



Careers for Graduates in Automation



with

THE ELLIOTT-AUTOMATION GROUP

www.rochesteravionicarchives.co.uk

ELLIOTT-AUTOMATION LIMITED

34 PORTLAND PLACE,
LONDON, W.1

The equipment shown in the cover photograph is an Advanced Airborne Digital Computer.

The photograph was taken in a factory of the Elliott-Automation Group by Walter Nurnberg, F.I.B.P., F.R.P.S., and is reproduced by courtesy of *Engineering*.

SECTION I GENERAL DESCRIPTION OF THE GROUP

Elliott-Automation Limited is a group of engineering companies and associates in the United Kingdom, European Free Trade Area, European Common Market and Commonwealth. It has been built up because industry stands on the threshold of a revolution based upon the introduction and application of automatic control systems. The organisation's resources are such that it will play a leading part in this revolution, not only in the United Kingdom, but throughout the whole World.

Since the end of the Second World War, the Group has been systematically developed. It started with the original company, Elliott Brothers (London) Ltd., and has been formed into an organisation capable of designing, supplying, and installing automation systems for any industry or service. Now it is the largest group in the world wholly directed to the introduction of automation.

The Group makes use of mechanical, pneumatic, hydraulic, electric and electronic methods as appropriate in its widely spread activities. It supplies the great majority of the components needed for its equipment from its own resources, and some major components such as instruments and control valves. Very many minor components are also sold separately, in large numbers, to other users.

Elliott-Automation Limited is itself a Holding Company which controls the operation of the Group from its Head Office in Central London.

The principal operating subsidiary is Elliott Brothers (London) Ltd., which has in its turn a large number of subsidiary Companies and Divisions. Most of these are located within three principal Establishments at Borehamwood (Herts), Lewisham (S.E. London) and Rochester (Kent), although a few subsidiaries and Divisions operate at other locations, mainly in the South-East of England. Other Companies in the Group are :

- Associated Automation Ltd. (N.W. London)
- Electroflo Meters Co. Ltd. (N.W. London)
- The Rheostatic Co. Ltd. (Slough)
- The Rotameter Manufacturing Co. Ltd. (S. London)

The Group has two Companies specifically concerned with the application of automation systems :

- E-A Automation Systems Ltd. (S.E. London)
- E-A Space & Advanced Military Systems Ltd. (Berks)

and two Service Companies :

- E-A Automation Services Ltd. (S.E. London and Kent)
- E-A Technical Services Ltd. (S.E. London).

The Group employs a total force of about 12,000 men and women in wholly-owned subsidiaries in the United Kingdom. A very high proportion of these are scientific and technical staff.

Abroad there are ten operating subsidiary companies in Switzerland, Germany, Sweden, France, South Africa and Australia. The Group has also a substantial interest in the French Company, Manufacture de Machines du Haut-Rhin.

It is the fundamental principle of the Group's organisation that the majority of separate divisions and subsidiary companies within the major units each specialise in one particular aspect of automation technology, be it a class of product or a type of process or system. The manager of the division is responsible for the technical and commercial success and progress of his division and has under his control development, production, buying and selling. While he may seek guidance and help, his decisions are his own responsibility.

This policy results in a very large number of promising men enjoying responsibility at an early age. This, in its turn, means that selection for promotion to the higher ranks of the Group's management is open to many more people. The Assistant and Joint General Managers, who co-ordinate the activities of groups of related divisions, are drawn from scientific, technical, and commercial activities.

The high degree of responsibility delegated to individual divisions involves a strong and well developed financial and administrative control function. This creates very satisfactory career prospects for non-technical recruits.

SECTION II
ACTIVITIES OF COMPANIES
AND DIVISIONS IN GREAT BRITAIN

ELLIOTT BROTHERS (LONDON) LTD.

The Divisions and Subsidiary Companies of Elliott Brothers are listed under the principal types of activity undertaken.

CONTROL VALVES

Black Automatic Controls Limited, (Corsham, Wilts.)

Manufacture of a wide range of direct solenoid and pilot assisted solenoid valves : also pressure, differential pressure, and flow switches for general industrial applications, and for specialised requirements in the guided missile and nuclear fields.

Farris Engineering Limited, (Rochester)

Manufacture of safety-relief valves and control valves under licence from the Farris Engineering Corporation and Farris Flexible Valve Corporation. These are made of special materials to very high standards of accuracy, and include flexible valves for dealing with difficult industrial fluids.

Fisher Governor Company Ltd., (Rochester)

Manufacture of diaphragm motor control valves, pressure regulators, level controllers and other equipment under licence from the American company. These are made in a very wide range of sizes and with many different types of operating mechanism.

