8030  
Electronic News Gathering (ENG) antennas – 8020  
Electronic systems – 5010  
Electronic warfare – 3014  
Encoders - optical absolute – 2014  
Encoders - optical incremental – 2014  
Energy management systems (CEDREC) – 4021  
Energy management and control systems – 3015  
Engineering Records Management System (ERMS) – 2030  
Engineering services – 8030  
Data processing equipment maintenance  
Simulator systems support  
Equipment power supplies – 4020  
Equipment supply to end users, OEMs and systems houses – 3016  
Ethernet, LANS – 3011  
Expert systems – 3014  
Export licensing – 5040

### F

Facsimile equipment – 4050  
Fault recorder (VoCuL) – 4021  
Fault tolerance systems – 6030  
Field engineering support – 8060  
Filters – 2018  
Financial terminals – 4050  
Finite element analysis – 7010 and 8010  
Fire control training simulators and systems – 3021  
Fire service mobilising and communications – 3011  
Flight information and display (AMIDS) – 3010  
Flight test and evaluation – 8060  
Floated gyros type 121, 122, 125, 126 – 1030  
Foliage penetration radar systems – 8030  
Follow-on logistic support/training – 8060  
Forecourt management systems – 2015  
Format conversation display systems – 8050  
Frequency convertors – 3023  
Fuel dispensing (Autocourt) – 2015  
Fusion arc welding systems – 2024  
Fuzes for all munitions, ordnance, missiles and rockets – 4010  
Fuzing – 7010 and 8010

### G

GRP – 4080  
Filament wound and hand laid storage/process vessels and hoppers  
General and custom fibre reinforced engineering  
Underground petroleum storage tanks  
Graphics Libraries for User Extensions (GLUE) – 2030  
Ground based communication systems – 6010  
Ground based navigational aids – 8050  
Guidance and control, navigation, test equipment – 8060  
Gun-sound ranging systems – 5010  
Gunners training aids – 1020  
Gymbal navigation systems – 7010  
Gyroscopes – 1030  
Gyroscopic Gun Sight, airborne (GGS) – 1020

### H

HB876 area denial submunition – 4010  
Handheld data terminals – 3023  
Handheld tactical teleprinters – 3023  
Head down displays – 1040  
Head up displays – 1040  
Healthcare systems – 3017  
Helicopter equipment – 4020  
Automatic stabilisation systems  
Stabilised sights  
Helmet mounted systems – 1020  
High Accuracy Submersible Inertial Navigation System (HASINS) – 1030  
High performance graphics controllers (VARS) – 3016  
High pressure air systems – 4040  
High voltage applications – 2025  
High voltage transformer rectifier units – 2017  
Hospital data communications – 3011  
Hospital diagnostic services computer systems (Delphi-Phoenix) – 3017  
Hospital patient management systems (Leadership) – 3017  
Hybrid microcircuits – 4020  
Airborne power supplies  
Solid state relays  
Hybrid microcomputers – 6030  
Hydraulic components – 4040  
Hydraulic control systems – 4040  
Hydraulic shock and vibration dampers – 4040



## I

Ice detectors – 4020  
In-house photoplotting system (DRIVE) – 2030  
Industrial and communication systems – 2011  
Industrial components – 2014  
Industrial process control (continuous and batch) – 3018  
Industrial systems – 3018  
Inertial borehole directional survey equipment rental (FINDS) – 2022  
Inertial guidance control – 1030  
Information systems – 3019  
Initial graphic exchange specification (IGES) – 2030  
Inspection, testing, certification – 5040  
Instructional design – 5030  
Instrumentation and measurement – 6040  
Instrumented test ranges – 8060  
Insulation – 4080  
Integration and test – 7010  
Integral rocket ramjets – 7010 and 8010  
Integrated data and voice communications – 3011  
International contract management – 5020  
Interface programs to a range of proprietary applications software – 2021  
Isolators – 2018

