



Fairey Surveys

newsletter

DECEMBER 1978

20

News of developments in the world of surveying and mapping

MINISTRY CONTRACT IN SAUDI ARABIA

SOUTH SHAMMAR MAPPING

SINCE publication of Newsletter 19, Fairey Surveys has signed a contract with the Ministry of Petroleum and Mineral Resources in Saudi Arabia for the production of 1/50,000 scale photo-map sheets. The area concerned is that known as the South Shammar and comprises 105,000 square kilometres and will involve 150 map sheets.

Data in Hand

The aerial photography and the air-triangulation observations and block adjustment have already been produced for the Ministry by KLM Aerocarto and will form the basis of the contract materials from which the maps will be produced by Fairey Surveys.

Field Work

Whilst the work involved can be described as essentially map compilation, cartographic presentation and printing, there is an element of field work involving name collection, classification and updating of photo detail plus measurement at 80 kilometre spacing of magnetic declination to arrive at accurately interpolated values for each map sheet. Such national geodetic control monuments and bench marks that fall within the area will be visited in order that the descriptive data held by the Ministry can be verified and the condition of the monuments reported. Names will be collected by Arabic speaking graduate personnel, including a representative from the Ministry and the tape-recorded

spoken names will be the subject of agreement for calligraphy and position with the names committee

of the Ministry, prior to the final compilation of each map sheet.

Publication

The finished map presentation will be a compiled orthophoto background with detail and contours overprinted in a five colour style. Arabic and English versions of each map sheet will be supplied within a 24 months delivery schedule starting from receipt of all existing data including style sheets from previous regions within the same national series. It is expected that field work will start before the end of 1978.

OBITUARY

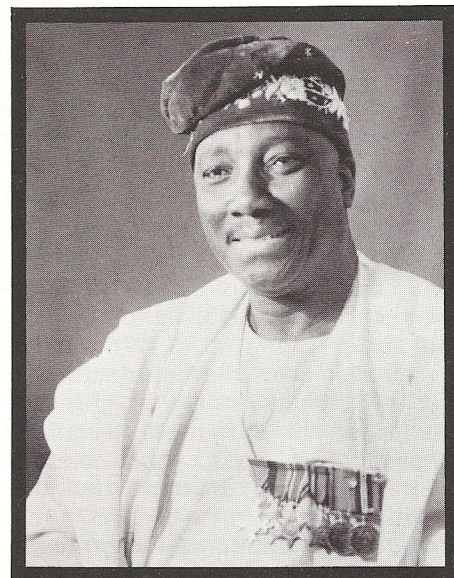
IT is with deep regret that we report the death in Ibadan, Nigeria on the 6th September, 1978 of Chief J. O. Laniyonu, M.B.E., F.N.I.S.

Chief Laniyonu was Managing Director of Geodetic and Aero Surveys Limited Ibadan, who, since 1971, have been Fairey Surveys' Nigerian Partners.

As a Surveyor, firstly in the Government Survey Department, then from 1939-1946 on military service in many African countries and the Far East, and finally as a private practicing Land Surveyor, he was always a prominent leader whose counsel was sought by all dedicated to the preservation of the highest professional standards.

'The Chief' was a well known sportsman both actively in his younger days and more recently as an administrator. A former Amateur Boxing Champion, he was also Lawn Tennis Champion of Northern Nigeria from 1931-1934. Those who knew him personally will remember the immense pride and dignity with which he carried out his duties as Chairman of Western Nigeria Ex-Servicemen's Welfare Association.

Men of his undoubted stature will always be sorely missed.



TELL US YOUR SURVEY PROBLEM

Teamwork

For a number of years, the design and manufacturing capabilities of our Research and Instruments Group have been used to provide Field Survey Department with a large number of mechanical interfaces for the various instruments and tripods in current use within Fairey Surveys, thus enabling maximum utilisation of equipment.