James Gordon Valves Limited, (Rochester)

Design and manufacture of tailor-made valves for special and unusual requirements. The Division produced the valves required for the hypersonic Mach 9 high speed wind tunnel at Farnborough and for a high speed wind tunnel in Canada. It also makes fuelling and ballast valves for ships.

DATA PROCESSING

Automation Analysis Department, (Borehamwood)

Theoretical studies of process control and similar situations to reduce to mathematical terms the activity being controlled, and from this to select the appropriate characteristics to be measured and controlled out of the very large number which may be involved in a complex situation.

Computing Services Division, (Borehamwood)

This Division undertakes, on behalf of the Elliott-Automation Group itself and a very wide range of other users, a computing service which embraces, among other things, calculations for civil engineering and aeronautical design. Its work includes the preparation of a very wide range of computer programming instructions.

Data Processing Research Laboratory, (Borehamwood)

Exploration and investigation of the more fundamental aspects of both circuit techniques and computing equipment design, together with the problems associated with the direct connection of industrial plant into computing and data-processing systems.

Elliott Computing Division, (Borehamwood)

Development, manufacture and sale of digital computers. The Division produced the major proportion of all digital computers manufactured in Great Britain in 1961 and has made extensive sales throughout the World. The biggest selling computer, numerically, has been the 803, a relatively small medium-priced solid-state general purpose digital computer, widely used for industrial control, research and commercial purposes. Another important product is the large fast 802, which is available for special complex tasks of which one example is experimental Air Traffic Control. The Division also has under development the 503, an extremely fast computer with a very high degree of flexibility in operation. This will be available at a relatively low cost.

National Computing Division, (Borehamwood)

Manufacture for sale in Europe by the National Cash Register Co. Ltd. of their N.C.R. 315, a commercial and business computer of very advanced design.

Panellit Limited, (Borehamwood)

Design and manufacture industrial monitoring equipment and advanced process control systems based on computers : also general purpose analogue computers which can be used for simulating chemical processes, the behaviour of nuclear reactors and the solution of mathematical equations. Systems designed and installed include those for automatic start-up and shut-down of conventional power stations ; data acquisition and reduction systems for nuclear power stations and similar uses ; and digital computers which optimise process control data and transmit the resulting instructions to plant controls.

Special Computing Division, (Borehamwood)

Application of computers to on-line systems. Here computers form an integral part of the system, being continuously fed with data to generate control orders which are sent directly to the controlling equipment.

FLIGHT INSTRUMENTATION AND AUTOMATION**Airborne Computing Division, (Borehamwood)**

Development and manufacture of analogue and digital computing systems for airborne use.

Aircraft Engine Instruments Division, (Rochester)

Manufacture of volumetric and true mass flowmeters and the like for aircraft engine use.

Aircraft Service and Repair Division, (Rochester)

Service and repair of aircraft instruments, particularly those manufactured by Elliott-Automation and the Bendix Corporation of the United States.

Automatic Test Equipment Division, (Rochester)

Development and production equipment for automatic tests on the Auto-pilot and control systems of modern military aircraft, replacing with greater speed and precision the teams of skilled tradesmen otherwise required. Production of similar equipment for industrial use.

Gyro Division, (Borehamwood)

Improvement of the design, manufacturing techniques and performance of precision gyroscopes. Keynote of the work is precision measurement and manufacture both in electrical and mechanical applications.

Inertial Navigation Division, (Rochester)

This Division provides the navigation system for the Blue Steel stand-off guided bomb, with which Mark II V-bombers are to be armed. This Division is the only organisation in Western Europe to have such inertial navigation systems in production. Important applications are anticipated for such systems in Polar navigation and other areas where radio aids are unreliable.

Military Aircraft Controls Division, (Borehamwood and Rochester)

This Division produces auto-pilots and associated control equipment for the English Electric Lightning, the Blackburn Buccaneer, and other projected R.A.F. aircraft ; auto-pilots and control systems for the Jindivics, Meteors and Canberras used as target aircraft at the various guided missile ranges in the Commonwealth ; and Air Data Computers which accept as data airspeed, Mach number, height and rate of climb, and present the processed results to the auto-pilot.

Precision Test Equipment Division, (Borehamwood)

Development and manufacture of specialised test equipment for inertial navigation apparatus and allied fields.

Transport Aircraft Controls Division, (Borehamwood and Rochester)

Development and production of flight control and flight instrument systems for transport aircraft in both the civil and military fields, including advanced analysis of automatic landing manoeuvres. The Division is engaged upon the development and production of the auto-pilot systems for the Vickers VC.10.

Designs are being developed for certain rotorcraft and the Division is engaged upon the study of flight control systems for supersonic transport aircraft and for vertical take-off aircraft.

MECHANICAL AUTOMATION

Industrial Weighing Division, (Lewisham)

Design and sale of control systems which depend upon measuring weights of loads or quantities of material, including high speed automatic weighing systems. Its systems use electrical strain gauge sensing and weighing devices.

