

THE RANGER

Journal of the Defence Surveyors' Association
Spring 2002

Volume 2 Number 5



Geographic data in the front line



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Contents - Spring 2002

| <i>Item</i> | <i>Page</i> |
|--|-------------|
| Editorial | 2 |
| Officers of the Association | 2 |
| The Defence Surveyors' Association | 3 |
| Bereavements | 3 |
| Chairman's Column | 4 |
| New Members | 5 |
| Visit to Fort Nelson | 5 |
| The View from Defiance Building | 6 |
| 42 Engineer Regiment (Geographic) - Operations Update | 8 |
| The Watchkeeper Project | 10 |
| The Future of Gunner Survey | 12 |
| Australian Army Survey Unit Demonstrates its Capabilities | 13 |
| Cleared for Take Off | 14 |
| Fifteen Stars Say Farewell to Rita | 16 |
| Border Surveying in Oman 1964 | 17 |
| European Army - Fact or Fiction | 19 |
| Mapping Great Britain at One-Metre Z Values | 21 |
| The Royal Engineers Museum | 25 |
| Airman with the Gunners | 28 |
| Naval Minehunting | 31 |
| Don't be a Last Minute.Com | 33 |
| More about the Tavistock | 36 |
| Geo People | 37 |
| The Fovant Badges | 39 |
| The Odyssey Timeship Project | 40 |
| New Professional Recognition for the Hydrographic Surveyor | 41 |
| The Evolution of the Military Engineer Geographic Technician | 42 |
| Hydrographic Training in the Royal Navy | 45 |
| Obituary | 47 |
| Book Review: Kitchener's Survey of Cyprus | 48 |

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Photograph: 1 Aeronautical Information Documents Unit RAF.*

This edition of Ranger...

The world is certainly an unhappy and troubled place as I write this column, an opinion borne out by two articles giving updates on the recent operational activities of the Royal Navy Hydrographic Surveying Squadron and their Sapper counterparts, 42 Engineer Regiment (Geographic). Both have been heavily involved in operational deployments for many months with the Royal Engineers geographic specialists deployed at the time of writing on eight different operations located across the Balkans, Sierra Leone, Afghanistan and Northern Ireland. Each deployment comprises either a single technician, as is the case at the moment in Sierra Leone, or a small team but all involve four or six month-long unaccompanied tours usually in uncomfortable, and possibly down right dangerous, locations. When compared to the overall numbers in the Royal Navy and Army as a whole, hydrographic surveyors and geographic specialists form a very small minority but they do seem to punch well above their weight.

The majority of the Association's members are not now serving members of the Forces but fill positions at all levels in a wide variety of businesses and industries proving yet again the quality and versatility of those trained in military geography and hydrography. As you would expect, many former surveyors have stayed with their profession, some to 'go it alone' and run their own businesses - generally very successfully - and more than a few have risen to senior appointments in major concerns. Those who have left the world of angles and distances and gone on to pastures new have entered an amazing array of second careers ranging from directing the Caravan Club's many sites to ski instructor. All in all, it makes the DSA a very good, and interesting, networking facility!

This issue of Ranger has the usual varied range of literary gems including a 'scoop' in the form of an article on the controversial so-called 'European Army' by the Geographic staff officer at the Brussels Headquarters. Training, a subject of concern in the commercial geomatics world, is covered by articles from the Royal Navy Hydrographic School and Hermitage. There are up-to-the-minute pieces from BAE Systems, AMS and Intermap that describe advances in geo-technology that are quite astounding. These are balanced by a fascinating account of Surveying in the Oman in the Sixties, a time when theodolite and EDM came as separate items!

I cannot finish this editorial without yet again mentioning the superb quality of the last edition of Ranger. The staff of AIDU have excelled again and produced another quality 'glossy' journal ...well done and thank you.

Once again, I hope you enjoy a good read.

Alan Gordon

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Opinions expressed in Ranger do not necessarily reflect those of the DSA or the editor.

DEFENCE SURVEYORS' ASSOCIATION

Formerly the Field Survey Association

The Defence Surveyors' Association, or DSA, is a registered charity whose principal objectives are:

- To maintain a permanent liaison between serving officers, retired officers and civilians working in the Defence domain who have a professional interest in geospatial data.
- To keep abreast of current issues in the geomatics arena.
- To recognise the most significant contributions to geomatics by serving personnel through the award of annual prizes.

The Association publishes the Ranger journal on a periodic basis and organises various technical visits and social events for its members. These meetings provide an ideal opportunity to meet a wide range of people, all of whom have a connection with some aspect of the geomatics profession.

The Council of the Association is currently widening its membership and improving its services to members. *If you want to keep in touch with the survey profession and friends in the business please come and join us.*

Membership is open to personnel who are engaged, or have been engaged, in Defence related geomatic disciplines at a management level. In addition, a candidate for membership must also be known personally to at least two Members, who, as sponsors, must satisfy the Council that he or she is suitable for membership.

The cost of membership is a modest £10 per year payable by standing order on the 1st January. New members joining while still serving get free membership for the remainder of the year in which they join.

