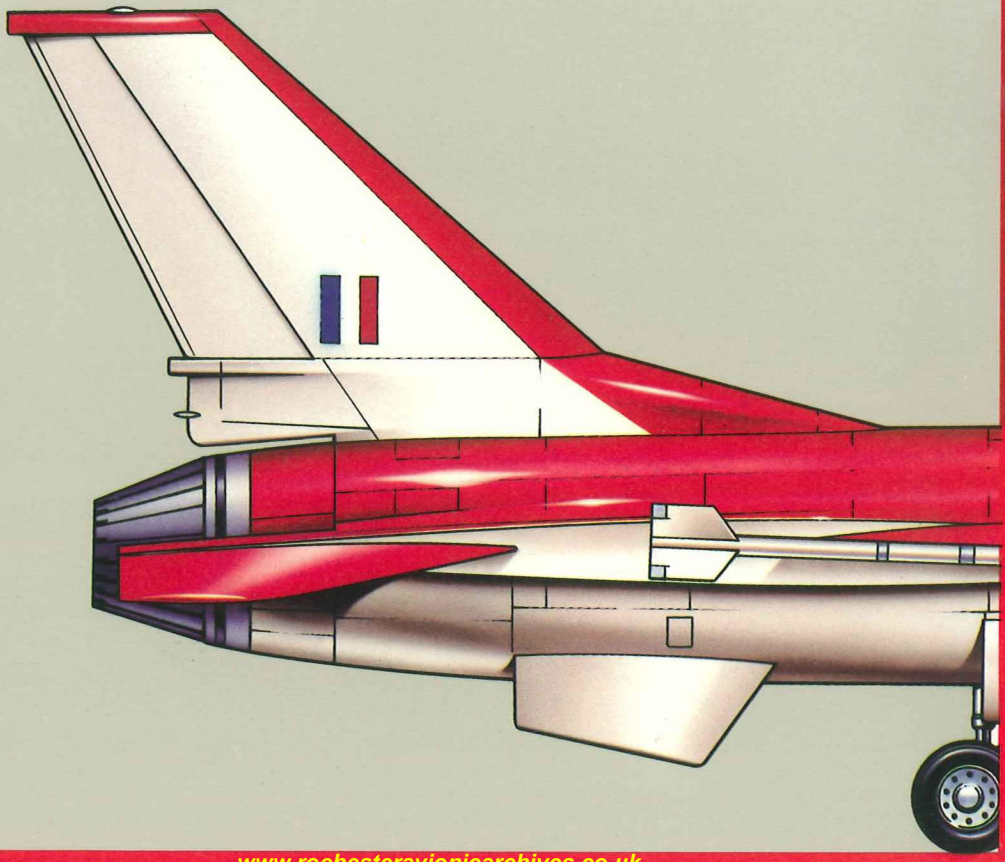
GETTING INTO AVIONICS



www.rochesteravionicarchives.co.uk

Without avionics, today's aircraft couldn't leave the ground.

Avionics is an invisible technology.

You can't see much evidence of the avionics content of an aircraft just by looking at it, because the systems themselves are small, and packed tightly into the airframe.

But in terms of what those systems do, and what they make the aircraft capable of, they're as important as the airframe itself.

To say that a modern aircraft couldn't get off the ground without avionics is quite literally true.

High performance aircraft are inherently unstable in their design. Advanced flight control systems such as those pioneered by GEC Avionics back up the pilot's own control movements through the input of data from attitude, airspeed and other sensors located around the airframe. They then transmit that data in digital form to the aircraft's control surfaces, making it predictable and safer in flight. In this context, avionics give the pilot an additional 'brain' as well as an extra pair of hands to help him fly the aircraft.

Once in the air, avionics helps the aircraft navigate with pinpoint accuracy, through inertial navigation systems which sense the slightest change in the aircraft's attitude, speed or course. Or the navigation systems could take the form of a moving map display, which presents the pilot with a detailed map of the terrain he's flying over, and which accurately follows every change in speed or course.

Avionics have also given military aircraft an all-weather, 24-hour capability, through low-light or infra-red TV systems which, when linked to laser-based holographic generators, give a pilot a clear, 3-D view of the ground ahead, even in conditions of total darkness.

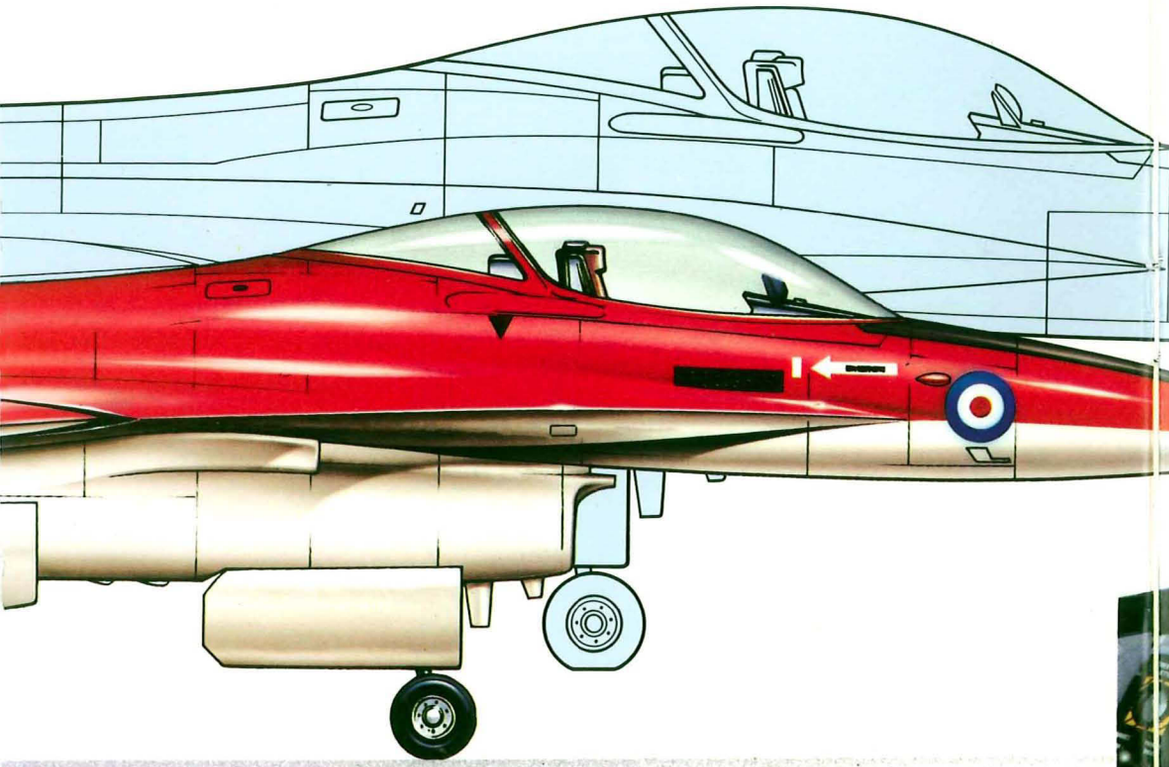
A pilot needs a constant stream of data about his airspeed, snap up and down capability or any other aspects of his aircraft's performance. Avionics presents him with that data clearly and legibly in his direct line of vision through head-up displays. We've even managed to package a display system inside a pilot's helmet, so that he is able to see any information he needs, no matter which way he turns his head.

In a military scenario, an aircraft needs to remain undetected if it's to accomplish its mission. Electronic countermeasures alert a pilot to any possible radar threat, and can neutralise that threat by electronic means.

Today, avionics have become totally indispensable to almost every aspect of the way an aircraft functions.

As the company producing the world's largest range of avionics systems, you could argue that we've become almost as indispensable.

For further information contact, The Graduate Recruitment Officer, GEC Avionics Limited, FREEPOST, Rochester, Kent ME1 2BR.



For 70 years, we've been making aviation history.

It's appropriate that our headquarters address should be Airport Works, Rochester.

Because it's literally on the site of an airfield which has its own place in aviation history, as the place from which the Stirlings and other Short Brothers' designs first took off.