Mechanical Automation Division, (Lewisham)

Automatic systems which are basically mechanical in character, including a range of postal mechanisation equipment, including segregating, grading and facing machines.

Mechanical Engineering Division, (Lewisham)

Mechanical computing machinery, including-computers for Naval and other fire control systems, and for anti-submarine systems ; mechanical measuring and recording systems ; and mechanical components including gyro equipment, integrators, ball resolvers, plane converters and other mechanical analogue units. This Division is also engaged on the development and application of numerical machine tool control systems.

Servo Components Division, (Lewisham)

Development and manufacture of miniature precision instruments such as synchros, a.c. pick-offs, linear servomotors, a.c. servo-motors, d.c. split-field motors, permanent magnet motors, and similar position control servo components.

Webb Conveyors and Automation Limited, (Dartford, Kent)

Manufacture of mechanical handling equipment, particularly a wide range of conveyor systems for manufacturing industry. These are of advanced design, incorporating integrated electronic controls.

NUCLEAR INSTRUMENTATION AND AUTOMATION

Elliott Nucleonics Limited, (Lewisham)

Design and manufacture of instruments and other equipment for nuclear reactors and their control. Among many other projects, the Company has provided instrumentation for the land-based prototype Naval reactor at Dounreay, and will provide the instrumentation for the Navy's second nuclear submarine. It has made flux scanning equipment for the Hero reactor, control rod mechanisms for the U.K.A.E.A.'s Advanced Gas Cooled Reactor at Windscale and a control operator's training simulator for the Berkeley and Bradwell stations.

Isotope Developments Ltd., (Aldermaston, Berks.)

Design, manufacture and supply measuring devices based on nuclear radiation ; also, instruments for detecting and measuring radiation for medical and laboratory purposes.

PROCESS INSTRUMENTATION AND AUTOMATION

Electrical Measurement Division, (Lewisham)

Design and manufacture a wide range of standard and specialised electrical measuring instruments.

Electronic Process Control Division, (Lewisham)

Manufacture of electronic process control instruments and systems including DeVar miniature potentiometer recorders and process controllers, and Swartwout control systems for the oil refineries and the chemical industry which have advantages of electrical process control without incurring explosion hazards which have previously made pneumatic systems seem essential.

James Gordon & Company Limited, (Stanmore, Middx.)

Provision of complete boiler control systems and ancillary equipment for boiler plant including instrumentation.

Leybold-Elliott Ltd., (Greenwich)

Jointly owned by Elliott Brothers and the German firm of Leybold, this Company designs and manufactures industrial installations and all components for vacuum processes and research. Vacuum processes have application in the drying of plastics ; in the freeze-drying of food and medical products ; for de-gassing and drying impregnating agents and impregnating cable and electrical components ; for coating materials with metals ; and for leak detection. There are important applications in nuclear and space research.

Process Control Division, (Lewisham)

Development and manufacture of pneumatic, electric and electronic instruments and control systems for the automatic control of processes in industrial, commercial and public utility concerns. Individual sections deal with the sales of such equipment for :

Chemical and oil industries, including oil gasification
Rubber and plastics industries
Food and marine applications

Heat measurement, mining and metals
Paper and pulp industries, water and sewage
The gas industry

The Division also incorporates Bristol's Instrument Company Limited, manufacturing process control instruments under licence from the American Company.

Quality Control Division & Hallikainen Instruments Ltd., (Lewisham)

Manufacture, in part under licence from American companies, of continuous boiling point recorders, viscometers, vapour phase or gas chromatographs, moisture analysers, infra-red and ultra-violet spectrophotometers and mass spectrographs. All are mainly used for determining the characteristics of materials and products under continuous processing conditions in the chemical and petroleum industries, either for manual or automatic control.

Rotron Controls Ltd., (Rochester)

Owned jointly with the Rotron Controls Corporation of the United States, the Company manufactures flowmeters and associated equipment for positive and mass flow measurements, based on the rotational speed of a vortex created outside the main stream.

RADAR AND COMMUNICATIONS

Airborne Radio & Radar Division, (Borehamwood)

Development, manufacture and installation of a range of airborne communication systems and navigational aids for civil and military aircraft. Work is also done on weather warning radar and blind landing equipment.

Elliott-Litton Limited, (Borehamwood)

This Company, jointly owned by Elliott-Automation and Litton Industries Inc. of Beverly Hills, California, has assumed responsibility for the principal interests of the Electron Tube Division of Litton Industries in the United Kingdom and Commonwealth and the Micro-Wave Valve Division of the Elliott-Automation Group. The work include Klystrons and Magnetrons of high power for wavelengths from 4 mm. upwards, and a range of rugged Klystrons of life ten to fifteen times the normal.