Those desirous of becoming Members should contact the Association at its registered address or telephone the Membership Secretary on 01730 823638 or e-mail: membership@defencesurveyorsassociation.org

EDITOR'S THANKS AND APOLOGIES

My thanks to everyone, volunteers and volunteered alike, who produced an article for this edition of Ranger. In the end I received sufficient high quality input to fill two issues and so, at the very last minute, I had to select those to be included in the Spring edition. Selection was firstly on the basis of the currency and timeliness of the content followed by the need to maintain a balance between the three component disciplines of the DSA and also the yesterday, today and tomorrow theme. My sincere apologies to those authors whose work has not been included...your efforts will appear in the Autumn edition. Please do not let this current abundance of wealth stop anyone from writing something for the next issue....all articles are most welcome.

Alan Gordon

BEREAVEMENTS

It is with regret that the association announces the deaths of Ernest (Alfred) Hodnett and Harry Pickles. Ernest was a former Chairman of the Association and an obituary appears elsewhere in this issue. Harry was a very active member during the 1950s and 1960s. He was Officer Commanding a mobile Reproduction Unit during the Second World War and later rose to become the Director of a London-based Printing company.

Although not a DSA member, the death of Bunny Lewis, well known in surveying circles and a former Principal Map Research Officer with Military Survey, will be sad news to many members.

CHAIRMAN'S COLUMN

This will, unfortunately, be my last Chairman's Column for the Ranger as I am fast approaching the end of my second two-year tenure when I am to be replaced by Colonel (Retd) John Croft, late RE Survey. John has been a member of Council for a number of years and has, in the last 12 months, been our Membership Secretary as well as being Vice Chairman. Because of this active involvement with the DSA in recent times, I am sure he is known to most of you and needs no introduction.

My aim at the beginning of my first two-year tenure was to raise the profile of the DSA and increase its membership, which had been declining over previous years. Whilst I believe I have achieved this, John Croft is aware that we have to sustain this and there is still much for him to do to meet our charitable objectives with minimal operating costs whilst meeting the expectations of our members. This is a difficult balancing act and, whilst membership fees have not increased for a number of years, I am not sure it can continue that way for much longer even though the Council keeps finding innovative ways of increasing our revenue and decreasing our costs.

There are also other changes in appointments taking place: Robert Dobbie is being replaced by Morris Felton as the Hon Treasurer and I am likely to replace John Croft as Membership Secretary, unless another volunteer can be found. By giving up his Treasurer's duties, Robert will be able to concentrate his efforts, as Webmaster, on the refinement and maintenance of our splendid website. Our website is now kindly sponsored by EDS Defence Ltd, the UK defence arm of the global IT/IS Services company, Electronic Data Systems and I hope this support will continue in future years. With the change in Hon Treasurer, comes the change in bookkeeping methodology as we go digital. Morris Felton has now purchased his accounting software package and we will, no doubt, be seeing a different format when our accounts are presented at the next audit and AGM. David Wallis has kindly agreed to continue as Hon Secretary but he is in desperate need of help on occasions with 'folding, packing, licking and sticking' of circulars. Anyone out there willing to help would be most welcome.

Since the last edition of the Ranger, in Autumn 2001, we have had two social events coupled with after lunch visits to the RAF Museum at RAF Hendon and The Royal Armouries at Fort Nelson. Both were excellent visits, with the latter attracting more than 60 people, and my thanks go to David Wallis and Geoff Gathercole for carrying out the recce's and making the necessary arrangements. For this year's AGM, on Saturday 1st June, we will be going to Brompton Barracks, Chatham with lunch in the Officers Mess and a tour of the RE Museum afterwards. John Croft has been kind enough to make the preliminary arrangements for this visit with the details being finalised by David Wallis. For early September, Morris Felton and myself hope to arrange a Thames boat trip followed by lunch and a tour of the Tower of London and I suspect this will be a popular event so book early when you get the form.

Our membership continues to rise and at the last Council Meeting, on 16th March 2002, the number stood at 181 although I am sure it is out of date by now with the recent election of several more members. No doubt the Editor will be updating this figure and listing our new members elsewhere in this publication. As I have said in previous reports, this increase has been principally due to the quality and wide circulation of this twice-yearly magazine. BAE Systems kindly continues to remain the primary sponsor for The Ranger and I thank them for their support. So, if you are a non-member reading this article and would like to stay in touch with your fellow professionals why not join the Association now, either on line at www.defencesurveyorsassociation.org or by contacting myself on the telephone number given below. £10 per year is all it costs with the benefits of attending four social events and visits per year and being kept in touch via this publication being delivered to your home address.

As our membership continues to rise the need for volunteers to help out with Committee duties on an ad hoc basis becomes more urgent, and anyone wishing to offer their services is asked to contact either the Hon Secretary, David Wallis via the website or myself at the number given below.

I do hope you enjoy the remainder of the magazine and spread the word by telling your professional colleagues about it.

Mike Stanbridge
Chairman
Tel: 01256 74 2542

NEW MEMBERS

The Association welcomes the following new members and hopes to see them at an event in the near future.