At GEC Avionics, we've been involved in the developing story of aviation since long before the term avionics was ever used.

We started under the name of Elliott Brothers, making high-quality instruments. We were so quick to recognise the future importance of aviation, that by 1910 we had developed our own range of flight instruments.

Since then, we've matched every advance in aviation technology with advances in our own technology — sometimes producing a device or a system which itself spurred a major advance in an aircraft's capability.

For example, in the 1950's we developed the world's first head-up display system, thereby starting what has become almost a separate field of avionics technology in its own right.

Our history has been one long string of 'firsts', each one marking a technical or commercial achievement of importance not only to us, but the avionics world in general.

In the mid 1970's we were the first non-US company to sell avionics equipment direct to a US aircraft manufacturer, in this case Boeing, who recognised the excellence of the digital throttle controls systems which we had developed specifically for the 747.

We've capitalised on that initial success in the US by opening our own production and R&D facilities there, so that now a significant part of our business is in the US — in marked contrast to the popular belief that British companies can't export high technology to America.

In many cases, we've actually taken completely new technologies, and developed them into technically and commercially viable systems. For example, how many people, a few years ago, would have believed in the feasibility of combining low-light TV and holographic techniques to produce a pilot's display system of unique clarity and performance, and which greatly enhances the operational capability of modern military aircraft?

In recognition of the unique role we've played — and will continue to play — in aviation and avionics history, a total of ten Queen's Awards, for both technology and export achievement have been won.

The widest avionics capability in the world.

To say that GEC Avionics produces a wider range of avionics systems and equipment than any other company in the world is a statement of fact, not a piece of advertising jargon.

You'll find our systems operating in 150 aircraft types throughout the world, from small military helicopters to the Boeing 747. In physical size and order value, our products range from flight control systems and air data computer systems, to the complete communications and mission control electronics for the AEW Nimrod. Current activities at Rochester include:

Airborne displays

We were one of the first companies to develop the head-up display — now specified as an integral piece of avionics on any combat aircraft, and featuring such advanced techniques as laser holography. Our work in pilot's displays has been the focal point of many of our other activities for, example low-light TV systems.

Maritime aircraft systems

One of our Rochester Divisions is dedicated specifically to acoustic processing and communications systems. Whenever an RAF Nimrod makes the headlines in a maritime search and rescue operation, that operation is highly dependent on systems supplied by GEC Avionics. Our advanced AQS901 airborne underwater detection system using sonobuoys won us the Queens Award for Technological Achievement in 1983.

Inertial navigation systems

Our Guidance Systems division has been largely responsible for the development of today's most advanced attitude sensing devices, including those based on laser technology.

Flight control systems

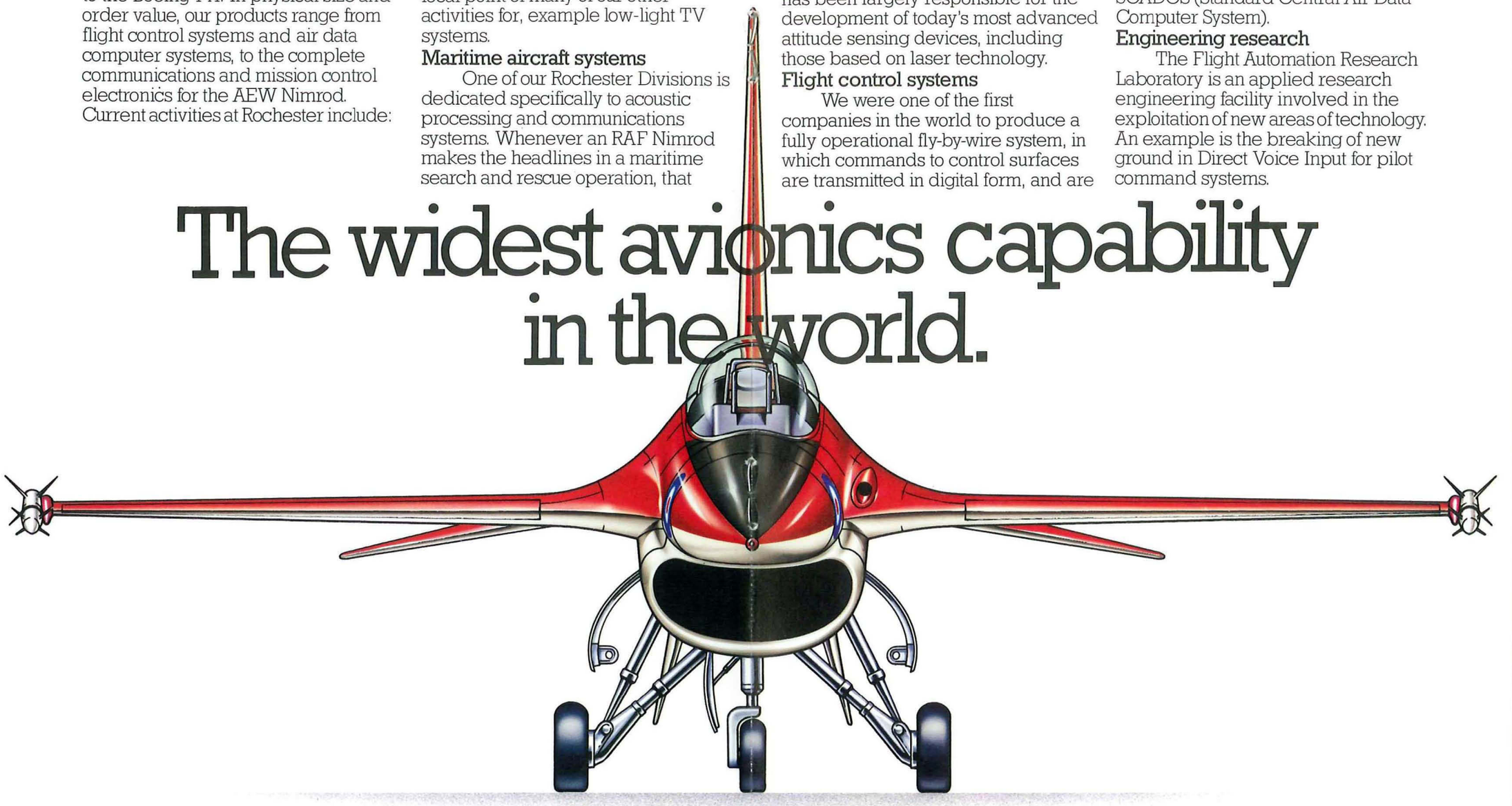
We were one of the first companies in the world to produce a fully operational fly-by-wire system, in which commands to control surfaces are transmitted in digital form, and are enhanced by sensing devices distributed around the airframe.

Air data systems

Our Instrument Systems Division has achieved remarkable success with the development of a major new hardware/software package for the U.S. Air Force and Navy — known as SCADCS (Standard Central Air Data Computer System).

Engineering research

The Flight Automation Research Laboratory is an applied research engineering facility involved in the exploitation of new areas of technology. An example is the breaking of new ground in Direct Voice Input for pilot command systems.



The project team : who does what.

At GEC Avionics, our work embraces literally every aspect of avionics technology.

But regardless of what particular system we're working on, our approach to that work is always the same.

We see our business very much as solving problems. And to ensure that those solutions are fully effective, we need to focus the maximum amount of skill and experience on the problem in question.

To do this, we break every project down into recognisable, manageable task cells. And on each task, we bring to bear a complete cross section of skills in the belief that the solution we seek will not be confined to one discipline alone.

The men and women who represent that mix of skills form the project team — a group of experienced engineers and young graduates who bring their own knowledge to bear on a task, but who also broaden their experience by working closely with people from disciplines different to their own.

The systems engineer

❶ In avionics, some of the most fundamental decisions we have to take concern what form a new system will take. For example, will it be based on distributed microprocessors, or will its data handling be done centrally? Do we handle specific tasks through dedicated micros, or through software programs?