The Microwave and Electronic Instruments Division, (Borehamwood)

Design and manufacture of instruments operating in the range from 350 Mc/s to 220,000 Mc/s. Applications are largely in the military field, but other applications include research and development laboratories and test rooms. These instruments are also used in radar and in communication systems, including satellite applications, and in thermo-nuclear research. The Division also operates a consulting service in this field.

Radar Division, (Rochester)

Development and manufacture of advanced radar and associated data handling equipment for land, sea and airborne applications. Extensive use is being made of new techniques, and equipment is being developed for use under severe environmental conditions, such as those applicable to modern guided weapons. A large proportion of the Division's activities is devoted to the developments leading to the use of digital computing techniques in conjunction with modern radar equipment.

Radar Research Laboratory, (Borehamwood)

This Laboratory carries out research work for the divisions in the Radar and Communications Group. This involves the research and development of techniques, systems and components (electronic, microwave and mechanical), and the study of problems associated with radar, telecommunications, microwave and electronic instruments and guided weapons.

Telecommunications Division, (Borehamwood)

Development and production of telemetry and data handling equipment for military and commercial purposes, including multichannel transmission by line, and by V.H.F., U.H.F. and microwave radio links; microwave propagation survey equipment; telemetry and remote control systems; transistorised power supplies; V.H.F. and U.H.F. mobile radio telephone systems.

Weapons Division, (Borehamwood)

Much of the work of this Division lies in the field of guided weapons and associated equipment such as simulators and trainers. It developed and made the radar transponder which enabled the Black Knight Test Vehicles (for the medium-range ballistic missile programme) to be tracked accurately at great distances. Other work includes ground-to-air homing research; precision electronic integrators; bomber crew trainers; complete anti-aircraft gun control systems.

The Division is also studying stabilisation and certain other features of a hypothetical space research satellite which might be engineered at some future date.

ASSOCIATED AUTOMATION LTD.

Automation Accessories Division

Design and manufacture of accessories for computers, such as card readers and tape readers, including extremely fast readers which are used in conjunction with many different makes of computer throughout the world.

National Automatic Machines Ltd.

Manufacture and sale or renting of automatic vending machines.

Office Machinery Division

Manufacture and development of Duplicating, Adding and similar machines on behalf of certain well-known companies in this field.

Post Office Division

Development and manufacture of coin operated machines of many kinds including Pay-on-Answer coin operated telephone boxes now being introduced as part of the Subscriber Trunk Dialling system.

Relay Division

Development and manufacture of high duty relays, both to the Division's own design and under licences from other companies.

THE ELECTROFLO METERS CO. LTD.

Provides instrument engineering, control engineering and automation systems for public utilities, private industry and for the control and automation of the services of, *inter alia*, hospitals and large office blocks.

The Company has the following divisions :

- Power generation and steam raising ;
- Temperature control and measurement ;
- Paper industries ;
- Public utilities and metal industries ;
- Chemical, oil and plastics industries ;
- Gilmoor controls (a small specialist division dealing with remote control techniques for public utilities, etc.).

It has also the largest non-Governmental fluid dynamics laboratory in Europe, where a great deal of investigation is carried out on contract for the engineering industry. The standards established in this laboratory are officially and generally accepted.

THE RHEOSTATIC COMPANY LIMITED

Design and production of controls for central heating, ventilating and air conditioning systems ; thermostats for use in domestic appliances ; controls for oil-fired burners and for gas and solid fuel heating systems. Complex thermostatic systems are produced to deal automatically with modern large scale heating and ventilating installations.

ROTAMETER MANUFACTURING COMPANY LTD.

This Company's most important product, the Rotameter flowmeter, is designed to measure the flow of liquids or gases, and can be provided in suitable types and materials to deal with all gases or fluids known, either for direct or remote reading. The Company also makes density meters and a Liquid Level Indicator suitable for particularly difficult fluids.

ELLIOTT-AUTOMATION APPLICATIONS AND SERVICE COMPANIES

E-A Automation Services Ltd., (Rochester)

The Sheet Metal Division undertakes all sheet metal work, such as control panels, for the Group. The Installation Division handles the installation of all control panels, consoles, and display arrangements at the sites and plants for which they have been manufactured.

E-A Automation Systems Ltd., (Greenwich)

Provides a comprehensive service to the Group and to industry, by studying, designing and carrying out the engineering of complete automation systems, including data handling. The problems associated with servo-mechanisms are analysed with the help of analogue computers. The Company has thus both a consultancy and contracting function. It has brought into practical operation some very important examples of true automation in the process industry, and has other similar major projects in hand.

E-A Space and Advanced Military Systems Ltd., (Hampshire)

This is a recently formed Company, parallel to E-A Automation Systems Ltd., but intended to specialise in the activities implied by its title.

E-A Technical Services Ltd., (Lewisham)

A Service Company formed to undertake the Group's service work on process control and other installations.

