Fairey Surveys
newsletter
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News of developments in the world of surveying and mapping
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BAHRAIN CONTRACT

SURVEY AND MAPPING OF THE STATE OF BAHRAIN

Fairey Surveys has signed a contract to carry out photography, geodetic surveys and photogrammetic mapping of the State of Bahrain over the next two years.

The contract with the State of Bahrain Ministry of Works, Power and Water, calls for aerial photography to be flown at four different scales in both colour and in black and white, including 350 sq. km. of off-shore colour photography. To meet the variety of photographic demands, Fairey Surveys will use one of their fleet of survey aircraft with twin camera installations.

Muharraq Island, Bahrain

Preliminary planning by Fairey Surveys is already underway with the party leader installed in Bahrain preparing for the mobilisation of the field survey team. This team will carry out a complete geodetic survey and the control for the photogrammetric mapping of the islands.

Included in this contract is a requirement for orthophotography. Fairey Surveys was the first company in the U.K. to invest in the equipment and staff necessary for the development of this new photographic mapping technique, which is now emerging as a product for which there is a growing demand in both the home and overseas markets.

The four scales of photography specified are 1:40,000 black and white; 1:20,000 black and white panchromatic and infrared for accurate depiction of coastal detail at low water spring tides; 1:10,000 true colour; 1:6,000 black and white of the northern part of Bahrain where the main centres of urban development occur. The scales of topographic mapping are 1:100,000 designed as a single sheet; 1:50,000 in two sheets; 1:25,000 in a nine sheet series. The larger scales selected for detailed planning and engineering purposes are 1:10,000 in line-map and orthophotomap forms; 1:2,000 and 1:1,000 for the developed areas defined by the State Government.

Upon completion of the contract Fairey Surveys will have provided the State of Bahrain with a comprehensive new series of metric maps. In addition the survey will provide for the future a complete network of monumented triangulation stations and bench works to geodetic standards, thus establishing the reference datum to which all engineering and cadastral surveys will be tied.

AUTOMATION & MAP-MAKING

SOME THOUGHTS ON THE FUTURE ROLE OF THE PHOTOGRAMMETRIST IN A COMPUTERISED WORLD OF SURVEY.

Contributed by O. W. CHEFFINS

Man's ingenuity has led the human race into the technological world in which many of us live. His early skills of making efficient tools with his bare hands out of pieces of flint were motivated partly for survival but perhaps also as a means of labour saving. The time thus saved gave man scope for greater development. In the 150 years since the industrial revolution hundreds of manual skills have died out and we now live in an environment created by mass-production. A decade or two ago, the challenge to man's mental skills also started when electronic computing techniques were invented, and today computers are replacing human operators of machines and instruments.

In the land surveying profession, the invention of photography and flying during the past century has greatly speeded up the process of map making. A vertical aerial photograph might seem to be a good substitute for a map, and indeed for some purposes a mosaic of aerial photographs can be very useful. However, unless the landscape is flat, the aerial photograph will contain perspective displacements in much of the detail. Differential rectification of the photograph is necessary to remove these displacements and the resulting product is known as an orthophotomap. Photography of the earth's surface taken from satellites can be virtually free from perspective deformations because of the narrow angle geometry of the optical systems, but the photography is at a small scale.

The usefulness of a map is not confined to its metric quality. In the words quoted by a managing director of this company, the real value of a map is what is omitted: in current jargon, these omissions are analagous to "noise". Consider a satellite photograph of Great Britain: the wealth of minute detail makes it impossible for anybody except an expert to locate the simplest of features: a satellite photograph on its own could not even be used as a simple motorway route guide.

Map construction from aerial photography is achieved by a photogrammetric process whereby the operator of a plotting instrument surveys the landscape from an optical model of the ground which is specially restituted from the aerial photographs. The advantages of photogrammetry for map making are obvious – problems of access, bad weather and limited daylight do not hold up production of the work.

Photogrammetry is in fact a form of analogue computing, but with the development in digital computing techniques the automation of photogrammetry is becoming a practical reality. The aim is to be able to put the aerial photography through an automatic process which will convert the stereoscopic parallaxes into contour lines and spot levels, as well as to select the pertinent detail features and plot these on a parallel projection at the required map scale; the 'map' in this case may be stored on magnetic tape or a disc which a user can "interrogate" when he needs to refer to it. Ultimately, the conventional aerial camera which records the images of the landscape on film, may be replaced by a remote sensor which records directly in digital form. Such is the nature of much space imagery nowadays.