## J

JP233 distributor electronics – 4010

## K

Klystons – 2019

## L

LNA subsystems – 3023  
Land navigation and attitude reference system – 1030  
Land survey system (FILS) – 1030  
Laser and IR proximity fuzes – 4010  
Laser and IR proximity fuzing – 7010  
Laser beacons – 1020  
Laser designators (markers) – 1020  
Laser gyros – 1030  
Laser rangefinders – 1020  
Laser welding and cutting systems – 2024  
Lasers – 2020  
Launch motors – 7010  
Licensed manufacture and support – 1050  
Limiters – 2018  
Linear and interactive video courseware – 5030  
Liquid cargo handling training simulators and systems – 3021  
Load, assemble and pack – 5011  
Loads – 2018  
Logistic systems – 1050  
Low cost, lightweight graphite composite tracking antenna systems – 8010  
Low noise electronics for high energy physics experiments with particle accelerators – 6030  
Low noise FET amplifiers – 3022  
Low voltage multi output (mil spec) – 2025

## M

Magnetron radar system HV power supplier – 2025  
Mainframe access terminals (IT2000) – 3019  
Maintainer training simulators and systems – 3021  
Manager/secretary communication systems – 4050

Map displays – 1040  
Map film production – 1040  
Map generation – 1040  
Map rectification machine – 1040  
Maritime surveillance radar, military or exclusive economic zone protection – 1010  
Marked target seekers – 1020  
Message switching (TARE) – 3011  
Metrology systems – 2013  
Microprocessors – 3013  
Microstrip – 2018  
Microwave communication equipment – 8050  
Microwave components – 2018  
Microwave power amplifiers – 3022  
Microwave relay link systems – 8020  
Microwave systems – 3022  
Military and commercial displays – 1040  
Military datalinks – 3011  
Military telecommunications systems – 6020  
Millimeter-wave high stability oscillators – 3022  
Mine control measures training simulators and systems – 3021  
Mine countermeasures – 3012  
Miniature low power amplifiers – 3022  
Missiles and weapons systems – 7010  
Mission computing – 1030  
Mission planner systems – 8060  
Mission planning displays – 1040  
Modification and update – 7010  
Motors - external rotor AC – 2014  
Motors - precision AC shaft – 2014  
Motorway control and communications – 3016  
Multifunction displays – 1040  
Multiple EO sensor systems – 1020  
Munitions and cluster munitions – 5011  
Munitions dispensers – 7010 and 8010

## N

Naval systems – 3012  
Navigation training simulators and systems – 3021  
Navigation systems – 1030 and 7010  
Navigation and nav-attack systems for aircraft – 1030  
Needs analysis – 5030  
Neodymium Yag transmitters and trancivers – 1020  
Networked terminals – 3019  
Night vision goggles – 1020  
Nuclear instrumentation – 6030  
Numerical control module (InfoCAM) – 2030

## O

Office automation – 3019  
Offshore communications – 3011  
Oil and gas production, storage and pipeline control – 3018  
On-board data handling systems and trouble shooting – 6030  
On-board microgravity payloads – 6030  
On-board remote sensing payloads – 6030  
On-board scientific payloads – 6030  
Ongoing support for existing contracts – 5040  
On-load tapchangers – 4070  
Operational analysis – 7010  
Operations research – 8060  
Optical communications systems – 4020  
Optical disc rugged data storage – 1040  
Optical film measuring equipment – 1040  
Orbit control instrumentation – 6030  
Ordnance systems – 5011  
Ordnance systems and components – 8010  
Oscillogyro type 142 – 1030