It has depots and offices at provincial centres all over the country.

SECTION III RECRUITMENT

General

Throughout this section the references to graduates includes holders of a Diploma of Technology. Would-be recruits who have this diploma in appropriate subjects will be in every way as welcome as those with university degrees. Almost all the companies and divisions described in the foregoing sections also have promising vacancies for recruits with appropriate Higher National Diplomas and for holders of Higher National Certificates. There are numerous cases of men with these latter qualifications achieving rapid progress within the Group.

It should also be emphasised that the Group is extremely interested in recruiting women scientists and technologists, for whom progressive careers are available.

It will be obvious from the description of the Group's activities that a great deal of work is done at an advanced scientific and technological level throughout. Vacancies exist for mathematicians, physicists, and engineers in almost all branches of these subjects. Chemists and metallurgists will also notice activities which require their services.

Full scope exists for men who wish to devote themselves very largely to scientific and engineering development. The Group's laboratories do not undertake any large volume of fundamental research in the normally understood sense. Many of the scientific fields in which new applications are being sought and developed are, however, so close to the frontiers of scientific knowledge that many of those concerned need to deal extensively in the examination of fundamental concepts. It should not be overlooked that many of the systems developed within the Group for the application of both industrial and military automation involve extremely advanced mathematical thinking.

The Group's philosophy of maintaining responsibility within small Divisions and Companies does, on the other hand, mean that the importance of commercial enterprise is strongly appreciated at all levels. Sales activity is essentially technical: many important technical issues have constantly to be thrashed out between the Company's representatives and its customers. Thus, apart from actual sales vacancies, there is every opportunity for scientists and technologists to acquire a sound understanding of the essential profit-making elements necessary to every successful business.

The point has already been made in the general description of the Group that the type of organisation developed provides unusually favourable opportunities for early responsibility within, and indeed for, a self-contained Division. It would however be wrong to give the impression that such rapid promotion can be won without both considerable effort and real ability.

The Group quite obviously has very extensive production facilities. These are very closely linked to the development function. In a Group in which so much novel and advanced work is being undertaken, engineers will find considerable scope for contributing at all stages, from design to actual production, in the improvement of productive efficiency.

Because of the importance of the financial control function there are also excellent opportunities for graduates in arts and economics. Apart from financial control exercised centrally, and other non-technical central activities, each of the large number of Divisions and subsidiary Companies has a Budget and Cost Officer, in which appointments graduates can find a useful opportunity of first exercising real responsibility on the conclusion of their training. More senior appointments subsequently available include those of Divisional Controllers, an important and senior role within the Division. Some Divisions and Companies also have Contracts Managers and other analogous non-technical appointments. Ultimately, for the most successful employee, financial control appointments open the way, like other careers, right up to the top levels of management. Organisation and Methods is also regarded as an important activity and offers careers to arts graduates.

The principal routes of entry to the Group are described below. The greatest numbers of graduates are required by, and actually recruited by, Elliott Brothers (London) Ltd. The immediate opportunities of joining other companies in the Group direct from Universities or Colleges of Technology will be explained to would-be recruits, but in many cases the entry of graduates into other companies will be considered after a period of training or experience with Elliott Brothers.

Direct Entry

It is frequently found to be to the mutual interest of the Company and of graduate recruits that instead of joining programmed training schemes, they should enter directly into laboratories or development or engineering departments. They are there able to make immediate use of their scientific or technological qualifications, while receiving specific training in the work of the department. Such graduates have the opportunity of a prompt transition from the University or College work to effective, and often very responsible work, within their chosen field. Provision is made for further study where appropriate.

At the same time, care is taken to recognise particular abilities and aptitudes so that direct entry of this sort does not lead to graduates becoming tied down in work which they discover is not in fact their real metier. An attempt will also be made to enable young scientists and technologists to gain a constructive insight into the broader issues of managerial and Company effectiveness, so that they can by their own observation, criticism and thought, prepare themselves against the time when they may have to broaden the scope of their activities.

Direct entry is also, of course, eminently suitable for scientists and technologists who have obtained second and advanced degrees, but who have not the specific experience to apply for advertised vacancies. Their additional academic experience is naturally taken into account in the work which they can undertake immediately upon joining the Company. It is also particularly appropriate for men with Diploma qualifications obtained after taking a sandwich course.

Graduate Technical Training Scheme

Engineering graduates who wish to supplement their academic studies by a course of practical training in accordance with the recommendations of the Engineering Institutions can do so by joining this scheme. This corresponds to the Graduate Engineering Apprenticeships organised by many other companies.

Like such apprenticeships, the Scheme provides for appropriate periods in machine shops, in assembly, planning, progress, drawing and design departments, and in both budgetary control and sales functions. The basic course lasts two years but first appointments in production, engineering or sales application engineering are chosen so as to combine opportunities for both the exercise of responsibility and the continuation of training.