More recently there has been an increasing demand for engineering surveys of a specialised nature, which continue to utilise the most up-to-date surveying equipment but in addition require that this equipment be used in some unconventional environments.

Due to the nature and complexity of these specialised surveys a close liaison has been established between the engineering division and the survey department. Based on this liaison and our previous experience Fairey Surveys can offer a unique service.

Examples of some past problems:

Spinning Target

In 1973 we were asked if we could co-ordinate the centres of a large array of standpipes in a Nuclear Power Station to a relative accuracy of four thousandths of an inch.

In order to achieve this in the time allotted, it was necessary to observe targets centred in the standpipes from four theodolite positions simultaneously. No existing target was suitable. Those which could be intersected could not be observed simultaneously, while those which could be observed simultaneously exhibited phase and other undesirable effects due to the large number of powerful lamps around the site.

R & I designed and manufactured a set of targets using a graticule composed of chromium, vacuum-deposited on glass, spun about a diameter in a very accurate mount. A lamp mounted beside each theodolite, illuminated the graticule for that theodolite only when it was exactly face on.

The rate of spin was high enough to overcome flicker, so that all four theodolites saw a rock steady, brightly illuminated image.

These targets operated faultlessly during the surveys of four reactors spread over a period of three years,

and it is fair to say that they made the job possible.

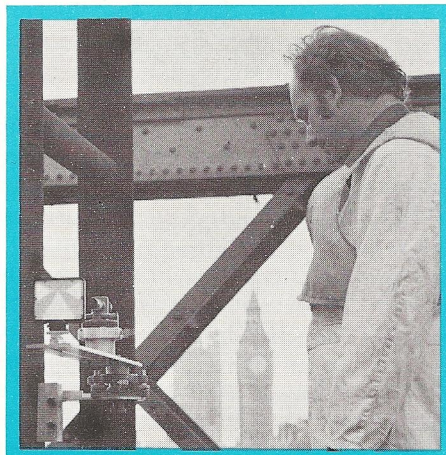
As-built Dimensions

The next specialised survey task, required measurements of the hull form of a large oil tanker in order to determine whether the manufactured shape varied from the designed shape (to a degree that would explain an apparent shortfall in performance). R & I designed and manufactured a number of special targets and reflector holders with magnetic bases, for clamping to the hull, and also provided illuminated levelling staves so that vertical measurements could be made downwards from the underside of the hull in conditions of very low natural light. This modification for levelling has proved useful in many other applications.

Bridge Structures

Two recent contracts have both concerned railway bridges, the first being the precise alignment of a new bridge and the second being the provision of data for the repair of an old one.

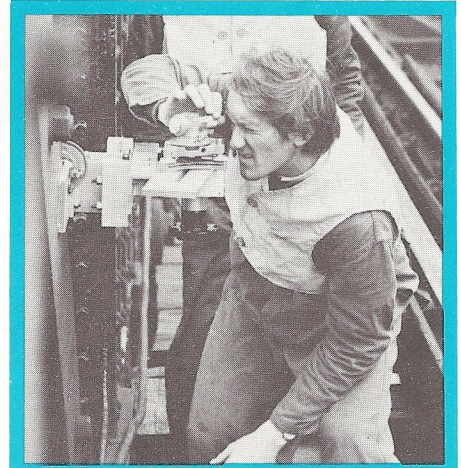
In the first case a laser was used in conjunction with tooling mirrors and Fresnel zone plates, first to set components of the structure accurately parallel, and then after stressing, to measure the angular shift in the components so that correcting shims could be



Lining apparatus for girder, with 'Big Ben' in the background.

manufactured. The laser mounting system, mirror mounts and adaptors for connecting them to the bridge structure were all designed and manufactured by R & I in liaison with the Survey section.

The second contract involved taking measurements to inaccessible points under the bridge, and relating them to alignments on the deck. A range of equipment had to be designed in a very short space of time. To do this R & I went into the



Optical plummet used to measure offset distance from centre of underside of girder.

field with the survey section, first to assess the problem and then to check the efficiency of the equipment.