Reaching the right decision, and therefore the right system configuration is a task that calls for a high level of conceptual skill, and above all, the ability to decide what the customer really wants from a system. This is particularly true at the early stages when we develop the mathematical model that will assess the systems performance, and guide its development. It's a task which no-one can tackle alone — hence the importance of the project team environment, and the dialogue through which the right decisions will be reached.

The software engineer

❷ Today, real-time software is the basis of virtually any avionics system. For that reason, the software engineer is always an important member of the project team, and is involved from the earliest conceptual stages of the project.

Designing and writing the software which an avionics system will operate is probably the most demanding programming task you could ever face.

Not only is the system functionally complex, but aspects such as response time and integrity assume life-or-death importance.

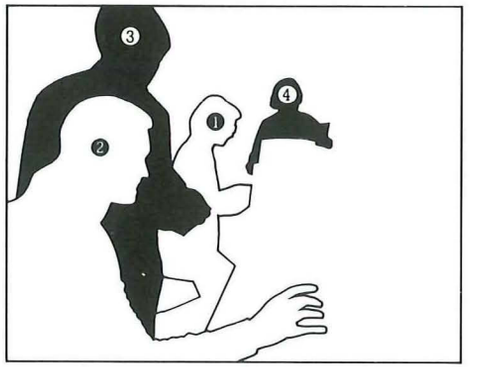
The development engineer

❸ Once the system configuration is resolved in theory, it must be designed in detail, and the various circuits made to perform both individually and when fully integrated and interfaced.

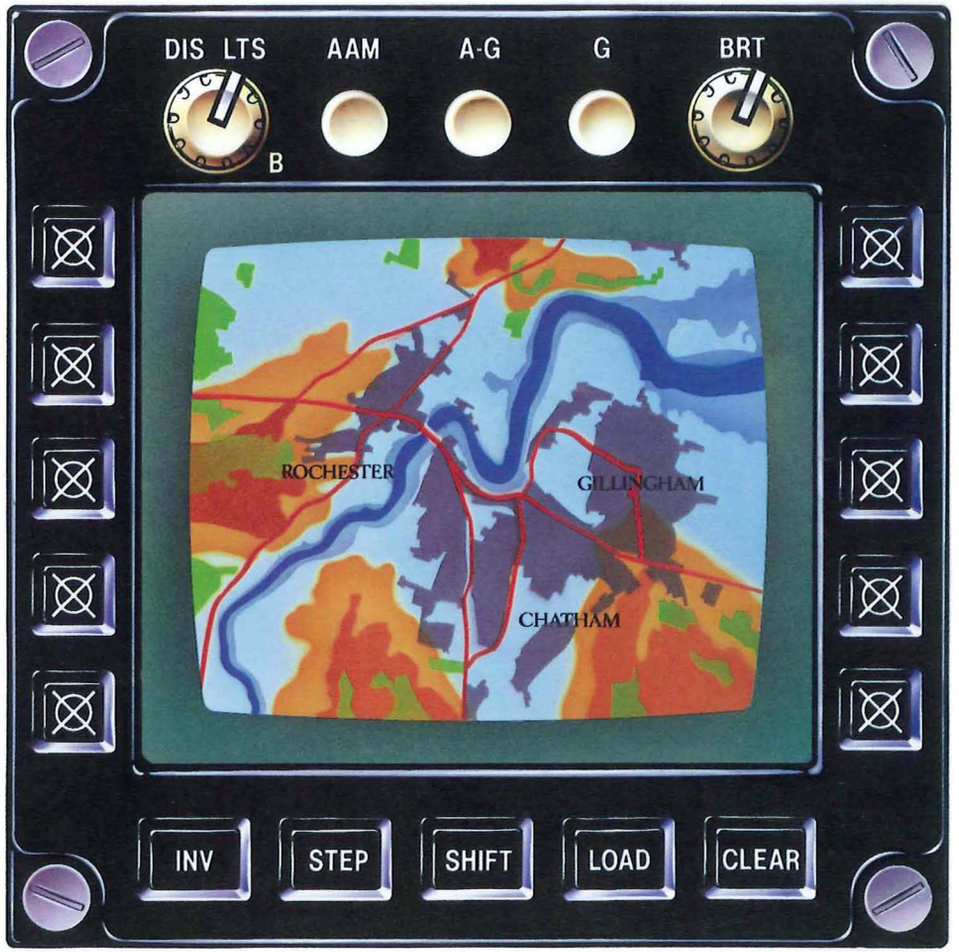
In avionics, circuits can take many different forms — digital, analogue, hybrid or integrated. Whatever option chosen the design will represent the latest techniques, and will have to overcome the special problems inherent in avionics applications — heat dissipation, size and weight constraints, power consumption and effectiveness against partial systems failure or degradation.

The quality engineer

❹ Quality has a special significance for avionics. It's a consideration which is present right from the early stages of a project, not something which merely applies a few checks when most of the work has been done. Quality engineering impacts in many ways on a systems project — on the assessment of such crucial parameters as mean time between failure, on the selection of components and the audit of their suppliers, and of course on every sub-system, and every stage of the project as it develops.



Rochester: your home base.



Rochester is one of the five Medway towns which between them make up a distinctive and active community. The area also has a clearly defined topographical identity. The sea and the Medway estuary with its many small islands form the Northern boundary, while the River Medway itself makes an effective demarcation line with areas closer to London. To the East, the North Kent holiday resorts stretch out as far as the North Foreland. To the South, you drop quickly down over the scarp slope of the North Downs into the villages and orchards of Kent.

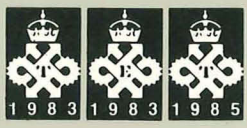
One of the biggest headaches for any graduate starting work is accommodation. On that score, the Rochester area has a lot to offer. The large number of colleges in the area ensure a good market for centralised, rented accommodation, varying from bedsits to self-contained flats. Prices range from £18-£30 per week, with several accommodation agencies providing necessary information and advice, in addition to Company lists of available property.

For the first time buyer a buoyant market of traditional terraced houses or modern developments on the outskirts of the area are available. Prices start from around £22K.

For recreation, the River Medway provides a high concentration of water sports activities, whilst Gillingham provides a new sports centre offering sports as diverse as fencing, and volleyball, as well as the more conventional activities of football and weight training.

Not everyone wants to spend all their spare time in sporting activity, and for anyone wanting little more than to explore unspoilt countryside and find a quiet country pub or restaurant, the Rochester area provides an excellent base.

For anyone wanting to venture further afield at weekends or in the evenings, London is only 40 minutes away by fast train.



The Queen's Award for Technological Achievement

The Queen's Award for Export Achievement 1983

The Queen's Award for Technological Achievement

GEC AVIONICS

Aviation Service and Repair Division

This Division provides a total support facility for equipment manufactured by the Product Divisions at Rochester, aimed at satisfying the needs of both Civil and Military customers. Our activities embrace repair and overhaul, defect investigation, warranty administration, initial provisioning, supply of spares, product improvement, design and production of special test equipment, technical publications training and field service. Comprehensive support is provided world-wide.

A special feature of the division is its third-line specialist maintenance exchange and repair scheme currently operated for the several systems designed by GEC Avionics which are used in the Tornado aircraft. Post Design Services are provided for previous similar schemes instituted for Company systems on Jaguar aircraft and the Lynx helicopter. This requires the supply of fully commissioned special test equipment, the procurement and management of spares inventories, the preparation and validation of repair documentation and the training of service personnel.

Wide experience is provided of all the Company's products and engineers are required to obtain specialist knowledge by working with development teams in product divisions with a view to transferring their knowledge to the product support organisation.

Graduates in Electronic Engineering conversant with analogue and digital techniques are required to be engaged on design of third-line special-to-type test equipment and maintenance and trouble-shooting of complex airborne control systems. Additionally, engineers are required for on-site support of these systems at Service establishments and with Civil Airlines.

Some of our current and projected tasks include the support of BAC 1–11, VC10, A300, A310, A320, Concorde, Boeing 707 and 747, Tornado, Lynx, Jaguar, Nimrod and F16 Aircraft.