## P

Packaging, shipping – 5040  
Parametric amplifiers – 3022  
Parametric (3D) solid modelling – 2021  
Passenger handling information – 3010  
Passive helicopter identification equipment (PICKET) – 4010  
Payload simulators – 6030  
Periscope/visual training simulators and systems – 3021  
Personal computer workstations – 3019  
Perspective displays – 1040  
Phase locked oscillators – 3022  
Phaseshifters – 2018  
Pingers – 2023  
Platform transmitter terminals (ARGOS) – 2023  
Pods - communication and ECM – 8060  
Point detonating fuzes – 4010  
Point detonating fuzing – 7010  
Pointing and displays – 1020  
Police command, control and communications – 3011  
Police - military communications system – 6020  
Portable digital telephone systems (ZONEPHONE) – 4060  
Position and Azimuth Determining System (PADS) – 1030  
Post design services – 1050  
Potentiometers - precision conductive plastic – 2014  
Potentiometers - precision wirewound – 2014  
Power conversion systems for military and industrial applications – 2025  
Power generation monitoring and control – 3018  
Power supplies – 2017, 2019 and 2025  
Power tubes – 2019  
Precision guided missiles – 7010  
Precision hydraulics – 4040  
Precision machining – 4040  
Prepregs using paper, cotton fabric and woven glass fabric impregnated or coated with thermo setting resins – 4080  
Press fit connection system – 2016  
Pressure activated fuzes – 4010  
Pressure activated fuzing – 7010  
Printed circuits – 3013  
Process Management System (PMS) – 3018  
Procurement factoring – 1051  
Product development – 1050  
Product support – 7010  
Production machinery – 6040  
Program management/prime contracting – 8060  
Projected (film medium) map generation – 1040  
Propulsion – 7010  
Public utility monitoring and control – 3015  
Publications – 1050  
Public telephone service (PHONEZONE) – 4060  
Pump - blender, mono, duo, twin, quad and multi-product dispensers – 2015  
Pump - hydraulic – 2015  
Pump - installation and maintenance – 2015

## R

RF-IF rack equipments – 3023  
RF data link terminals for data/video transmission in ground and airborne vehicles – 8040  
RF modems for broadband cable networks – 8040  
Radar antennas – 8020  
Radar procedures training simulators and systems – 3021  
Radar simulation – 3021  
Radar systems for specialised applications – 1010  
Radar warning systems – 4020  
Radioactive pollution monitoring networks – 6030  
Radio communication electronic warfare – 6010  
Radio communication equipment – 6010  
Radio communication systems – 6010  
Radio equipment – 8050

Radio frequency data communications products for civil and military applications – 8040  
Radio modems for wireless data links – 8040  
Radio navigation – 6010  
Radioactive pollution monitoring networks – 6010  
Ram air turbines – 8010  
Ramjets – 7010 and 8010  
Rapid international courier delivery – 5040  
Raster symbol generator (colour and monochrome) – 1040  
Real-time perspective image generator – 1040  
Real-time data processing systems for inflight tests – 6030  
Recorders - remote photo recording – 1020  
Refurbishment – 4040  
Relational processor – 3013  
Reliable on-board software – 6030  
Remotely-piloted vehicle telemetry, tracking and control systems – 8020  
Repair and spares manufacture – 1050  
Research and development – 6040  
Resin-bonded cylinders – 4080  
Resistance welding systems – 2024  
Resource management – 3011  
Responders – 2023  
Rifle/small arms/Anti-tank/Marksman indoor firing ranges – 3021  
Road transport control, monitoring and communication – 3016  
Rocket engines and components – 8010  
Rocket motors – 7010  
Rocket systems – 8010  
Rotary mirror scanners – 1030