The equipment produced was a mixture of existing survey instruments, such as optical plummets, targets, reflectors and optical squares, with mechanical systems capable of being clamped to bridge members to locate automatically their inaccessible centre lines and relate them to the optical alignments on the accessible deck of the bridge. In order to match the high transverse accuracy achieved by the special equipment, the longitudinal measurements were all made using the Mekometer, with its 1/10th mm resolution.

Mekometer Modification

The Mekometer itself has been modified in the R & I department. A special fitting, replacing the original Kern base, makes it a much more versatile instrument, as does the pressure equalisation device, connected to the cavity, to improve response time to changes of atmospheric pressure and prevent ingress of moisture.

Another Mekometer accessory is a 1/10th wavelength mirror, fitted in a gimballed mount with slow motion drives. This enables the Mekometer to be used for measurements in places previously inaccessible to it.

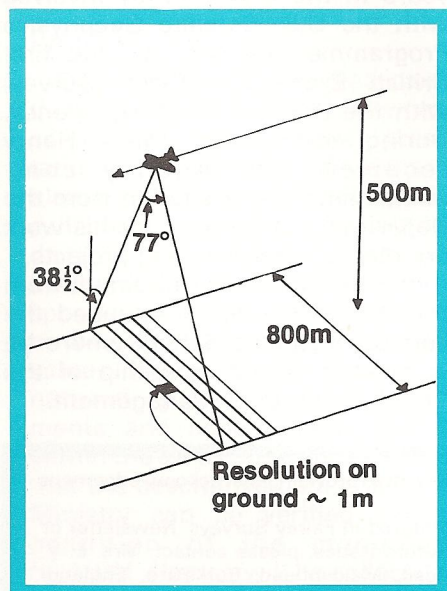
No two survey problems are identical, our engineers' individual solutions with perhaps specially designed equipment may be the answer to your peculiar surveying problem.

HEAT LOSS STUDIES

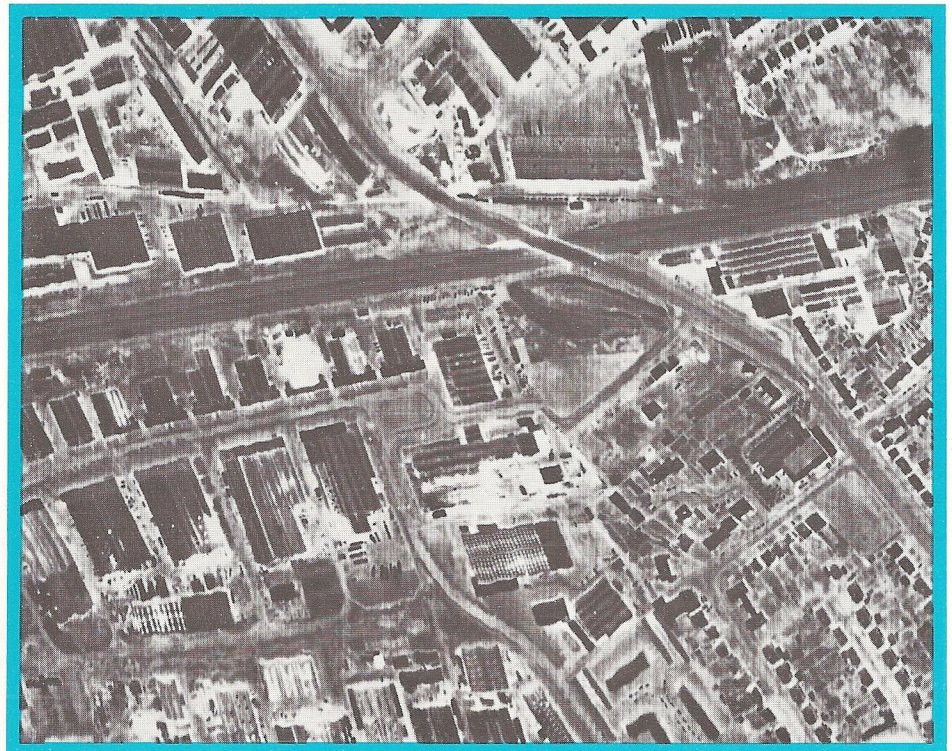
IN recent years fuel shortages and rising costs have emphasised the need for stronger energy conservation measures. Airborne thermal surveys can be used to detect areas of excessive heat loss from a building and if adequate preventative measures are taken, savings in fuel bills without a reduction in comfort levels can be made.