Central Quality Department

The standards of quality and reliability offered by the Company are an essential part of the performance of avionic systems and this Department works to help assure customers that "nothing shall fail" in the extreme environment of an aircraft. Quality Assurance is regarded by management as a vital activity requiring specialist support and C.Q.D. fulfils this task by providing services of a specialised nature to the Company's Divisions at Rochester. These services can be split into two categories — Service Activities and Corporate Services.

A. Laboratory Services

(i) Provision of an Environmental Test Laboratory, where a wide range of mechanical and climatic tests are carried out on equipments.

(ii) Provision of an Electromagnetic Compatibility Laboratory where investigations and tests are carried out on equipments.

(iii) Provision of Electrical and Mechanical Calibration Laboratories where sophisticated measuring and test equipment is checked and calibrated against higher grade instruments, with traceability to National Standards.

(iv) Provision of an electrical test equipment repair facility where faulty test equipment may be rectified.

(v) Provision of an Environmental Calibration Laboratory which carries out calibration, traceable to National Standards, of a wide range of Environmental Test facility functions.

B. Corporate Services

(i) The generation and maintenance of documentation relating to Quality matters.

(ii) Performance of independent Quality Audits.

(iii) Providing an interface between the Divisions of the Company and appropriate organisations in the interpretation and adoption of general Quality Assurance policy.

These specialist activities are also provided for other companies and for government departments.

Quality Assurance staff are recruited from people already experienced in Q.A. techniques, from graduates, and from ex-service technicians with appropriate technical experience.

As far as graduates are concerned, much of our work would be particularly interesting to people trained in electrical/electronic engineering or applied physics/electronics disciplines. The environmental test laboratory has limited requirements for graduates with a training in mechanical engineering. Graduates are trained "on the job" and are involved in specifying, performing and reporting environmental tests on a wide range of avionic equipments. The identification and solution of design problems shown up by environmental testing involves close co-operation with equipment design teams.

The function of Central Quality Department, by its very nature, offers suitable graduates a unique opportunity to learn about a variety of electronic equipments in a

Continued over

relatively short time by becoming involved in a range of testing activities aimed at exposing design weaknesses.

Automatic Test Equipment

In common with all the other Divisions within the Company, this is a completely autonomous unit responsible for all sales, design and development and production activities associated with sophisticated test equipment primarily but not exclusively for the avionics industry. The Division's products range from small microprocessor based general purpose test equipment to large scale fully customised computer controlled automatic test systems providing the capability of testing from DC to microwave frequencies. The Division is involved in a range of software activities including digital and analogue processing. Simulation techniques are continuously being evaluated and improved. Integrated test system development, associated with test subjects ranging from components to complete systems, is being carried out for a variety of products from avionics to the modern car. Current development activities within the Division involve investigating and enhancing a wide range of automated testing techniques from the checking of individual components in-circuit to the full functional testing of printed circuit boards and complete units.

The Division is employed in a major area of work on the specialised ATE for the Tornado Multi-Role Combat Aircraft. This is the largest contract ever let for military avionic ATE in Europe. In parallel with this the very latest commercial products providing versatile and powerful testing capability for industrial and military requirements are being actively marketed. In addition to test equipment the Division is engaged in the development of sophisticated software packages to provide a new concept in electronic manufacturing management and control. Further work is being negotiated in various countries of Europe and in the USA.

The Engineering Department of over 250 people employs some 150 qualified engineering personnel. It is responsible for the production of the Test Programs for ATE; the writing of system software to drive the ATE instrumentation and peripheral devices such as magnetic tape handlers, discs, cassettes, line printers, paper tape readers; the design of interfacing circuitry for specialist instrumentation and the overall design of total systems of ATE to cover the avionic fit of a particular aircraft or to meet a commercial product requirement.

There are opportunities within this Division for Electrical/Electronic Engineers, Applied Physicists, Computing Engineers and occasionally Mechanical/Production Engineers. Because of the nature of the work, experience on up-to-date equipment in the field of radar/communications/computers/data transmission is particularly useful.

A balance is sought between young engineers qualified to degree standard and more senior experienced engineers. In recent years a requirement has evolved for a more flexible approach to work and the traditional Hardware and Software skills have tended to become less evident although specialists in each are still required. With the ever increasing complexity of electronic equipment younger

Continued over

engineers are particularly encouraged to develop a greater awareness of other disciplines.

Test Programming has emerged as an interesting challenge for the new graduate embracing the skills of both the software and hardware engineer. It is often seen as a good starting point from which a sound understanding of the products and associated techniques can develop. Other opportunities exist for graduates to join multi discipline teams working on the design and development of current and future ATE.

The Divisional Engineering Structure to Technical Manager level provides scope for career development through the Project to Project Manager, Engineering Manager and hence to Technical Manager. Promotion is still available through the specifically technical routes encompassing the positions of Senior Engineer and Principal Engineer.

Combat Aircraft Controls Division

The main products of Combat Aircraft Controls Division are automatic flight control systems (AFCS) supplied for fixed-wing combat aircraft. The Division is involved in the complete process of system and equipment design, development, manufacture, rig and flight test and the production of equipment for in-service use. A significant part of the current business is for overseas customers.

The systems range from simple autostabilisers to complete digital AFCS and involve gyros, accelerometers and actuation systems as well as the Division's own designs of analogue and digital airborne computers.

This Division currently employs over 540 people and nearly 300 of these are in the Engineering Department which employs over 168 qualified engineers. The main current projects in the Engineering Department are:

Harrier and Sea Harrier

Both aircraft types are fitted with a three-axis stability augmentation system which operates during take-off, transition, normal flight and hover. Additionally, the Sea Harrier is equipped with an autopilot which provides height, attitude and heading hold facilities.

Tornado

Fly-by-wire command and stability augmentation system, digital autopilot and flight director, quadruplex electro-hydraulic actuators, spin prevention and incidence limiting. The Tornado is an advanced swing wing supersonic aircraft developed jointly by UK, Germany and Italy and is now in large volume production.

Active Control Technology

Extending the experience gained as suppliers of the Flight Control Equipment for the **Jaguar Fly-by-Wire** Active Control Technology Demonstrator programme, the project team has also developed the quadruplex Flight Control System for the UK **Experimental Aircraft Programme** (EAP) Demonstrator Aircraft. Designed as an unstable Control Configured Vehicle, this aircraft depends entirely upon the high speed, high integrity, digital FCS to provide artificial stability, and hence optimal control response and agility. This activity leads directly to the Flight Control Systems required for the future European Fighter Aircraft programme and many other advanced aircraft programmes around the world.

AM-X

Flight control system comprising two dual-redundant computers based on 16-bit microprocessors, and providing Fly-by-Wire control of 7 control surfaces. The AM-X is being developed by an Italian/Brazilian consortium, and FCS development is in conjunction with Aeritalia.

T-45A

Yaw Damper Computer for the US Carrier Trainer aircraft based on the popular Hawk trainer produced by McDonnell Douglas.

New Developments

Advanced digital technology is

Continued over

employed in the systems and support equipment including microprocessing, large scale integrated circuits and optical data transmission. Extensive use is made of high level languages for software development on disc operating systems.

Each project has its own team of engineers carrying out the design, development and commissioning of equipment defining all of the specifications and technical documentation and supporting the customer's test rigs and development aircraft.

The theoretical analysis and simulation to design the system and to specify the performance of the system elements is carried out by systems engineers who work closely with the project team. The software for digital systems is developed by software engineers working as part of the project team whilst the applications team works on potential new systems, research and development and the application of new technology.

Engineers have access to the most modern Computer Aided Engineering (CAE) work stations and tools, which are coupled into an extensive Computer Aided Design (CAD) facility.

Graduates in electrical/ electronic engineering, control, computing sciences, mathematics, physics and engineering sciences are suitably qualified. Technical and management training both within and outside the Company is given to fit in with individual career development and young engineers may be sponsored for pilot training with the Company Flying Club.

Powerplant Systems Division

The Division is involved in all aspects of aviation gas turbine powerplant control, instrumentation and test. This market is increasing in scope, as the complexity of modern gas turbines increases and the demands upon the engine from the airframe become more stringent. As a result of these factors, traditional forms of control and instrumentation are being replaced by digital electronics.