Major V Grealy BSc, MBA, MCIPD, FRGS, FCMI, FRSA, MANLP. Following his Army Survey Course, Vince enjoyed tours in Australia, around the world with 512 STRE and in Germany before real life caught up with him and he was posted to Feltham. After seven years in a variety of interesting posts Vince left the service to start a new career as a management consultant.

Lieutenant Commander AK Waddington BSc (Hons). Andrew became a hydrographic surveyor in 1988 and undertook the long hydrographic course in 1993. He served as Survey Operations Officer on HMS Beagle and HMAS Moresby before taking up the post of Executive Officer on HMS Herald. He has also had command of the minehunter HMS Walney. He is currently responsible for career management of the Hydrographic Officers.

Mr S Jones. Shaun followed a career as a surveyor in the Royal Artillery serving in a variety of regiments, at The Royal School of Artillery and on operations in the Gulf War and Bosnia. He is now a Senior Surveyor with Plowman Craven Associates working in the London area.

Dr P Collier BSc, PhD. After seven years with the Directorate of Overseas Surveys, Peter opted for an academic career with the Department of Geography at Portsmouth University. He is keenly interested in the history of military survey and is currently working on Volume 6 of the History of Cartography.

Major A Keeley BSc. Tony served with the British Antarctic Survey before commissioning in the Royal Engineers where he specialised in Survey. During his Military Survey career he was posted twice to 512 STRE, the USA and Germany and enjoyed several tours at Hermitage and Feltham. Recently retired from the Corps, Tony is now the Training Adjutant at the Royal School of Military Survey.

VISIT TO THE ROYAL ARMOURIES, FORT NELSON

The programme for Saturday the 16th of March promised a very full day and so it turned out to be as, in the event, there was so much to see that we ran out of time to take in the magnificent displays cataloguing the history of gunnery.

There was a meeting of the DSA Council at 10.30 with members and their guests arriving at noon, in time for drinks at the bar, before watching a demonstration of the firing of a 25-pounder howitzer by the museum staff. We then retired to take luncheon in the dining hall of the Fort, which was very nicely laid out with white linen tablecloths and floral decorations. 62 members and their guests were treated to an excellent three course meal with wine, for a price which made this event one of the lowest cost on record.

After lunch we were treated to reminiscences of an officer on the Front Line in the First World War, given by an accomplished actor appropriately dressed in the uniform of the period. Our Editor, Alan Gordon, then gave a very well documented account of the long association that Military Survey has had with Portsdown Hill and Fort Southwark in particular.

Later in the afternoon than had been expected, we were split into three groups to set off on a guided tour of the



Fort, going though the rabbit warren of tunnels which were dug by Irish labourers in the early part of the 19th Century. Taking almost 19 years to complete, after which the threat from the French was well past, thereby leading to the Forts on Portsdown Hill being known as, "Palmerston's Folly's". All of us had a most memorable day, sufficiently so as to want to go back to revisit Fort Nelson at our leisure.

David Wallis

THE VIEW FROM DEFIANCE BUILDING

By Commander Vaughan Nail RN

This article follows on from Jeremy Churcher's article published in the Autumn 2001 edition of *The Ranger* and draws highlights from a busy period, not only for operations at sea but also for major restructuring in the Fleet command chain. The operational tempo at sea has been unrelenting for the Fleet as a whole and the Surveying Squadron has played its full part. In the Spring of 2002, the staff of Captain, Hydrographic Surveying Squadron officially disestablished, with elements of staff transferring to Commodore Devonport Flotilla under a broad initiative called "Fleet First". I have swapped my view of the Hamoaze and Torpoint Ferry for Weston Mill Lake and the Lynher River. Although this has, to a certain extent, reduced the autonomy that the Squadron enjoyed, the ships should now benefit from the support of a significantly larger technical team situated in the heart of Devonport Naval Base. Captain HM, who remains Hydrographer of the Navy, now also deploys six small teams providing specialist oceanographic, meteorological and hydrographic advice when embarked in Fleet units.

In brief, the past six months have seen the Royal Navy's Hydrographic Survey Squadron employed in the Middle East, North Atlantic, Antarctica and home waters. For a

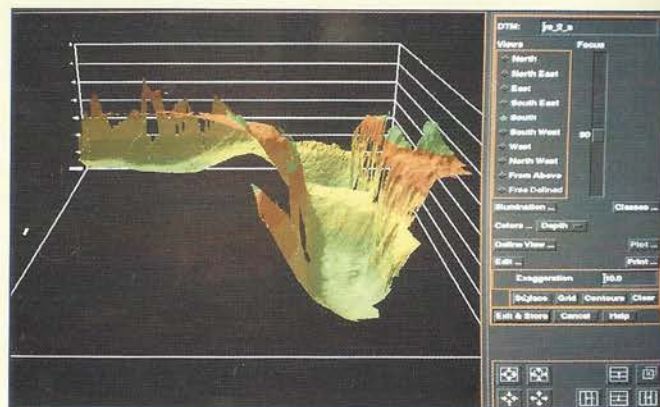
period of several months in the Autumn of 2001, *Beagle*, *Roebuck* and *Scott* were all operating in support of naval forces in the Indian Ocean and Arabian Gulf. The Ice Patrol Ship HMS *Endurance*



HMS BEAGLE enters Devonport for the final time, flying her paying-off pennant.