Fairey Surveys has recently completed an airborne thermal survey within the U.K. One purpose of the survey was to identify and evaluate areas of heat loss from industrial and office buildings.

The use of airborne thermal surveys in the U.K. on a commercial basis has emerged over the last ten years and Fairey Surveys has always been a front runner in the field. At the present time the equipment used is a Daedulus DS-1250 multispectral linescanner. Unlike conventional air photography, where the image is exposed onto a photographic film, the thermal image is built up in a series of strips which are viewed at right angles to the line of flight by means of a rotating mirror. Each strip has a field of view of $77^{\circ} 20'$ and the forward movement of the aircraft is such that successive strips overlap to give a complete 'picture' of the ground beneath the aircraft.



Basic concept of thermal infra-red linescan.



Thermal infra-red image of mixed industrial and residential area depicting building heat loss.

The thermal infra-red detector in the aircraft, records the radiated heat loss from the ground for each linescan, along with the temperature of two reference black bodies to enable an absolute temperature calibration to be made. This radiation, which is invisible to the naked eye, can then be transformed to produce an image of the temperature variation of the ground surface. Thus, not only is the method of imaging different from conventional air photography, but the type of image produced is also different. In operation the Daedulus scanner can detect temperature variations as small as 0.25°C over a range from -10°C to $+40^{\circ}\text{C}$, and has a resolution of one metre when the aircraft is flying at a height of 500 metres.

With the Daedulus DS-1250 scanner the detected radiation is converted inflight to a proportional electrical voltage and stored on a magnetic tape. This facility to record the image on tape in analogue form is the major advantage of the Daedulus system, compared with other linescan instruments which record either directly onto photographic film or video tape, inflight.

The advantage is that the magnetic tape can then be used to provide an objective and quantitative analysis of the thermal imagery. In the laboratory, geometrically corrected images can be produced by writing the data onto a photographic film. In addition computerised processing of

the data is used to produce a density sliced image, each slice representing a temperature range. Density slicing is achieved by dividing the image into a number of grey wedges or 'windows'. The resultant sliced image can be presented in black and white or in colour. Colour slicing involves assigning a colour to each density 'window' and simplifies the task of the interpreter in identifying the tonal density and hence temperature of a particular feature on the image. A further possibility is to convert the analogue tape into a digital format which would then allow computation to be made of the heat loss in watts/ m^2 .

The thermal infra-red images are usually taken at night to avoid solar radiation effects and give maximum temperature variation between different surfaces. Ideal conditions are cloud-and-haze-free skies, air temperatures near to freezing and no temperature inversion. Imagery cannot be obtained through clouds, or in rain, as water absorbs the radiation.

Whilst the main concentration in the survey just completed was heat loss on industrial sites, thermal surveys are ideal for monitoring the effectiveness or otherwise of residential insulation. Other applications include monitoring underground steam pipes for leaks, locating fresh water outlets offshore and recording water pollution patterns, such as from power stations, industrial and sewage outfalls.

GROUND SURVEY TEAMS

Many readers are perhaps not fully aware of the complete range of services offered by teams from the Ground Survey Section. These teams are staffed by experienced surveyors and equipped with modern instruments (infra-red, laser and microwave) to provide a rapid service within the United Kingdom and Overseas for:

- ★ Site Surveys—1:100-1:1000 scale
- ★ Setting Out for Engineering and Construction projects
- ★ Road and Pipeline Strip Surveys
- ★ Pencil Plots/Fair Drawings on Stable Based Media
- ★ Gridding, Profiling and Data Collection for DGM Systems
- ★ Day rate hire of surveyors with/without instruments.