In the past the bulk of the Division's work has been in the UK in both civil and military spheres. However, export work is increasing, with markets in North America, both Canada and the USA, and in Europe. Other countries are also showing interest, from as far apart as South America and Australia.

Engine Control

Electronic engine controllers have been developed for a number of powerplants, ranging from small helicopter engines, military fighter engines to large civil airliner engines. To date the most successful application is on the RB211-535 engines which power the Boeing 757s flown by British Airways and others. Recently the Division was awarded a contract to design an engine control system for an Unmanned Aircraft where considerable improvements in performance, reliability and operation can be achieved.

Fuel Management

Over 50 different aircraft types are equipped with the Division's Fuel Flowmeters or Fuel Content Gauging Systems. In addition, complete Fuel Management Systems are being developed to maintain trim and attitude in supersonic aircraft as fuel is used and pumped around.

Displays

As a result of work on engine instrument displays, the Division has acquired expertise in the use of Liquid Crystal Display technology in aircraft applications. Following successful flight trials the Division has been awarded contracts for Reversionary Instrumentation, Cockpit Displays and Information Terminal Systems. One of the Division's displays was selected for the British Aerospace EAP advanced technology aircraft demonstrator programme.

Engine Test

Hand in hand with the increased requirements for engine performance in aircraft, is a requirement to test overhauled engines accurately, consistently and efficiently. The application of computerised testing gives all of these advantages coupled with a reduction in fuel and engine hours used. Systems are in operation in the United Kingdom, West Germany, Italy and Canada. Orders have now been received from Saudi Arabia and from the United States Air Force for 300 systems covering 34 different engine types.

Engine/Airframe Health Monitoring

Significant operator cost savings are possible through better objective knowledge of the health status of aircraft structural, avionic and engine components. The Division was selected to supply the

Continued over

Maintenance Data Panel for EAP and has subsequently been awarded further contracts for analytical software.

Sensors

Development of sensor technology is under way to provide new means of monitoring fuel flow, fuel contents and tyre temperature.

Organisation

The Division consists of Production, Commercial, Quality Assurance, Sales and Engineering departments, of which Engineering is the largest. A large proportion of the Engineering department is made up of graduates at Degree, HND and HNC levels. The department is headed by a Chief Engineer with Project Managers and Service Group heads. Each Project Manager supervises several Project Leaders and they in turn have Project, Development, Systems and Software Engineers assigned to their project team. In addition to this project orientated structure, the Service Groups for electronic design systems and software, provide pools of expertise which may be used for consultation or direct temporary attachment to project teams. In order to maintain the Division's strength within the market place a Future Systems Team exists to study relevant new technologies and techniques which are applicable to future product development.

Facilities and Resources

Computing facilities for administrative, commercial and engineering purposes are provided by a large minicomputer with terminals throughout the Division and a number of microprocessor systems. Production, Model Shop and Drawing Office facilities are also available, and the Division is responsible for the Company Fuel Systems Laboratory. In addition to these in-house facilities, use can be made of any of the Company's control facilities or those of any other Division when these are available.

To ensure that these facilities are usefully employed, the Division requires graduates in Electronic Engineering, Control Engineering, Computer Science, Physics and Mathematics, and provides technical and management training tailored to individual career development and market demands.

Airborne Display Division

We are the world's most experienced manufacturer of Head-Up Display Systems (HUDS), having supplied over 6,000 systems, more than those produced by all other manufacturers put together. Almost all of these HUDs, as they are called, are exported and equip aircraft such as the General Dynamics F-16 Fighting Falcon, the Vought Corporation A7 Corsair II, and the McDonnell Douglas A-4 Skyhawk. In addition to these, many other types of aircraft have been retrofitted to carry our equipment.

A HUD system provides electronically generated symbols displayed on a Cathode Ray Tube and optically projected into the pilot's sightline to appear superimposed on his view of the outside world seen through the windscreen. The present generation of HUDs are also able to display a television picture of the outside world derived from an electro-optical sensor to restore to the pilot at night a similar visual scene to that seen directly under daylight conditions. Many HUD systems, in addition to their display functions, also provide complex weapon aiming and navigational computing functions.

We also design and produce a variety of advanced airborne electronic displays for direct viewing, designated Head-Down Displays. These displays are fitted to aircraft such as the Tornado Multi-Role Combat Aircraft and the refitted Nimrod, where they form part of the sonics system developed by the Company. A new range of electronic displays in which the Division is active is helmet mounted systems, including night vision aids using image intensifier tubes. All of these displays require complex high speed Symbol Generators/Display Processors, and the Division has played the key role in Europe in introducing processor architectures such as MIL-STD-1705A, along with the Support Software facilities required to provide high level language software for these equipments.

Another important area of activity is the design and development of special test equipment to provide rigorous test and support for these various display systems.

Because of the very high percentage of export business, overseas facilities have been established to provide local manufacture where necessary. One such facility exists in Atlanta, Georgia, USA, where A7, A-4 and F-16 equipment is manufactured. Other manufacturing organisations have been set up in the European countries where the F-16 aircraft has been sold.

The Division has a work force of about 800 people, distributed among the Engineering, Production, Commercial and Sales Departments. Of these, the Engineering Department employs about 400 people of whom over half are professional engineers.

The majority of work is carried out on a project basis, i.e. during the design and development phase, a group of engineers work as a team on a particular system. This enables an engineer to identify with that

Continued over

equipment, and provides a variety of interest as the project moves through development. A project team is normally headed by a Project Manager, responsible for all aspects of a programme and is assisted by a staff of Project Leaders, Project and Development Engineers and Technical Assistants. Each Project Manager is responsible to the Chief Engineer.

In general, engineers are qualified to HNC, HND or Degree standard and employment opportunities existing within the Engineering Department reflect the wide spectrum of skills and techniques used in the equipment manufactured by the Division. Much of this equipment is based on specialised digital computers whose outputs are used, via the appropriate analogue circuitry, to drive cathode ray tube displays. Consequently, advanced digital and analogue design and software development form major activities within the Department.

Electronic designs are evolved using the latest state-of-the-art devices and technology such as microprocessors and very large scale integrated circuits. Extensive use is being made of computer aided engineering facilities. The associated analogue circuitry also covers a variety of disciplines varying from relatively low frequency deflection amplifiers through to high band-width video amplifiers, compatible with UHF television systems.

Software development is carried out by a group of 80 software engineers and programmers. Operational flight programs for the various display systems control display content and formats, and provide system interfacing and computational requirements. These programs are developed using high level languages and structured real time programming techniques.

A Systems Group exists within the Engineering Department, not attached to any one project, consisting of various specialists who act as consultants for the different projects. The activities covered by this group include systems specification, design and evaluation, and optical, mechanical and thermal design, in addition to more theoretical systems investigations. Optical design includes the use of diffractive optics, and the Company has pioneered holographic techniques and established a holographic production facility within the Division to manufacture holograms for the latest standard of HUDs.

Flight Controls Division

The main products of Flight Controls Division are automatic flight control systems (AFCS) supplied for all types of aircraft, except fixed wing combat aircraft which are the responsibility of Combat Aircraft Controls Division.

Divisional programmes include commercial transports, rotary wing aircraft and remotely-piloted aircraft. The Division is involved in the complete process of system and equipment design, development, manufacture, rig and flight test and the production of equipment for in-service use. A significant part of the current business is in Europe and the United States.

The systems range from simple autostabilisers to automatic landing systems, a complete digital AFCS and fly-by-wire systems which involve gyros, accelerometers and actuation systems as well as the Division's own designs of analogue and digital airborne computers.

This Division currently employs 320 people and over 150 of these are in the Engineering Department. The main current projects in the Engineering Department are:

Boeing 747

Improved automatic throttle system capable of control from before take off to landing. Works with all 747 engine configurations.

A310 Airbus

High integrity digital slats and flaps drive control. This European Airbus transport entered airline service in 1983.

Lynx

This Westland rigid rotor helicopter, which is now in service, has a fail-operational stability augmentation system; the autopilot controls down to the hover at low altitude for rescue and anti-submarine operations.