Graduate Process Control Engineering Scheme

As from autumn 1962, a limited number of mechanical and electrical engineering graduates will also be accepted for a two-year training course in which a more condensed practical training in machine shops will be followed by periods in which trainees will be able to gain experience of process plant operation, and of the installation, commissioning and servicing of process control systems.

This will be followed by training and by experience in sales engineering and on the production side of the manufacture of process control instruments and equipment.

First appointments will be available in the sales or installations departments of the Divisions and Companies concerned with industrial process control.

Graduate Commercial Training Scheme

This course of training is basically for two years, but the particular interests and abilities of individual graduates may determine the actual length of time required before they take up appointments in which the extent of personal responsibility obviously outweighs the specific training content. This is due to the fact that much of the training is done by assignment to the types of work in which graduates will specialise, at least in the early stages of their careers. Some degree of responsibility is thus exercised almost from the very commencement of training, which is always a question of doing rather than watching.

Training starts with an assignment to a Division where the trainee can undertake actual work, usually in a Production Progress Department. There, and in other Departments, such as Purchase, Sales and Engineering, he has the opportunity of familiarising himself with the basic processes of Divisional activity. Subsequent assignments usually include a short period in an Accounts Department, in Budgets Co-ordination, and in the Organisation and Methods Department, in all of which there is live participation in the work of the Department.

These latter stages of the programme are flexible. Although other opportunities do occur, the majority of trainees take their first substantive appointments as either Budget and Cost Officers or as members of the O. & M. team. The training is designed widely enough so that the choice of career need not be irrevocable, but whenever a career choice can be made at a reasonably early stage in training, assignments can be made accordingly, so that work under training guidance in the chosen field can gradually be extended into more independent responsibility. As might be expected, however, training as such does not terminate suddenly with a graduate's first independent assignment.

General

Members of all these schemes will have the same opportunities as direct graduate recruits to commence their own preparation for future career development.

Salaries and Conditions of Employment

Starting salaries are standard according to the scheme of entry, but it is recognised that among direct entry graduates in particular there will inevitably be differences between the immediate contributions which can be made by different recruits. Subject to such considerations, basic starting salaries during 1962 will be :

Direct Entry graduates with first degree :	
Pass degrees	£800-£850 p.a.
Honours degrees .. .	£850-£925 p.a.
Graduates entering Technical Training Scheme and Process	
Control Engineering Scheme .. .	£850 p.a.
Graduates entering the Commercial Training Scheme ..	£750 p.a.

These salaries will be increased by £50 p.a. at the end of each of the first four six months of service, except in cases where larger starting salaries or subsequent larger increases are offered in consideration of particular qualifications or abilities. Salaries for recruits with second or higher degrees will be negotiated in each case.

Appointments will be offered on the basis of a normal five-day week, with three weeks' holiday per year (which can be taken at any time, subject to management agreement) in addition to statutory holidays. A month's notice will be given by either side to terminate appointment. A contributory pension scheme is available, membership of which automatically provides non-contributory life assurance. Very reasonable provision exists for payment in the event of sickness.

Direct-entry recruits can normally expect to remain for some years at the location to which they are appointed, but it is in the nature of a rapidly expanding organisation that this cannot be guaranteed. Recruits under the other schemes will be given as much of their training as possible at one location, but some movement between different locations is quite often necessary.

It is the Company's policy that changes of location, whether temporary or permanent, should not cause financial loss ; but inability to make such moves for other reasons might militate against career progress : in the sense that the range of possible promotion would obviously be restricted.

In view of the Group's policy to build up its overseas companies as viable members of the national economy in which they are based, permanent overseas appointments are unlikely to play a significant part in the general pattern of graduate careers.

Applications

Representatives of Elliott Brothers (London) Ltd. visit a large number of British Universities and Colleges. Information about these visits can be obtained through Appointments Boards or their equivalent.

Direct applications are also welcomed. When interviews cannot be arranged at a University, applicants will be invited to visit one of the Group's Establishments whenever appropriate vacancies are likely to be available. Direct applications should be made as follows :

Elliott Brothers (London) Ltd.: Direct Entry

Applicants for direct entry into any of the principal fields of activity listed in Section II should write to the appropriate Personnel Manager as follows :

Control Valves : Flight Instrumentation and Automation.	Personnel Manager, Elliott Brothers (London) Ltd., Airport Works, Rochester, Kent.
Data Processing : Radar and Telecommunications.	Personnel Manager, Elliott Brothers (London) Ltd., Elstree Way, Borehamwood, Herts.
Mechanical Automation : Nuclear Instrumentation and Automation : Process Instrumentation and Automation.	Personnel Manager, Elliott Brothers (London) Ltd., Century Works, Lewisham, London, S.E.13.