Further Enquiries:

J. A. Brownlee Ext. 36

FAIREY FALCON BUSINESS MAPS

FOUR new titles have appeared recently in the growing list of cartographic products published by Fairey Surveys.

Produced jointly with Falcon Publishing of Bahrain, this new series covers the important commercial centres of: Bahrain, Qatar, Abu Dhabi and Dubai. Each map is designed to meet the needs of both resident and visiting businessmen and includes a classified directory of all major business houses and a detailed town plan.

Aware of the need for a publication of this kind in other areas it is planned to extend the series in the near future.

Copies available in the Gulf States or from Fairey Surveys.

NEW STAFF APPOINTMENTS

TREVOR Beaumont, who recently joined our Environment and Resources Consultancy will have particular responsibility for the company's transport planning and highway engineering studies.



Trevor Beaumont

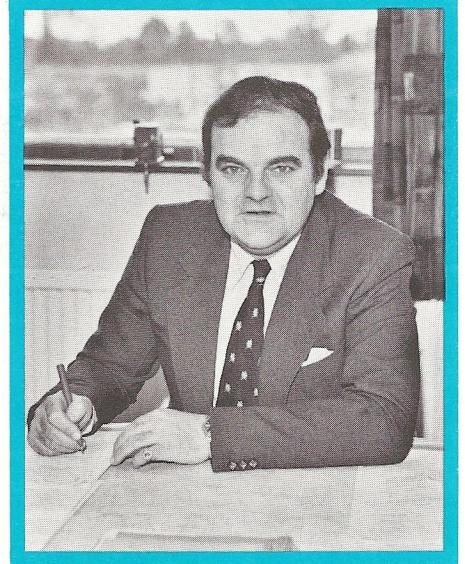
Mr. Beaumont has come to us from the Overseas Unit of the Transport and Road Research Laboratory, where he has been deeply involved with the application of remote sensing techniques for highway engineering and transport planning in developing countries.

Born in Leeds, Mr. Beaumont obtained an external University of London B.Sc. (Special Hons.) degree and after further study at Sheffield University and I.T.C. Delft he received an M.Sc. in applied Geomorphology.

During the last four years he has participated in instructional courses organised by the Ministry of Overseas Development and CENTO for developing countries and has made presentations at the UN seminars held in Reading and Manila.

Mr. Beaumont has published many papers; is a Member of the Institute of Highway Engineers and is a council member of the Remote Sensing Society.

WE are pleased to announce the appointment of Major (Rtd) W. Miles Henry as a Senior Marketing Executive.



W. Miles Henry

Born in Hong Kong, Miles Henry attended school in the U.S., University in Ireland and was commissioned into the Royal Engineers in 1956. Two years in Libya were followed by training and experience in aerial photography and photo interpretation.

Career highlights from 1965-1977: Secondment to Ordnance Survey as Assistant Regional Officer. Command of a Canadian Survey Detachment in Nova Scotia on first and second order triangulations. Course in photolithography at London College of Printing. Five years in the U.S.A. firstly involved with the U.S. Satellite Geophysics Programme and then as the first British Exchange Officer (Survey) with the Defense Mapping Agency. During this period Miles Henry received two Agency commendations and a citation from the Department of Defense for his work on international mapping projects.

In 1977 upon his retirement from the Army Mr. Henry attended the London Business School where he completed his Membership of the British Institute of Management.

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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, please contact: Mrs. E. V. STORRIE, Fairey Surveys Limited, Reform Road, Maidenhead, Berkshire, England. Telephone: Maidenhead (0628) 21371. Telex: 847352. Cables: Airimap, Maidenhead.

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