Universal Drone Autopilot

A new AFCS for conversion of ex-service aircraft to aerial targets remotely controlled by a radio link.

Initially fitted to the Sea Vixen Naval Fighter, the system controls all aircraft functions during a flight from brakes off to standstill.

Falconet Subsonic Aerial Target

This advanced target system uses a flight control system functionally split between the aircraft and a ground-based unit, to minimise aircraft cost. The system will be used on the Hebrides range.

Advanced Ground Control Station

A new generation of ground control equipment is being produced for control of aerial targets. These systems are designed to minimise operator workload and feature colour c.r.t. displays to replace the conventional instrumentation.

New Commercial Aircraft

Advanced digital flight control systems using the latest digital techniques are being developed for new commercial aircraft in Europe and the USA. The Division has been selected by Boeing to produce prototype equipment for the proposed new 7J7 airliner.

Continued over

Phoenix

Flight Controls Division is prime contractor for the development and supply of the British Army's Phoenix Battlefield Target Acquisition and Surveillance System comprising a small remotely piloted vehicle carrying a thermal imager, with ground control equipment, launcher and support vehicles.

New Developments

Advanced digital technology is employed in the systems and support equipment including microprocessing, large scale integrated circuits and optical data transmission. Extensive use is made of high level languages for software development on disc operating systems.

Each project has its own team of engineers carrying out the design, development and commissioning of equipment, defining all of the specifications and technical documentation and supporting the customer's test rigs and development aircraft. The theoretical analysis simulation and specification of the system elements is carried out by systems engineers who work closely with the project team. The software for digital systems is developed by systems and software engineers working as part of the project team; and the applications team works on potential new systems research and development and the application of new technology.

Graduates in electrical/ electronic engineering, control, computing sciences, mathematics, physics and engineering sciences are suitably qualified. Technical and management training both within and outside the Company is given to fit in with individual career development and young engineers may be sponsored for pilot training with the Company Flying Club.

Instrument Systems Division

The Division is responsible for marketing, designing, manufacturing and supporting a wide range of avionics products to worldwide customers. This broad product range is now expanding into new areas such as microprocessor controlled sequencers for ejection seats. With a total work force of about 430 the Division is large enough to generate opportunities while maintaining a high level of involvement at all levels. The diversity of work and expanding nature of the business ensures that the new graduate can rapidly identify with the products and derive job satisfaction and career development soon after joining.

Air Data System

Digital Air Data Computers using pressure sensors and microprocessors to provide multiple electronic outputs of height, airspeed, mach etc. for use by other aircraft systems such as autopilots and control systems. The Division is currently supplying computers to a number of UK and foreign customers including a major program for the United States Air Force and Navy. This program involves the retrofit of air data computers for over thirty types of USAF/USN aircraft from the smallest fighter to the largest transport.

Helicopter Systems

A novel system, developed entirely within the Division, is aimed at overcoming the problems of providing accurate Air Data information on helicopters, where the movement capability of the helicopter makes conventional systems inadequate. The Division produced the world's first microprocessor-based Helicopter Air Data System and this is in service with the US Army on the Bell Helicopter AH-IS anti-tank helicopter. To date, over 1,000 of these systems have been supplied. Current contracts include the Agusta A129 and the Anglo-Italian EH101.

Stores Management Systems (SMS)

Complex multi-unit digital systems providing high integrity release control of the wide range of conventional weapons carried by modern military aircraft. The Division designed the SMS for the multi-national Tornado aircraft and has supplied around 1,000 computers to this program with an additional 600 pylon decoder units. Work is continuing to develop a new generation of Stores Management Systems capable of meeting the requirements of US and European aircraft into the 1990s.

Others

A consistent feature of the Division's activities has been the frequency with which new and novel ideas emerge and are accepted by the Company for private venture funding. Several such ideas are at various stages of development in the Division.

Cognizant of the ever-changing technology needs of avionic products the Division maintains close contact with the Company's research laboratory and is constantly in touch with various centres of learning, countries' defence departments, airframe

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companies and the various armed forces. Engineers and managers are thus exposed to a very wide spectrum of project activity providing an extremely challenging environment for application of existing skills, further learning and career progression.

There are opportunities for Electronic/Electrical Engineering Graduates, Computer Scientists, and Mathematicians (with an interest in electronics and programming) who are required to join the project teams, which are at different stages of the design, development, manufacturing, commissioning and flight testing of the product ranges mentioned above. Each project group is a compact, very self-motivated team dedicated to its particular tasks.

Instrument Systems Division pays particular attention to encouraging employees to actively seek a line of career development most suited to their personality. Both technical and management lines of advancement are open to all after an initial period of gaining expertise within avionics. The current strength of the Engineering Department is around 220 and the range of engineering disciplines include systems, electronic and mechanical design; software compilation, integration, and proving; qualification testing; test equipment design and integration; project management; design and drawing using the latest computer aided design tools; technical publications; logistics engineering including training and product support. These sections all use modern equipment including extensive Divisional and Company computing facilities relevant to the task in hand.

In parallel with the development of new high technology systems many new techniques for improved production control, manufacture, test and inspection are being introduced for which graduate engineers may also be required.

Maritime Aircraft Systems Division

The Divisions principal products are Acoustic Processing Systems used on board fixed-wing aircraft and helicopters involved in anti-submarine warfare.

The sounds emitted by a submarine are received by a number of sonarbuoys and transmitted to the maritime patrol aircraft where the Acoustic Processor separates these signals from the sea noise and displays the information to the Acoustic Operator. The Operator interprets this data to rapidly detect and locate the submarine.

The Division has recently undertaken the design and development of a Tactical Processing and Display System for maritime patrol aircraft and helicopters. This System combines vital information from the many different sensors i.e. radar, electronic support measures (ESM), sonar, for correlation by the Tactical Operator and thus contributes greatly to the success of the mission.

With systems in service with the Royal Navy, Royal Air Force and overseas forces, and with highly advanced systems under development, the Division is a world leader in airborne real-time acoustic processing:

AQS — 901

This system is a very complex airborne processing system and has been proved highly successful in RAF Nimrod Mk 2 and Royal Australian Air Force P3C Orion Squadron Service. Our Systems are the only "in squadron" equipment able to process all the currently available NATO inventory of sonarbuoys.

AQS — 902

The first application of the AQS — 902 system was for the Royal Navy Mk V Sea King helicopter in which it has operated for several years. It has also been selected for further Sea King up-dates.

This System has been sold to the Indian Navy, selected for the Fokker Enforcer and is currently under evaluation by the US Navy amongst others. The AQS — 902 is designed for the smaller ASW aircraft and helicopters many of which have acute weight and space constraints.

AQS — 903

The AQS — 903 System is lighter, smaller and has considerably more powerful processing and display capacity than its predecessors, employing the latest state-of-the-art-technology. This System is being developed primarily for the Sea King replacement helicopter, known as the EH101, but its design means it is eminently suitable for any ASW fixed-wing aircraft or helicopters.

The Divisions activities enhance the total spectrum of engineering development.

The main functions within the engineering teams are as follows:—

Systems Design and Integration

This team takes the customer specification for acoustic processing and interprets this into a system design as defined by detailed hardware and software specifications. The team analyses and controls the development activities necessary to meet

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performance within the prescribed cost and time scales.

The team is also responsible for the overall integration of elements of a system into a working whole and involves the in-house rig commissioning of systems and the measurement and analysis of system operational performance, from both in-house and field trial activities.

Software

The programming activities cover a broad range of software technologies encompassing real time programming in high level languages, mathematical modelling, assembly language programming and compiler development. An extensive range of in-house computers and support facilities are available for use by the software teams.

Hardware Design

These teams are responsible for the electrical and mechanical design of computers and other system elements marketed by the Division. They take the design from initial concept through the prototype and qualification phases to preparation for series production. Computer Aided Design facilities, coupled with state-of-the-art technology, ensures that quality high performance products are utilised by this team.

Engineering Services

These include Drawing Office and a Technical Publications Section, as well as library services.

The Drawing Office is a self-contained unit responsible for the preparation of drawings for manufacture. Computer controlled draughting equipment for digitising and interactive design is used for multilayer PC board layout and artwork generation.