Associated Automation Ltd.: Direct Entry

Applicants should write to the Personnel Manager, Associated Automation Ltd., 70 Dudden Hill Lane, London, N.W.10.

The Rheostatic Co. Ltd.: Direct Entry

Applicants should write to the Personnel Manager, Rheostatic Co. Ltd., Slough, Bucks.

Graduate Technical Training Scheme

Graduate Process Control Engineering Scheme

Graduate Commercial Training Scheme

Entry to any other Company in the Group

Applications should be addressed to the Chief Personnel Executive, Elliott-Automation Limited 70 Dudden Hill Lane, London, N.W.10.

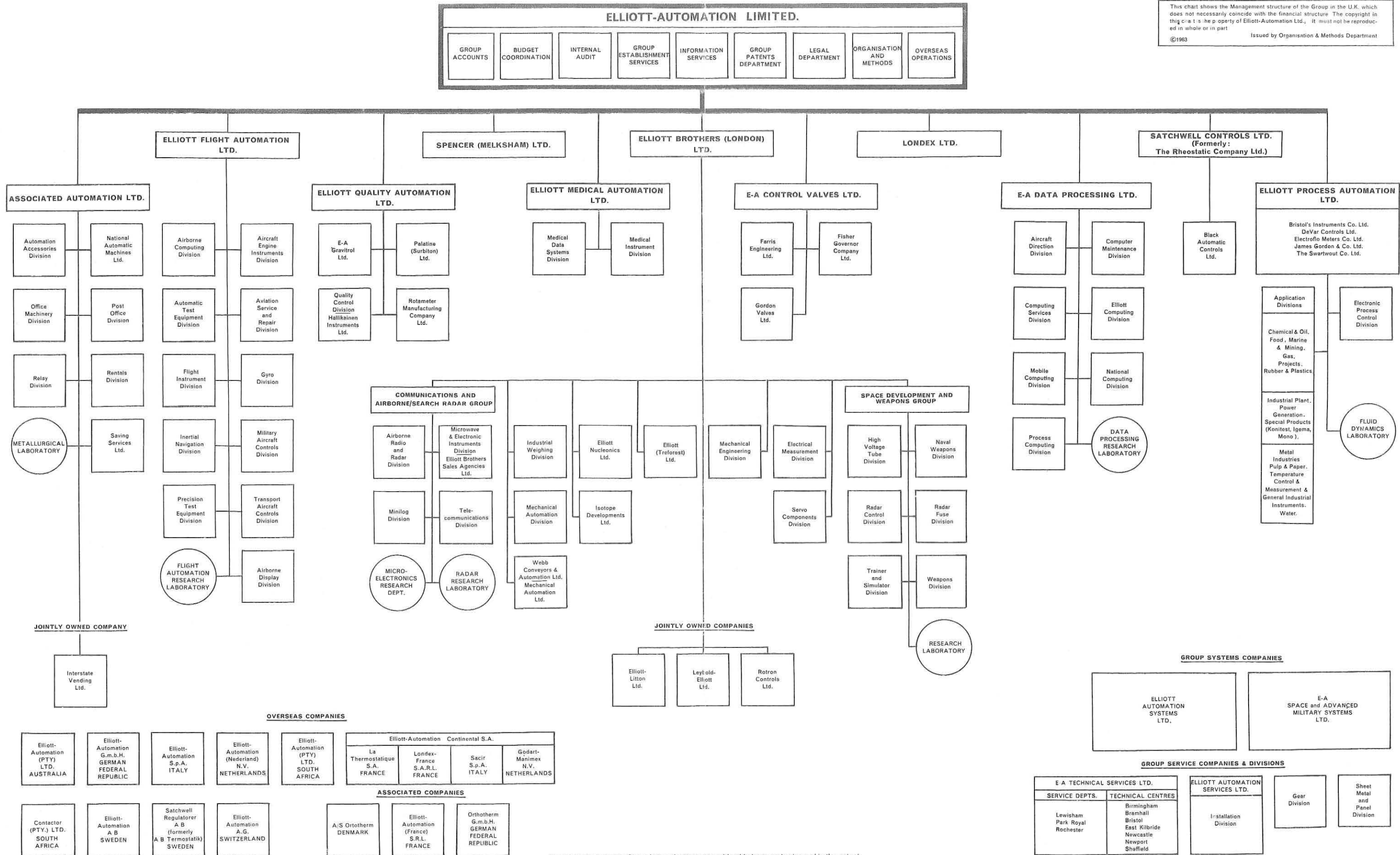


Careers for Graduates in Automation



with

THE ELLIOTT-AUTOMATION GROUP



The Elliott-Automation Group has undergone a considerable increase in size and in the extent of its operations since this brochure, "Careers for Graduates in Automation", was published in 1961. The Group now consists of more than a hundred virtually autonomous Companies and Divisions each of which is concerned with some aspect of automation, from instrumentation to automatic control and from computation to materials handling. Elliott-Automation is now the world's largest organisation wholly concerned with automation.