has also been very busy in her annual Austral Summer deployment, although sadly for the last time as part of the Squadron, as she transfers to the command of Commodore Portsmouth Flotilla. She will retain a party of survey specialists to continue the unique Antarctic hydrographic programme, filling in the blank spaces in one of the few expanses of ocean that remains largely unsurveyed. Naval Parties 1008 and 1016 continue the important and demanding work of delivering a significant number of surveys in support of the Civil Hydrographic Programme. The 2001 surveying season was perhaps one of the most productive to date, thanks to an unexpectedly high level of reliability from the relatively old surveying systems fitted. This year they have manfully struggled against weather and equipment deficiencies in their new survey system to continue their intensive survey work package. *Gleaner* has continued to push the frontiers of multibeam surveying in inshore waters by completing a thorough and precise survey of

the pilotage route into Devonport just weeks before the arrival of HMS *Vanguard* for her first major docking. The Mobile Survey Team also participated in this survey, as well as assisting *Endurance* in the Falkland Islands and conducting a collaborative survey with the Military Survey Department of the UAE.



Data from HMS GLEANER's survey of the navigable channel into Devonport Naval Base (vertical exaggeration 10x).

Perhaps the most significant event of the period was the decommissioning of the 34-year-old coastal survey vessel *Beagle*. She was the last of a group of eight ships, in two classes, all purpose-built in the 1960s to raise surveying to new levels of productivity and quality. These vessels incorporated significant technical advances on build and were subsequently fitted with further enhancements in sensors and data-processing systems as they became available. It was fitting that her last year of service pushed this small but faithful servant of the Fleet to the forefront, with back-to-back deployments to Sierra Leone and the Gulf region.

In the latter deployment, she undertook important military survey work, some in direct support of the on-station frigate. During her return to UK, she played a central role in the rescue, in poor weather, of a disabled freighter carrying a large number of economic migrants. Three of her Ship's Company received Commander-in-Chief's Commendations for their conduct in very demanding circumstances.

While we said goodbye to an old friend, the future took on a somewhat more tangible form in March 2002, as the new HMS *Echo* was launched in Appledore, North Devon. This vessel, and her sister ship *Enterprise*, was more than adequately described by Richard Labone in his article in the Autumn 2001 edition. However, it is perhaps worth emphasizing the enhancement in military capability attached to the introduction of this ship. For the first time since the early 1960s, when converted but obsolescent frigates formed the backbone of the then Surveying Flotilla, some elements of military survivability have been built into survey vessels. This includes NBC protection and the separation of the main

power generation/propulsion systems into several compartments to give welcome redundancy in the face of battle damage. These complex 3,500 tonne ships will be operated at sea, in peacetime at least, by an extraordinarily small complement of 47 officers and ratings. *Echo* is due to enter operational service at the end of this year.

Scott has continued her planned ocean survey operations in the mid-Atlantic and northern Indian Ocean. Despite a backdrop of significant engineering difficulties, aggressively managed by the ship, Defence Logistics Organisation support staff ashore and contractors, she has completed bathymetric and gravitational surveys of large tracts of ocean to a standard unrivalled by any other survey vessel in the world. The products arising from these surveys are highly prized by the exclusive band of operators who currently benefit from the exceptional fidelity of this data.

Exercise *Saif Sareea* off the coast of Oman was overshadowed by the grim events in New York, but this did not unduly disrupt the maritime elements from conducting their assigned roles. *Roebuck* continued to advance the process of near real-time transfer of data from the amphibious landing areas to Fleet HQ in Northwood. This proof of concept was relatively successful, but much work is needed to provide an integrated system that delivers robust, rapid and secure broadband communications from ship to data fusion centre ashore. After this short but productive period, *Roebuck* returned for leave and maintenance, before deploying for further exercises off the West Coast of Scotland and in the Baltic. She has therefore been operating beyond her designed capability in climatical extremes at either end of the thermometer! For the immediate future she remains the only survey vessel available for contingent tasking.

That completes my round-up of survey vessels activities. In terms of total capability, the Surveying Squadron is perhaps at its lowest ebb for several years as we await the arrival of *Echo* and *Enterprise*. This so-called "capability gap" will be challenging for all involved with naval survey operations and it remains important for us all to maintain profile during this lean period. However, the activities of the surveying ships in the meantime have been varied in scope and well aligned to the operational needs of the Navy.



Captain Mike Barritt, Captain HM and Hydrographer of the Navy, presents the weather vane which was fitted to the yardarm of the previous HMS *ECHO* to the new ship's CO, Commander Martin Jones.



Vice Admiral Jonathon Band inspects the guard of HMS *BEAGLE* during her decommissioning ceremony.



Admiral Sir Nigel Essenigh, First Sea Lord and former Hydrographer of the Navy, views the survey work conducted by *BEAGLE* in her final deployment.

**'Recruit a member today
for an Association
tomorrow'**

42 ENGINEER REGIMENT (GEOGRAPHIC) SUPPORT TO OPERATIONS UPDATE

By Lt Col John Kedar

Commanding Officer 42 Engineer Regiment (Geographic)

42 Engineer Regiment (Geographic) continues to be very heavily committed. The UK involvement in operations over the last six months has increased considerably and the Regiment, as I write, has soldiers deployed on eight operations and a number of other tasks.