## S

SCADA – 3015  
SCADA systems for power transmission and distribution – 2012  
SCOOT urban traffic control – 3016  
SHF combat net radio satcom adaptor – 3023  
SHF man-portable satellite terminal – 3023  
Safety and arming devices – 4010  
Safety and arming fuzing – 7010  
Safety surveillance and control – 3011  
Satellite attitude sensors – 1030  
Satellite communication systems – 3023  
Satellite electrical ground support equipment – 6030  
Scan converters - analogue and digital – 1020  
Schematic drawing and data capture (InfoSCHEM) – 2030  
Sculptured surface design (InfoSURF) – 2030  
Secure, dependable communications – 3011  
Security systems – 5010 and 5050  
Seekers/Guidance sensors (TV, laser, IR) – 7010 and 8060  
Sensor assessment – 4010  
Sensor research – 4010  
Sensors – 8030  
    Target detecting  
    Underwater mine  
Sensors and signal processing for weapons systems – 4010  
Shipboard surface search radar – 8050  
Ship inertial navigation system – 1030  
Ship weapon system engineering – 3012  
Shutters – 2018  
Signal conditioning instrumentation – 6030  
Simulators and systems – 3021  
Simulation and training systems – 8030  
    ASW  
    Navigation  
    Periscope/visual  
    Rifle/small arms  
Small calibre systems – 5012  
Software engineering – 3014  
Software for ground support equipment – 6030  
Solid modelling - 3D (InfoSOLID) – 2030  
Solid state power conversion systems – 4090  
Sonar operator training simulators and systems – 3021



Sonar systems – 3012  
 High frequency surveillance and mine hunting  
 Naval consoles and displays (colour and monochrome)  
 Passive/active/narrowband/broadband/intercept  
 System performance and assessment  
 Towed arrays  
 Transducers and arrays  
 Vibration monitoring  
 Sourcing – 5040  
 Space – 1030  
 Inertial guidance control  
 Satellite attitude sensors  
 Space applications – 6030  
 Spacecraft platform simulators – 6030  
 Special laser communicators – 1020  
 Strapdown navigation systems – 7010  
 Strategic defence studies – 3014  
 Sub-bottom profiler (GEOPULSE) – 2023  
 Sub-systems – 2018  
 Submarine command team training simulators and systems – 3021  
 Submarine performance and control analysis – 4030  
 Submarine platform control systems – 4030  
 Depth data  
 Hover  
 Hydraulic valves for reducing noise  
 Hydroplane and rudder  
 Trim and compensation  
 Submarine systems – 4030  
 Subsonic and supersonic ramjets – 8010  
 Support equipment – 5020  
 Surface ship operations room training simulators and systems – 3021  
 Surface-to-air missiles – 7010  
 Switches, (semiconductors) – 2018  
 System design and engineering – 7010  
 System and software services – 3014  
 Systems/aircraft integration – 8060  
 Systems analysis – 8060  
 Systems engineering – 5020  
 Systems studies – 3023

**T**  
 TR cells and TR limiters – 2018  
 TWT power supply applications – 2025  
 Tactical electronics – 8030  
 Tailored software languages including artificial intelligence  
 for system autonomy – 6030  
 Tank fire control – 5012  
 Target activated fuzing – 7010  
 Target selective fuzing – 7010  
 Target selective/target activated fuzes – 4010  
 Target tow reels – 8010  
 Technical advice and assistance – 1050 and 8060  
 Technical training and field representation – 1050  
 Technology transfer – 5011, 5050 and 8060  
 Telecommunication systems (radio, multiplex, network management,  
 antenna systems etc.) for PTT authorities, public utilities and  
 private users – 2011  
 Telecommunications equipment – 4050  
 Telecontrol systems for meteorological buoys – 6030  
 Telecontrol systems for oil and gas production and pipeline  
 control – 2012  
 Telecontrol/telecommand systems for submarine robots – 6030  
 Telemetry – 7010  
 Telemetry and telecommand systems and instrumentation – 6030  
 Telemetry systems for the water supply industry – 2012  
 Telemetry tracking antenna systems – 8020  
 Telephone key systems – 4050  
 Terrain Reference Navigation Systems (TERCOM) – 1030  
 Test equipment calibration service – 1020  
 Test loop translators – 3023  
 Threat emitter antennas and systems – 8020  
 Simulation of enemy radars for US and Allied powers military  
 training