The Technical Publications Section is concerned with the preparation of technical instruction manuals, reports and other associated documentation. The documents are written to meet the requirements of commercial as well as British and American Government standards.

Future Systems

This team is primarily concerned with the response to proposal requests from prospective customers and operates closely with the Design and Sales teams.

The Division is growing rapidly and there are excellent opportunities for people to join our design, manufacturing and marketing teams. Due to the international nature of our business many of the positions available offer opportunities for travel overseas.

The Division is based at Rochester but has an expanding facility at Yeovil in Somerset which is primarily involved in software design and development.

The Flight Automation Research Laboratory

This is an applied research engineering facility where the main function is to investigate and exploit new areas of technology likely to lead to new and improved avionic products and systems for development by the operating divisions.

An avionic control system will include sensors to measure the behaviour of the aircraft and its component elements, some form of signal processing (computing) and actuators to drive the aircraft control surfaces. In addition, since the various units will be physically remote from each other, signal data must be transmitted between them. The sensor data and the results of signal processing need to be displayed to the crew; similarly the crew need a means to instruct the system to carry out specific tasks. Finally all elements of a control system need power, and the provision of suitable power from the main aircraft supply needs specialised circuit techniques.

To meet these requirements which cover a wide range of technical disciplines and product areas, the Laboratory is organised into the following teams whose specific skills embrace the above elements.

Systems & Computing

This team develops much of the theoretical background to our avionics systems design, embracing such disciplines as software engineering, systems integrity and new computing technology.

The team evaluates advanced computing concepts for avionic applications, which includes designing and building computing systems to verify their concepts and investigate software methodologies.

Sensors

The Sensors team develops 'solid state' sensors to replace electro-mechanical devices with the aim of reducing maintenance skills and costs while meeting the hostile aircraft environment.

The electrical interfaces between sensors and digital processors receive special attention.

Displays

In advanced aircraft there is a need to display large amounts of data in forms appropriate to the crew's needs. Cockpits are overcrowded and modern aircraft incorporate an increasing proportion of multi-mode electronic displays. Development proceeds on Head-Up (projected), direct view and helmet mounted displays and new technology displays such as LED's, LCD's and other flat panel displays.

Data Transmission

Digital data transmission systems including fibre optics are under active development to meet demands for high system integrity, high bandwidth and high immunity to electro-magnetic interference.

Custom LSI

The Custom LSI team is developing all aspects of the design and evolution of Custom LSI products being produced specifically to avionic requirements.

Design and Manufacture

This team examines the requirements of the Company for advanced methods of design and manufacture and conducts appropriate pilot projects. Current

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activities include computer aided engineering systems including hybrid and LSI design techniques, thermal design and novel cooling techniques, and methods of connection and assembly.

Power Supplies

The Power Supplies team investigates new techniques for power conditioning aimed at increased efficiency, high packaging density and high reliability to meet the very arduous demands in avionic equipment.

Advanced Projects

A team of experienced engineers carries out studies and project management allied to advanced manned and unmanned aircraft and new system techniques for tasks such as navigation.

Optical Design

This team provides a service in optical systems studies and the design and optimisation of conventional and holographic optical systems, producing prototypes for evaluation.

MMI

The growing complexity of modern electronic equipment demands the continuing development of Man-Machine Interfaces to ensure the efficient use of such systems. Projects undertaken by the MMI team range from Automatic Speech Recognition and Stereoscopic Viewing Systems to the application of Artificial Intelligence as aids to the human operator.

The Laboratory is particularly interested in recruiting graduates for these various teams, who have the ability to develop new ideas and concepts and can respond to a high degree of technical challenge in a wide range of disciplines.

Graduates (and post graduates) in Electronic/Electrical Engineering, Computer Science and Physics are particularly sought after but there are also limited vacancies for graduates in Mechanical/ Production Engineering.

The Laboratory which has a total work force of over 100 maintains a Model Shop which is well equipped with machine tools and possesses comprehensive computer facilities for design analysis and simulation.

Computing Services

Computing Services (CS) supports the management and other service departments at Rochester. It is concerned with all computing applications other than those of a purely engineering nature that are serviced by computing facilities within the avionic Divisions. In this role CS support covers the whole product life-cycle from the preparation of proposals and bids, through product design and definition to production planning, scheduling, ordering of materials and components, implementation of the build programme, and finally the support of our products during their operational lives, for example by spares provisioning and the analysis of field performance data.

The services provided by CS may be divided into the following main categories:

- monitoring and reporting of the Company's commercial and financial transactions and performance;
- direct assistance, as an information service covering both development and processing, with the design, manufacture, and post-delivery support of the Company's avionic products in the various specialist divisions;
- management and maintenance of the company database;
- advising on computing matters. Facilities in this area include an Information Centre providing a focal point where multiple supplier distributed resource systems can be evaluated, advice and guidance obtained, requirements discussed and hardware/software information collated;
- co-ordinating computer communications and maintenance to obtain maximum benefit from the Company's investment in computing facilities.

The staff of CS participate in the following departmental activities:

1. Production
   The Production Department is responsible for running CS's computers and providing engineering and technical support services. The mainframe equipment currently in use with CS consists of an ICL 2966 complemented by McDonnell Douglas equipment. These machines support a sizeable terminal network in the user areas at Rochester and are themselves linked to the large IBM-based resources at other GEC computer centres.
2. Development
   The Development Department, incorporating the systems and programming function, is the largest department in CS and is responsible for the design and implementation of systems in response to customer requirements and for support and user training when the system is in service. The Department is divided into two main sections, namely Financial and Manufacturing, organised in project teams of systems analysts and programmers, each headed by a project leader or manager.

A prime requirement for

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systems and programming staff is the ability to both understand the user's business requirements and their relationship to the total Company operation, and provide computer solutions which meet those needs.

To do this successfully, it is necessary to combine a genuine interest in business techniques with a numerate, logical approach to problem solving, plus a sound knowledge of computing technology.

3. Administration
   This covers general CS management, secretarial, administration and forward planning.

Computer Services employs approximately seventy people, many of these are qualified to Degree/HND level in Computer Science and allied subjects and are mainly employed in the Development Department.

Guidance Systems Division

The Products

The Division's interests are broad and range from the manufacture of subminiature inertial sensors, rate gyroscopes and accelerometers, to responsibility for complete integrated navigation and tactical systems. Users of our equipment are equally diverse, including the Army, Navy and Air Force of this country and of several overseas nations.

Our gyroscopes are used to sense angular motion and then to stabilise such devices as missile seeker heads (Skyflash and Sea Dart), optical sights (Javelin missile launcher), infra red and optical sensors, radar antennas, and satellite communication antennas, as well as for torpedo, aircraft and fighting vehicle guidance systems. Coupled with accelerometers, velocity and position data can be derived to provide the essential ingredients of an inertial navigation system. Today, more and more, there is an increasing trend to use "strapdown" rather than "gimballed" systems and we have several design solutions which embody such an approach. An associated digital processor carries out the transformation from "body" to "earth" co-ordinates in real time. In one form or another, such systems have been fitted to Sting Ray and Spearfish torpedoes, surface ships and submarines, robot aircraft and wheeled vehicles, Jaguar fighter aircraft and main battle tanks.

Other activities include the design of the Central Tactical Station in complex reconnaissance aircraft, including the integration of a number of different systems, the collation and correlation of varied information and its presentation to the human operator in a form he can successfully assimilate and rapidly act upon.

A recent development which we believe will lead to many successful sales is an electronically generated topographical colour map. This provides the pilot of fixed wing aircraft and helicopters with continuous knowledge of present position in relation to recognisable ground features. It is also applicable to ground stations communicating with remotely piloted vehicles and analysis of reconnaissance data. The same digital terrain data is now being further developed in conjunction with the Division's terrain referenced navigation system and associated avionics produced by other GEC Avionics' Divisions, to form an integrated total terrain avionics package to meet the requirements for future stealth aircraft. This involves several advanced techniques including mass solid state storage, very large scale integration, data compression, manipulation of digital data, the development of complex algorithms and colour video generation.