Map store in Afghanistan

This is the busiest we have been, in terms of operational diversity, ever, although in terms of numbers the deployments to Bosnia in 1996 and Kosovo in 1999 were larger. Approximately 35% of the Regiment's geographic technicians are deployed on operations or are at less than 24 hours notice to do so.

It is not just operations in which we are busy. Like many elements of the Armed Services, Exercise SAIF SAREEA 2 last year was a major undertaking. We deployed 14 Geographic Squadron to Oman on this, the UK's biggest joint and combined exercise in many years. We continue to support USA on airfield surveys to improve flight safety, and have conducted a testing survey exercise near Lake Turkana in Kenya. All in all the Regiment is in great demand.

I hope that the articles below demonstrate how our operational capability is being used by Defence. In addition I hope also that they highlight the interesting careers we can offer motivated young people.

GEOGRAPHIC SECTION MNB(C) - KOSOVO BACKGROUND AND UPDATE

By Captain L N Bell RE, SO3 Geo MNB (C)

A Geographic Section from 42 Engineer Regiment (Geographic) is currently deployed in Pristina in support of the Headquarters Multi National Brigade Centre MNB(C). Each section of seven personnel deploys for a 6-month period and consists of an SO3 (usually a Captain), the Brigade Geographic Sergeant plus 5 technicians. Terrain analysis, production and the standard map supply capability augment the Brigade integral asset of the Geographic Sergeant, deployed with PC and GIS software. Additional equipment enhances the section's capability: TACISYS, TACIPRINT and

Map SP, plus two PC systems linked to TACISYS, a stand-alone geo server and 3 AO-size plotters.

The type of geographic support offered to the Headquarters and six Battlegroups is concentrated around terrain analysis, with mass production support rarely being utilised over the past five months. The current section has produced a



TACISYS in Kosovo

full range of geographic products, with an increased demand for image mapping (now produced for some 130 urban areas in the MNB(C) area), perspective views, imagery fly-throughs, tinted elevation overlays and bespoke mapping to supplement standard mapping (digital and paper) and imagery.

The most productive area of improvement during the current deployment can be seen in data management. Effective archiving of past products proves an essential element of the section's work; archiving by referencing products to master data permanently stored in the systems hard drive enables a far easier and more flexible process. The section also holds a significant amount of hard-copy imagery, which by the use of ESRI's ArcView, is catalogued to allow easy inquiry in order to locate the subject area of interest and date. The final and most significant improvement to data management has been in the production and launch of the Operational Website, in which the Kosovo-wide spatial information database, or GIS is located.

The Website enables all branches within the Headquarters to share and display common information within department specific WebPages, although the true potential lies with the GIS. Using ArcIMS software, the GIS provides a common view of the theatre, utilising foundation data maintained by the geographic section; it has a vast potential for the display and analysis of large quantities of geographic information otherwise held in paper format. Foundation data such as mapping, imagery and vector data held on the geo server act as a base for operational-specific databases containing information such as boundary, route and ethnic data and branch specific data such as incident reports, each held within individual GIS projects. Although the GIS is a recent tool, interest from the Headquarters and

Battlegroups in its capability and potential has grown phenomenally. Within the first 2 weeks since its launch, 88 WebPages and 23 map services have been created, making up a total of 12 separate GIS projects. One of the largest projects to date has been the display of route information collected by Royal Engineers Recce elements. Route obstacle location and attributes can now be displayed for all routes within the MNB(C) Area of Operations, supplemented by digital photography.

The Geographic Section's achievements have not been limited to technical work; over 300 Euros have been raised to support the charity 'Hope and Homes for Children' in Kosovo through the publication of the Geo Calendar and the Section took first place in the MNB(C) physical 200 challenge.

A FIELD SURVEYOR IN TERA CLOTHING

**By SSgt Gray RE - Geographic Consultant
(Western Africa)**

Sierra Leone, the jewel of Western Africa, rich in mineral resources, is an ex British colony that was originally established as a haven for freed slaves, hence the name of the capital, Freetown, gained its independence in 1961. Unfortunately the last few years have not been kind to the country; there has been political upheaval in the form of military coups and more recently civil war between the RUF (Revolutionary United Front) and government forces. The RUF was originally instigated as an opposition party, however like most well intentioned movements the original political aims are forgotten and the movement was hi-jacked by extremists.

This culminated in a short frenzied and bloody insurrection in which the RUF penetrated the country all the way from their heartland, the central and Eastern areas, to the capital. Many horrendous atrocities were carried out, not least of which was the deliberate amputation of hands and feet of those unfortunate enough to find themselves in the path of the advancing RUF forces. The UK government and its ethical foreign policy largely ignored appeals for help, and it was not until the media took a vociferous interest that the government was shamed into acting. UK troops were then deployed in 1999, which included the ubiquitous Geographic Section.