Despite the computer revolution, it can be argued that schedules of numbers cannot always show relevant information at a glance, and users of mapping at some time will need to refer to the conventional product – lines on paper. An obvious adjunct to the photogrammetric process is automated cartography, and this is also a reality today.

As the recent congress of the International Society for Photogrammetry held at Helsinki, papers were presented for discussion about the latest developments in fully automated mapping techniques and the commercial exhibition included a dazzling array of the latest photogrammetric equipment, a large proportion of which was for computer-assisted photogrammetry. It is comparatively easy to select an efficient integrated automated system for a particular series of mapping and the storage of data for such in numerical form is straightforward. However, for project mapping where no two surveys are exactly to the same specification, it is more difficult to obtain a ready-made automated device which is efficient. In the words of Morrs M. Thompson and Edward M. Mikhail of the United States Geological Survey, who gave an invited paper covering recent developments and applications of automation in photogrammetry "people seem to be galloping off in different directions". At the end of the paper, the authors conclude that none of the automation developments has reached the ultimate stage of economy, technology or quality of output and they predict that the most up-to-date and sophisticated developments will doubtless be obsolete by the time the next ISP Congress takes place in 1980.

The conversion of the photographic image into a line map still demands human judgement, although correlators which can be taught to plot contours and sensors which can recognise patterns have reached a practical stage of development.

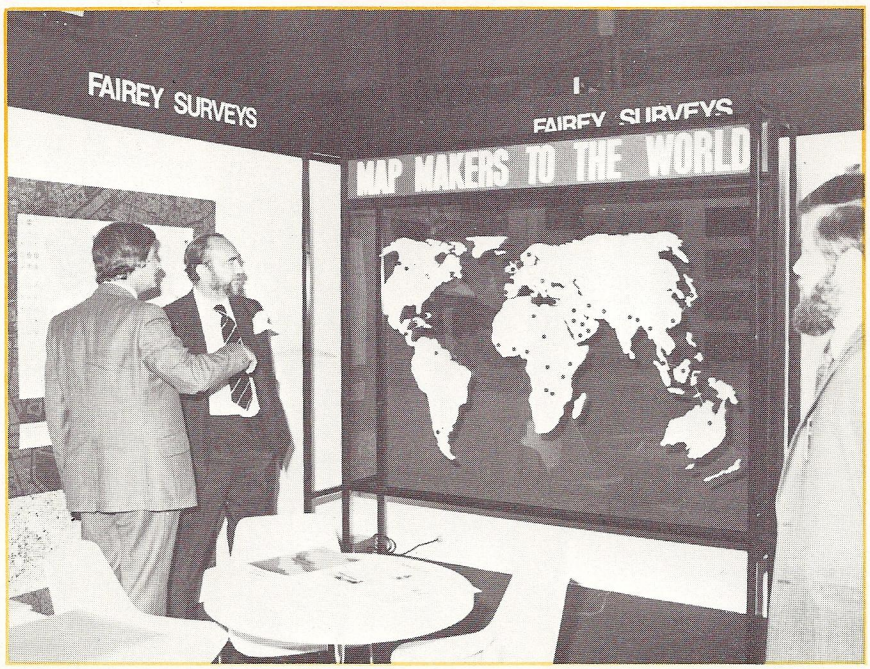
How then, should automation be introduced to photogrammetry and cartography? Clearly, the present development of equipment does not allow an organisation to change overnight from a manual to a completely automatic system, and still remain efficient. Automation must come, but the conversion will have to be gradual. The analogue stereoplotters in which capital has been invested are not yet obsolete, and these instruments will be the work-horses of photogrammetrists for some years to come. It is likely that they will be augmented with computer-aided devices working on a real-time basis to speed up the model orientation process and to smooth out idiosyncrasies in the operators' tracing of the detail. The cartographic stage of map-making will also become computer-assisted, with much of the drawing being carried out on a flat-bed plotter. But it is sensible that the transition from human draughtsman to flat-bed be properly phased, and that a situation is not reached where we find ourselves unable to crack nuts except with the proverbial steam hammer.

HELSINKI I.S.P.

The venue chosen for the 1976 Congress and Exhibition of Photogrammetry was the pleasant setting of Dipoli on the outskirts of Helsinki in Finland. A joint venture between the British Overseas Trade Board and the British Photographic Manufacturers' Association produced an all British section shared by seven companies.

Fairey Surveys presented a colourful and interesting stand featuring many examples of the services they regularly make available to planners and consultants the world over. In addition to photogrammetric work Fairey Surveys showed examples of their Middle East mapping, leisure maps, aerial photography, terrain modelling, digital mapping, and geophysical work. A Fairey Stereoviewer, one of the pieces of equipment produced by the company, with suitable photographs, was provided for the use of visitors to the stand. During the first week of the exhibition, all firms on the British stand were visited by Sir James Cable, KCVO., CMG. the British Ambassador to Finland. He expressed a great interest in the Fairey Surveys' display, which was explained to him by Peter Forsey, the Commercial Director.