The majority of the above equipments use microprocessors and, often extensive, real time high level programming.

The People

Our wide range of activities not only provide many and varied technical problems, requiring many different types of people with the

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training and skills to solve them, but also provides the opportunity for individuals to develop their own abilities, technical and managerial, and experience first hand, the needs of customers. Overseas travel can be involved.

The Engineering Department is structured as a number of multi-discipline teams, each assigned to a specific project. The work includes involvement with the original customer requirement/proposal, through design and development to production status of any new system. The largest percentage of the Department's resources are split between real-time programming and electronic design. The Department also has teams of specialist engineers, for example one team of electro-mechanical specialists is engaged on sensor development.

Engineers are generally recruited from graduates or people with equivalent qualifications or experience, in the following disciplines: Computer Science, Electronics, Mathematics, Physics and Mechanical Engineering. There are good prospects for advancement within the Department either as an engineering specialist or in technical management.

We generally employ new recruits as Systems, Development or Software Engineers.

Systems Engineers are often involved in specifying, modelling and analysing system performance. They can be involved in the establishment of an equipment's architecture, hardware and software, and the development of new algorithms. Some experience and/or a second degree is often preferred for this role.

Development Engineers are involved in all phases of a project development including:

(a) circuit design and proving, with increasing emphasis on the use of Very Large Scale Integrated (VLSI) circuits,
(b) development system test and commissioning,
(c) flight (or sometimes sea) trials.

Graduate mechanical engineers are responsible for the very important environmental aspects of development, including vibration and thermal stress analysis.

Software Engineers are increasingly required to design, write and prove large real-time programs using, in the main, a high level language such as CORAL or ADA. They are also involved in the integration of software and hardware and sometimes are involved in the practical trials of equipment in the field.

The Facilities

The Engineering Department includes a Drawing Office, Model Shop, Mechanical Design Team and a Technical Publications Department. These organisations support the project design activities outlined above. Other facilities include extensive computing resources and terminals, as well as computer aided design (CAD) stations and a full range of electronic and electro-mechanical test equipment. Investment in such essential areas is maintained at a high level.

Training

GEC Avionics is recognised internationally for the excellence of its electronic system design, its product range and the Company's commercial success at the forefront of high technology.

People are the most important resources possessed by GEC Avionics — Training is the investment in this resource, by which the Company and its employees grow together.

Training is open to all employees:
the school leaver taking a first step into working life;
the engineer enhancing his/her design skills;
the supervisor adopting new management skills;
the manager developing new commercial skills;
the employee preparing for retirement.

Company training can be considered broadly within the following categories:

Initial Training

Mainly open to those joining the Company straight from school. Students at 18+ join the Student Technologist, Commercial or Trainee Computer Programmer schemes, and are sponsored through college courses. Those at 16+ join Technician or Clerical training programmes.

All trainees are sponsored through further or higher education, suited to their needs and interests. Other training is delivered at the Company Training Centre, or in Divisions throughout the Company. Each year 200–300 young people begin their working lives in this way when they join GEC Avionics, Rochester.

Continuing Training

Continuation training is provided for adult employees, to develop existing skills or help in their more effective application, and to develop new skills and knowledge required as their work demands. This spreads over a broad range of material, from technical knowledge to applied techniques in management.

Technical courses are often specifically designed for the Company and delivered in-house. These are closely tailored to the needs of professional engineers, to include both software and hardware skills. In addition a wide variety of specialist external courses are provided where expertise does not exist in-Company.

Supervisory and management courses are matched to the seniority of the course delegate. These are supplemented by specific skill training in such areas as selection interviewing and report writing. For senior managers external courses are used to expose delegates to innovative practices in management techniques. The GEC Management College at Dunchurch is one of a number of facilities used for such training.

Many employees follow technical or commercial courses, by day or evening attendance, to build upon their practical work experience.

Examples of the training designed for the needs of specific groups of employees are the provision of an induction course for graduates, designed to ease their

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transfer into industry; and also the pre-retirement courses offered to employees entering their final year of employment.

Access to Training

The greater part of any training happens on the job, with the guidance of supervisors and more experienced colleagues. Where a specific training need is identified, supervisors may consult training publications which describe courses available within the Company.

Open learning packages are also available to employees, a service that allows an individual greater flexibility and control over his or her development within the Company.

About the Medway Towns

In East Kent, where the River Medway flows into the Thames Estuary, there's a distinct geographical area formed by the five Medway Towns – Chatham, Gillingham, Strood, Rainham and Rochester.

Together the Medway Towns form a busy thriving community in what has always been one of the richest parts of England – and one of the most popular in which to live and work. No wonder, when London and all its attractions are only 30 miles away, the seaside resorts of Whitstable, Herne Bay and Margate can be reached within half an hour by car, and a 10 minute drive will take you into the heart of the lovely Kent countryside.

Finding a Home

The Medway Towns offer a broad range of relatively low-priced properties, further details of which can be obtained from the following major estate agents:

Jackson Property Services
Unit 1, The Pentagon Centre
Chatham
Kent Medway 405143

Wards and Partners
7 Military Road
Chatham
Kent Medway 41243

Walter and Randall
9 New Road
Chatham
Kent Medway 717666

If you are looking for rented accommodation a housing list is available from the Welfare Officer. In addition the following companies will be able to help.

Garratt and Anderson
54 High Street
Chatham
Kent Medway 41180

Medway Apartments and Property Management
151 New Road
Chatham
Kent Medway 42878

Home from Home Property Management
7 Beech Grove
Higham
Rochester
Kent Shorne 2185

Shopping & Leisure

In Chatham, the main shopping centre for the Towns, is the new Pentagon shopping complex, where several of the major chain stores are represented. At nearby Hempstead, a SavaCentre provides easy parking and a host of shops under one roof. At both Rochester and Rainham, traditional open air markets are held every week.

The many leisure facilities include excellent pubs, restaurants and clubs throughout the whole area. Chatham Central Hall provides a wide variety of entertainment to please all tastes and the Chatham ABC is a cinema complex. The Black Lion Sports Centre in Gillingham offers a comprehensive range of recreational activities from football, cricket, tennis and squash to swimming, gymnastics, judo and hockey. There are private municipal golf courses available in the area as well as a popular dry ski slope.

Places of Interest

East Gate House and Charles Dickens Centre, High Street, Rochester. Exhibits of archaeological,

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geological and ethnological interest as well as local history including Dickensiana.

Guildhall Museum, High Street, Rochester. Above its roof is a cupola surmounted by a weather vane in the shape of a fully rigged ship. Lots of seafaring history inside.

Rochester Cathedral and Gardens. The bishopric of Rochester is the second oldest in England. The present cathedral was largely built in the 12th century.

Rochester Castle and Gardens. Built in the reign of Henry the First. Marvellous views from the battlements.

Royal Engineers Museum, Brompton Barracks, Chatham. Depicts the history of British Army engineers from William the Conqueror to the present day. Exhibits include aeroplanes, balloons and a model of the Mulberry Harbour.

Upnor Castle, Upnor. Designed to protect the Medway but did not prevent the Dutch from sailing up the River in 1667 and destroying several men-of-war.

Temple Manor, Strood. A 13th century hall with 17th century extensions, originally built by Knights Templar. Open Thursdays and Sundays throughout the year.

Road and Rail Services.
Fast travel to London and the Channel Ports is provided by the Network South East rail service. There are five main line stations in the Medway Towns area.

The A2/M2 Motorway skirts the Towns, with the following link roads:

A228 to Strood, Snodland, Rochester;
A229 to Chatham, Maidstone, Walderslade, Lordswood;
A278 to Rainham, Gillingham, Hempstead.

Holidays abroad? Take the M25 to Gatwick, the A2 to Dover, the A20 to Folkestone.

Distance from Chatham to main towns

Maidstone	8 miles
Gravesend	8 miles
Dartford	14 miles
Swanley	16 miles
Bexley	17 miles
Orpington	21 miles
Ashford	23 miles
Canterbury	27 miles
Herne Bay	30 miles
Central London	30 miles