On arriving, my first thoughts after recovering from the initial shock was that the HQs needed a Field Surveyor to sort things out. Having been in the Field Survey side of life for my entire career I suppose that I had become a bit arrogant, after all, we are the ones that go out into the field and do things whilst everyone else stays at home and plays with computers and things. How wrong I was. I could not understand why no one wanted to talk about the local hour angle, long line skew sub-tense or trivial vectors, and all the other good things that I thought a modern HQ should know about. It wasn't long

before I settled down to a nice routine of extremely taxing combat power-point graphics in between spurious requests from the nurses for party posters (at least I was popular with them).

I then made the fatal mistake of showing someone a 3D flythrough of the Freetown peninsular that I had made; everybody wanted one. There then came the usual discussions about the map datum, thirteen figure grids, what's a silent figure, why GPS was no good out in Sierra Leone, the maps must be wrong and of course if you use Latitude and Longitude you don't need to worry about the datum issue, did you? "And why can't I have a grid like what I use on Salisbury Plain or Soltau?"

However, there are also several real GEO projects that are ongoing. The first and most interesting is the production of a 'goings' map. The road infrastructure had been woefully neglected (due to the war), and many of the bridges had been damaged or destroyed. The information was collected by the Brigade advisors and then transposed onto a map using ARCVIEW (as a picture or map paints a thousand words and it is easier for the teeth arm elements to understand!) As a consequence of producing this graphical information I have become an ex officio member of the Sierra Leone Roads Working Group and attend the bi-monthly meetings where all the elements interested in the repair of the roads, i.e. UNHCR, NGOs meet to pool resources and exchange information. It is a generally very interesting and occasionally amusing event. Another project is the update of all the UK EOD tasking. Unfortunately there is a great deal of unexploded ordnance littering the countryside and all too often there are tragic cases involving the deaths of young children. Another real GEO task has been the provision of large scale image photomaps of the "up-country" towns.

I suppose that at this juncture I should mention something about map supply, our *raison d'etre*. Whilst not a glamorous subject it is undeniably our most important. I soon began to realize that people were very pleased when they left the office clutching a map, something that was apparently not very forthcoming from their own units stocks. I used to take great delight in explaining to anyone who I could corner that "the map is the common denominator on the battle field, everyone needs to know where they are and most importantly where they are meant to be going to". However it always seems to be the last thing that people think about when planning a trip up-country.

On reflection, with only several weeks before my end of tour I can look back and now realise that GEO does not always revolve around the vertical axis of field surveyors. We all have a part to play, our differences should be our strength that will enable us to give honest and attainable answers to the questions and needs of those who rely on us. I would commend this tour to all; you cannot put a price on the experience and knowledge that you gain, and the camaraderie that you experience.

THE WATCHKEEPER PROJECT

By Alastair Slater,

Business Development Manager - UAV Systems, BAE SYSTEMS

As has been shown recently in Afghanistan, the usage of Unmanned Aerial Vehicles (UAVs) for persistent surveillance has proven to be a major enabler towards the rapid achievement of military objectives. ISTAR (Intelligence, Surveillance, Target Acquisition & Reconnaissance) UAV systems offer a number of important benefits to the Military customer when compared to similar piloted systems, in terms of increased cost effectiveness and reduction of casualties in warfighting environments.

One of the most ambitious ISTAR UAV requirements currently under development is the Watchkeeper programme for the UK MOD. The Watchkeeper requirement calls for a sophisticated Airborne Surveillance system which uses UAVs as 'Imagery Collectors' over the battlefield. The British Army already has operational experience of using UAV Surveillance systems from the existing Phoenix programme, which has paved the way for the much larger and more ambitious Watchkeeper programme.

The primary function of Watchkeeper will be to deliver 'ISTAR' (Intelligence, Surveillance, Target Acquisition & Reconnaissance) to the Land Component Commander and his subordinate commanders at a number of different HQ levels (Division, Brigade & Battlegroup).



Predator - a UAV

land manoeuvre commanders' critical information and intelligence requirements throughout a range of environments and across the spectrum of conflict'

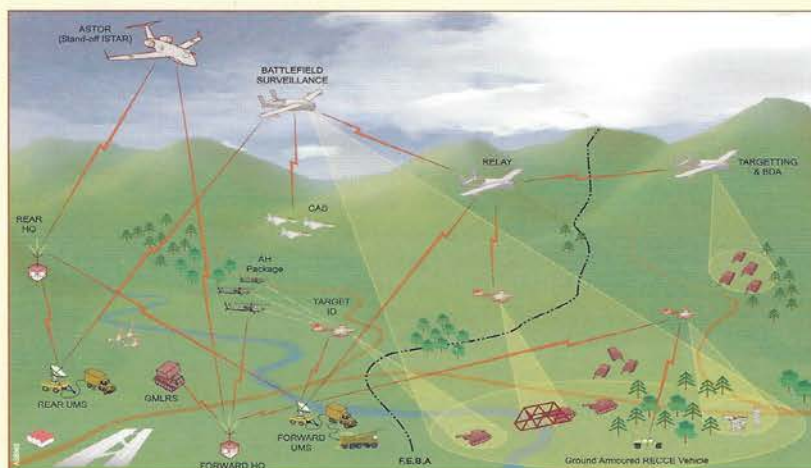
There will be a broad range of users for Watchkeeper, all potentially operating across the spectrum of conflict within a variety of scenarios in all environments including open and complex terrain. Watchkeeper will have to provide users with an all weather, day and night capability, as well as daylight colour imagery in order to assist positive identification of objects of interest.