Many old friendships were renewed and new contacts established as delegates from all over the world mingled and discussed new ideas.



PHOTOMAP

Visitors to the beautiful Forest of Dean and Wye Valley can now purchase a comprehensive map of the area compiled from aerial photography.

To cater for an ever increasing number of visitors to the Forest of Dean area the Forestry Commission have provided an impressive range of amenities. These include car parks, refreshment kiosks, camp and caravan sites, picnic areas and planned forest trails. While wishing to ensure the maximum recreational enjoyment the Commission is also very concerned to protect valuable plantations and to preserve the natural environment for future generations.

Previously, two maps had been issued for visitors, one indicating routes to the area and the other showing the location and nature of car parks and other amenities. Each of these publications was considered rather inadequate and it was felt that there was a need for an entirely new map embracing both functions.

Knowing that aerial photography had recently been completed for survey purposes, officials of the Forestry Commission approached Fairey Surveys to investigate the possibilities of using the photography for the production of a new comprehensive map. One which would assist the thousands of people who visit the area annually to enjoy their visit to the full.

Fairey Surveys have for some years worked on techniques for producing map backgrounds from vertical photography and this project was an ideal opportunity to utilise this accumulated experience. It was also something of a challenge to compile a map by this technique which would be accurate, informative and attractive enough in presentation to meet all the clients' requirements.

The area to be mapped was the triangle of land bounded by the rivers Severn and Wye, together with the forest areas to the west of Tintern and Monmouth.

Over 600 separate photographs were used to form a photomosaic. Achieving the desired effect of obtaining continuity of detailed mean scale, particularly in areas of high ground, exercised the expertise of our mosaicing section to the full.

Features of special interest are shown by a variety of red symbols. In addition all car parks, recommended walks and footpaths are classified by colour codes while roads and railways are indicated by traditional means.

Built up areas are shown with a red tint over printed with black background detail and rivers shown in blue have the tidal differences indicated.

The map which uses both sides of the sheet is further supplemented by panels of information and a fascinating history of the Dean Forest and Wye Valley.

AIRPORT RUNWAY APPROACH SURVEYS

Operating limitations within the approach funnels to airports will vary according to the surrounding topography, which has to be accurately charted to ensure safe air traffic control. Obstructions, such as trees, chimneys and other features which present themselves, can be of vital importance in determining what these operating limitations must be. It is therefore necessary for the authorities to keep a regular check on the runway approach corridors so as to monitor any building developments and other changes, which could significantly alter the constraints.

Measurement of obstruction heights on airport approaches by traditional ground survey methods can be a time-consuming exercise, since quite extensive areas of land have to be covered. Certain difficulties are also involved in the ground survey method, such as the need for access onto private land and the restricted visibility at ground level which hinders the surveyor's ability to sight onto the tops of trees or other features.

British Airports Authority recently awarded a contract to Fairey Surveys Limited for carrying out, by photogrammetric methods, obstruction surveys for the runway approaches of Aberdeen and Glasgow Airports. Vertical aerial photography was taken to cover the corridors in question, amounting to approximately 58 square kilometres in total. The flight sortie was made whilst the trees were still in full leaf, in which state the tops could be accurately measured by photogrammetry.

The photography was set up in a precision plotting instrument to be scanned in a series of bands running at right angles to the funnel centre-lines. Each band had been given a height limit, which varied according to the distance from the runway. All obstructions which exceeded the given height limits were measured, and their three-dimensional co-ordinates recorded automatically on punched paper tape, together with a code to describe the object, e.g. tree, house and so on.

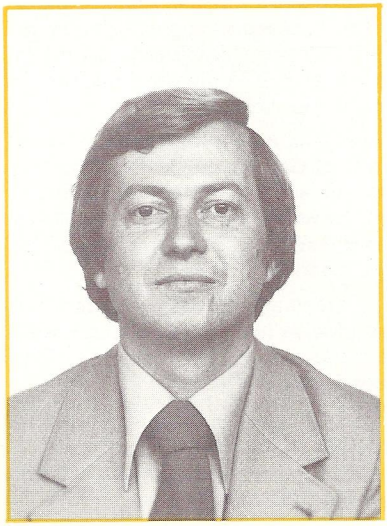
The data were subsequently transformed into the National Grid system and a typewritten schedule was output from the computer to give all the required details. The obstructions with their reference numbers were also plotted onto a 1/10,000 scale composite map based on the Ordnance Survey, which was brought up-to-date within the funnel limits during the photogrammetric process.