It is hoped that this Group Operational Chart will give some idea of Elliott-Automation's present structure.

THE ELLIOTT-AUTOMATION GROUP

The following notes are intended to supplement or revise the information contained in the printed booklet which in certain respects is incorrect owing to the Group's continued expansion. Some Divisions have been split due to their growth, others have been formed to pursue new aspects of our work. Our personnel strength has expanded from 12,000 to 16,000, an unusually high proportion of whom are qualified scientists and engineers, and our subsidiary companies are now also to be found in Austria, Italy and the Netherlands.

E-A Services Limited: formerly known as Automation Analysis Dept., (Borehamwood)

Process Computing Division: formerly known as Panellit Limited., (Borehamwood)

Airspace Control Division, (Borehamwood)., formerly Aircraft Direction Division Undertakes the design and programming of real-time data handling systems, mainly using digital computers for use in air defence, air traffic control and radar simulator control. Also the department designs special purpose display devices for use in the entire data handling field.

Mobile Computing Division, (Borehamwood): formerly Special Computing Division. This Division designs and produces digital computers and associated devices primarily for real-time applications in military, airborne and industrial systems. Design is concerned with high speed computing, miniaturisation and environmental problems.

Computer Maintenance Division, (Borehamwood). This Division undertakes the installation and maintenance of computers and associated equipment made by the Data Processing Group. Regional organisation in the U.K., with on-site and mobile field staff. Planning, installation, base workshops and technical support sections at Borehamwood. World-wide installation and emergency call service.

Computing Services Division, (Borehamwood), operates a Computing Service for industry, commerce research establishments, public authorities, local government, etc. A wide range of problems is handled in such fields as civil, structural, mechanical, nautical and chemical engineering, statistics, linear programming, and numerical analysis. The Division also runs a 'do-it-yourself' Computer Workshop.

Flight Automation Research Laboratory (Rochester)., undertakes the work previously done by Guided Flight Research Laboratory. It performs three functions:-

- 1) Engineering Research:
- 2) Central Quality Control:
- 3) Environmental Testing.

Engineering research is directed towards new ideas and techniques for Flight Automation. The Central Quality Control and Environmental Testing groups are a service for Elliott Flight Automation.

Flight Instruments Division, (Rochester) takes over instrument work from Military Aircraft Controls Division.

Airborne Display Division, (Rochester), has been formed to extend activities in the field of the integration of data displays.

Naval Weapons Division, (Frimley) undertakes the study, development and production of advanced radar, sonar and display systems. This involves research into propagation mediums as well as development in a wide range of modern techniques such as data processing, high speed digital computing, automation and a wide variety of analogue and digital servo applications.

Fuze Division, (Frimley). Part of Space Development and Weapons Group, formed to take over all the work previously done by Radar Division in connection with fuzes.

High Voltage Tube Division (Borehamwood), undertakes the development and production of advanced X-ray tubes and generators: neutron accelerators, ionisation chambers, proportional counters, and solid state radiation detectors, lasers, and cryogenic systems.

Trainer and Simulator Division(Frimley), formed to carry out research for the Space Development Group, this Division takes over from Weapons Division all aspects of simulator work except that undertaken by Aircraft Division Research Laboratory. It designs, develops and manufactures equipments in the trainer and simulator field for civil and military applications. These equipments enable personnel to be familiarised and trained for their task of operating and maintaining complex machines and equipments, e.g. nuclear reactors, flight systems of a new high speed jet aircraft, etc. The systems involve digital, analogue or hybrid computation techniques.

Microelectronics Research Laboratory. (Borehamwood). Development of thin film semiconductor and other constructional techniques for electronic equipment miniaturisation.

Minilog Division (Borehamwood)., provides a range of miniature logic elements which are used extensively throughout the Group, and are being increasingly used in industry for all forms of industrial control. Engineering work in the Division includes design of new units including thin film and solid state devices, application of the elements to customer problems and a considerable amount of industrial relations work by the engineering sales team.

DATEX (Lewisham), is responsible for the design and manufacture of digital recording and control systems based on the range of Datex Shaft Encoders.

E-A Traffic Automation Limited., (Borehamwood) has been newly formed to apply computer techniques to Road and Rail Traffic Control.

Medical Data Systems Division (Borehamwood.) has been newly formed to apply computer library facilities for medical record systems, with processing of clinical data for administrative statistical and research: with computer analysis of data from medical instruments.

E-A Marine Automation. (Greenwich) has been formed with the prime object of promoting the concept of Marine automation in its fullest sense and co-ordinating existing and future E-A activities in this field.