Significant numbers of ISTAR systems, including Watchkeeper, will come into service with the UK over the next ten years and, coupled to digitised Command & Control systems, will form the basis of the UK ISTAR capability for the next 10-20 years. Such systems must have the flexibility to be effective in both warfighting and other operations and be able to integrate with the current and future military information infrastructure (e.g. Communications networks). All of these systems will need to be managed via a "Systems of Systems" approach.

The mix of different ISTAR systems across all services must be carefully monitored ensuring that the critical interplay between them, including cross-cueing, can be achieved, and also that there is no over reliance on any one type of asset. For example, within the Land Component ground-based manned reconnaissance is considered to be a core capability at all levels and there is a particular synergy between this and ISTAR UAV systems such as Watchkeeper. Additional coordination activity must ensure that imagery formats and exploitation tools are harmonised, ensuring that Data Fusion can take place

efficiently within ISTAR coordination areas with access to many ISTAR systems.

In addition to the core Watchkeeper ISTAR role, it is envisaged that the system will grow to encompass other functions where a rapidly deployable UAV system can provide advantages. This would require a set of modular payloads for role fitment. The roles envisaged at present



The User Need

The high level 'Single Statement of User Requirement' issued by the MOD is as follows:

'Watchkeeper is required to provide accurate, timely and high quality imagery and IMINT (Imagery Intelligence), collected, collated, exploited and disseminated to satisfy



effective decision making rather than enhance it.

BAE SYSTEMS is ensuring that the Watchkeeper system (or 'Architecture') is analysed and developed in a holistic manner to ensure that the technical solution delivers the right information at the right time to the right person. Significant investment has taken place in representing a simulated Watchkeeper architecture within a 'Synthetic Environment' where engineers or military personnel can operate the system in real time, and ensure that the Imagery Intelligence (IMINT) being delivered to commanders is timely, accurate and useable.

The Watchkeeper system will be comprised of multiple UAVs (carrying sensor payloads for surveillance), Data Links, Ground Control Stations (GCS), various Ground Vehicles (to house the GCS & to launch UAVs). Sitting behind the hardware within the system is an Information Architecture

are: SIGINT, Communications Relay, Minefield Detection and Maritime/Littoral Operations.

The Challenge to Industry

The challenge for industrial Prime Contractors and their suppliers is to develop a system architecture that is suitable for a range of different roles, from peacekeeping operations to a full warfighting scenario, and can be deployed in a range of different configurations, depending on the ISTAR requirements of a particular operation. This presents a major engineering challenge, but also requires the contractor to consider operational and human issues related to using such a system. Industry has been asked to clearly define the way the system will be deployed and operated by the British Army, taking into account a range of factors, that include rapid deployability, Army formation structures, operator skill levels and training requirements, support chain and logistics management, decision making and information management.

The final point is critical, as essentially Watchkeeper exists to provide timely and accurate information to enable and enhance the decisions made by military commanders. If the system delivers an uncontrolled 'data deluge' to commanders, it may actually hamper

Stations (GCS), various Ground Vehicles (to house the GCS & to launch UAVs). Sitting behind the hardware within the system is an Information Architecture



(software, data links, networks, data storage etc.) which must be designed to integrate with other Army infrastructure platforms, such as the BOWMAN communications system.

The programme is currently in the Assessment Phase, which is due to run until the end of 2003. At this point, the MOD will make a decision as to its preferred solution from two competing bids, and then take the chosen bid through Main Gate ahead of a contract award. An initial downselect is taking place mid-2002 to eliminate two of the four current competing contractors (Lockheed Martin, Northrop Grumman, Thales UK in addition to BAE SYSTEMS).

BAE SYSTEMS sees Watchkeeper as an critical programme, both for the development of the MOD's ISTAR capabilities and in ensuring that UK industry remains at the forefront of UAV technologies, which are going to be increasingly important as the number of Military (and Civil) UAV programmes grows in the UK and abroad.



THE FUTURE OF GUNNER SURVEY

The coming of GPS and onboard Inertial Navigation Systems together with an arrangement for DGIA to provide fixation, if required, has made RA Survey redundant. A revised Royal Artillery Navigation Policy is currently being drafted and is due for publication in May this year. We hope to have an article on the new Navigation, Fixation and Pointing policy in the autumn edition of Ranger.

Thought for the day!

Search any park or square in the land and you won't find a statue to a committee!

AUSTRALIAN ARMY SURVEY UNIT DEMONSTRATES ITS CAPABILITIES

Article provided by Maurice Friend

The men and women of 1 Topographical Survey Squadron, Royal Australian Engineers, based at Gallipoli Barracks in Brisbane, Queensland, played host to twenty-four members of the Mapping Sciences Institute, Australia (MSIA) in June. The visit was arranged for members to see first hand what army mapmakers do, and to foster a closer working relationship between the civilian mapping industry and its military counterpart.