Zones of Visual Influence

Protection of amenity is a very important consideration to planning departments when siting large structures, such as power stations, in rural surroundings. Mr Ronald Hebblethwaite, Landscape Architect for the Generation Development and Construction Division of the Central Electricity Generating Board, developed a system known as "Zones of Visual Influence" (ZVI) whereby the topography surrounding possible sites for large structures, as represented by contours on a map, can be used to construct diagrams which show the zones where such a structure would be visible. He also used the heights of existing surface mantle features, e.g. woods, buildings hedges etc. and took into account correction of Ordnance Survey Data height for curvature of the earth and refraction of light.

Following C.E.G.B. outline specification, Fairey Surveys Limited have now produced digital computer programmes which are being used in conjunction with photogrammetric plotting methods, to determine the visible and non visible zones for given structure heights, taking into account earth curvature, refraction of light and ground mantle screening.

The results are presented to the Generating Board as a map, according to their specification, in the form of reprographic negatives from which they make litho plates for two-colour printing. On the printed maps the areas from which the top or more, of the object can be seen are shown clearly in yellow, while the areas where even the top of the structure cannot be seen are shown grey.



Dr. J. L. van Genderen

We have pleasure in informing our readers that with effect from the 1st October, 1976, Dr. J. L. van Genderen joined the staff of Fairey Surveys as Co-ordinator of our Resources and Environmental Consultancy team.

For two years Dr. van Genderen has served Fairey Surveys as a member of the panel of consultants available to advise and assist clients with specialised problems. An acknowledged expert in the fields of remote sensing of the environment for natural resources and the interpretation and analysis of the data collected, Dr. van Genderen has acted as consultant to such bodies as the European Space Research Organisation and N.A.S.A. for the Sky-Lab-EREP programme.

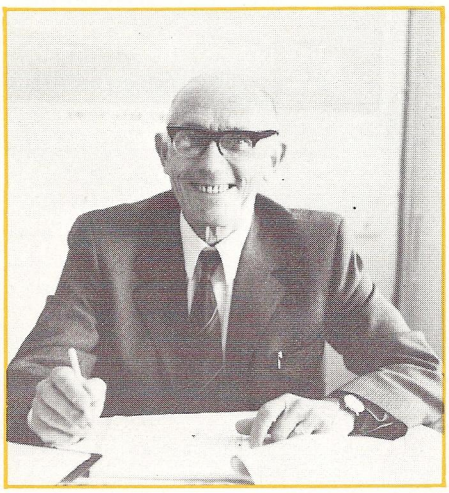
This appointment further strengthens Fairey Surveys' technical capabilities and increases the scope of the services we offer our clients. We hope Dr. van Genderen will enjoy a long association with us.

JIM HILL RETIRES

We would like to wish Jim Hill a long and happy retirement since he took his leave from Fairey Surveys in September this year.

Mr Hill, born in London and educated at Hampton Grammar School, trained for his profession through the Battersea Polytechnic, the Ordnance Survey and the Royal Engineers.

After holding posts with British Insulated Callendars Cable Co., E.M.I. and Ordnance Survey, Mr. Hill joined Fairey Surveys as a ground surveyor in 1947. His first job was the Joseph Pasha Dam and irrigation system in Syria, and by the end of this project, he was already 'surveyor in charge'. Upon his return to the U.K., he was appointed Mapping Manager and in this capacity he still continued to gain overseas experience particularly on ground survey projects in the Middle East.



In 1952, Jim Hill went to Thailand as Project Manager for the Me Ling River irrigation project and followed this by taking control of the United Nations project for the Me Tang hydro-electric and irrigation scheme in Northern Thailand.

During the period 1955-1958, Mr. Hill, as Project Manager, was charged with the task of organising the Iran Cartographic Centre as directed by the Government of Iran. His period in Iran also included the mapping of 200 cities and towns, an oilfield project and the Mazandaran Plain irrigation scheme.

Jim gave up globe-trotting in 1960 and took up the appointment of U.K. Contracts Manager. It was while occupying this position that he laid the foundations for the formation of Fairey Surveys of Ireland Ltd. and Fairey Surveys Scotland Ltd.

He will be greatly missed by his colleagues at Fairey Surveys and we feel sure he carries with him the best wishes of all his friends throughout the survey world.

If you require further information on items featured in Fairey Surveys' Newsletter or would like to be added to the mailing list for future issues,

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