Timing, electronic and mechanical fuzes – 4010  
 Traffic census – 3016  
 Traffic signal control and monitoring systems – 2012 and 3016  
 Training simulators and systems – 3021  
 Transformer rectifier units – 4020  
 Transponders – 2023  
 Transportable/tactical ground stations – 3023  
 Travelling wave-tube amplifiers – 2019  
 Tunnel plant monitoring and control – 3016  
 Turbo products – 8010  
 Turnkey communications contracting system planning and project  
 management – 2011  
 Turnkey Eutelsat ground stations – 3023  
 Turnkey Intelsat ground stations – 3023  
 Turnkey repair and maintenance facilities – 1050  
 Turret control – 5012  
 Two part connectors – 2016  
 Two-gimbal inertial navigation system – 1030

**U**  
 UHF handheld terminals – 3023  
 Universal Electronic Head Down Display (UNIHEAD) – 1020  
 User documentation – 5030  
 Utility management systems – 4020

**V**  
 VME products - 68000 – 3013  
 VSAT – 3011  
 VSCF generation systems – 4090  
 Varactor tuned oscillators – 3022  
 Vehicle displays – 1040  
 Vehicle electrical testing – 3016  
 Very large scale integrated circuits – 6030  
 Video recording systems – 1040  
 Video production – 5030  
 Computer graphics  
 Scriptwriting  
 Sound tracks  
 Video  
 Viscometers – 4021  
 Ferranti-Shirley cone and plate  
 Portable co-axial cylinder  
 Voice messaging – 3016 and 4050

**W**  
 Warehousing, inventory control – 5040  
 Warheads – 7010 and 8010  
 Warheads/payloads – 8060  
 Weapon aiming systems – 1020  
 Weapon aiming/Mission computer – 1040  
 Weapon control systems – 3012 and 8060  
 Weapon modernisation – 5012  
 Weapon systems – 7010  
 Weapons equipment – 4010  
 Weapons systems training simulators and systems – 3021  
 Welding system controls – 2024  
 Wind tunnel testing – 7010 and 8010  
 Word processing and personal computer networks – 3019  
 Wound components – 2017

**Y**  
 YIG tuned filters – 3022  
 YIG tuned oscillators – 3022

**Z**  
 ZONEPHONE digital portable telephone systems – 4060

## Financial summary 1987/88

### Salient features of the accounts

	1988 £M	1987 £M
Turnover	822.1	628.7
Operating profit	78.9	55.4
Profit on ordinary activities before taxation	68.0	50.2
Outstanding order book	1500.0	800.0
Shareholders' capital and reserves	345.7	208.1
Net borrowings	145.6	23.9
Capital employed	491.3	232.0
Net borrowings to Capital employed	29.6%	10.3%

	p	p
Earnings per ordinary share	8.26	7.50
Dividend per ordinary share	2.328	1.94
Number of employees at 31 March	24 818	21 683

### Analysis of turnover and operating profit

	Turnover £M	Operating profit £M	Turnover £M	Operating profit £M
Existing businesses	584.7	57.4	556.0	56.1
Businesses acquired in 1988	192.7	22.9	—	—
Businesses discontinued in 1988	44.7	(1.4)	72.7	(0.7)
	<b>822.1</b>	<b>78.9</b>	<b>628.7</b>	<b>55.4</b>
Defence related markets	567.2	67.9	387.3	45.6
Civil and industrial related markets	254.9	11.0	241.4	9.8
	<b>822.1</b>	<b>78.9</b>	<b>628.7</b>	<b>55.4</b>

The results include those for International Signal & Control Group PLC for the four and a half months from 16 November 1987 when the merger with that company was declared unconditional in all respects.

This financial summary is an abridged version of the company's full accounts which have been filed with the Registrar of Companies and have been reported on without qualification by the company's auditors.