The afternoon commenced with Major WM Thomson, Officer Commanding, 1 Topo, giving an interesting overview of the role, capabilities and employment of the squadron. He outlined the work recently performed in East Timor, the Pacific region and other locations within Australia. Close liaison is maintained with allied military survey agencies in USA, Canada and UK. After the briefing, to commemorate the occasion, the MSIA presented the squadron with a framed facsimile historic map of New Holland by William Dampier 1701.

A tour of the facilities followed where senior technical staff provided detailed information on aerial photography acquisition, geodetic survey, photogrammetry, digital data manipulation, map reproduction, map storage and distribution and the very latest deployable support.

When the squadron went to East Timor after the independence vote in 1999, ground control was inadequate. The first job was to establish an accurate baseline within the country. This was created with GPS triangulation connecting the capital Dili, with two stations within Australia, Darwin across the Arafura Sea and Ceduna near the Great Australian Bight in South Australia. The squadron also surveyed and produced detail plans of border sites between East and West Timor and other areas as required.

The impressive TOPOSS deployable self-contained equipment was explained to small groups as they huddled in the confined space. Mounted on a large truck with a supporting generator, this latest acquisition of the squadron is able to store large amounts of GIS and digital image data. Two operators can create maps on their workstations and send the operational product directly to the in-house printer. The strength of TOPOSS is in its mobility, rapid production and distribution of up to date maps to commanders in the field.

The interesting and informative promotion concluded with a get together at the squadron's Murray Bar where MSIA members viewed map products, made useful contacts, and forged a link between the institute and the squadron.



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CLEARED FOR TAKE OFF

By Flight Sergeant Andrew Fuller

Introduction

Most countries publish aeronautical charts and documents for their own national flight procedures but very few agencies publish charts and documents for large areas of the world. From their West London base at RAF Northolt, it is No 1 AIDU's task to publish aeronautical information in graphical, textural and digital format for use by UK military and allied forces. These charts and documents are known collectively as FLIP's (Flight Information Publications).

No 1 AIDU's area of responsibility and coverage extends from the eastern seaboard of the United States, across the Atlantic to Europe, through the Mediterranean, Africa and Middle East to the Far East. The Unit produces En Route Charts and supporting En Route supplement documents, Flight Planning Documents, Terminal Approach Procedures Charts, Helicopter Landing Site and Minor Aerodrome Books, as well as a variety of digital products. Reciprocal arrangements operate whereby No 1 AIDU FLIPs are distributed to allied forces in return for their national FLIP's, and most No 1 AIDU products are available for sale to civilian users on request.

Aeronautical Information

Aeronautical information is continually received from around the world, and No 1 AIDU maintains a comprehensive library of Aeronautical Information



A section from an En-Route Chart covering the Glasgow area.

Publications (AIP's) to support the Unit's role. All incoming NOTAM's (Notice To AirMen) and new AIP pages are scrutinized by teams of analysts to assess if any No 1 AIDU products are affected by changes from around the world. The amendments are then 'summarised', and distributed to the various product editors who will validate and authorize changes into the relevant FLIPs.

Once the received information has been analysed, if applicable, it is incorporated into No 1 AIDU's aeronautical database. DAFIF (Digital Aeronautical Flight Information File) as it is known, is co-produced with the United States National Imagery and Mapping Agency (NIMA), and is designed to contain such information as may be found in military FLIPs. The principle information consists of Navigation Aids, Waypoints, Airways, Controlled Airspace, Special Use Airspace (Airspace Reservations) and Aerodromes. Issued on the twenty eight-day AIRAC cycle, the system is used to support flight management systems, radar displays, flight simulators, and a whole host of other projects. Internally at AIDU, it is used to compile and produce En Route charts, digital displays, and a variety of aeronautical overlays used with various topographical products such as Low Flying charts.

Automated Cartography

The computerised cartographic system consists chiefly of Compaq Alpha workstations running the Open VMS operating system. The cartographic software is Laser-Scans LITES2, which is used to digitise and maintain the various FLIP charts, which number in the thousands.



An Air Cartographer using a LITES2 workstation to amend an En-Route Chart.

The large format charts are compiled and produced using an 'in-house' written program called GRAPHIS (Graphic Information System), which performs specific custom extractions from DAFIF, and then plots the information through LITES2 as a graphic. The GRAPHIS software modules can easily be adapted to produce graphics from any other database that can generate a geographically coordinated ASCII text file. Together with text placement software, this program has revolutionised the way large charts are produced at No 1 AIDU. Under the previous manual system whereby all charts were produced using traditional draughting cartographic techniques, an En Route Chart may have taken up to six months to compile and publish. No 1 AIDU completed a digital redraw program where over seventy charts were completed in ten months. This has enabled No 1 AIDU to realistically offer multiple chart

sheetlines with customised special purpose overlays to meet the demands of our users, who operate in a variety of roles.

Low Flying

Low Flying as undertaken by the RAF demands reliable, accurate, up to date mapping, both aeronautical and topographical. Until recently, the topographical components of the UK-produced half million scale Low Flying Charts was approximately ten years out of date. The aeronautical content is updated every six months. However, with digital topographical support from the Ordnance Survey, No 1 AIDU has converted the UK Low Flying Charts from the traditional manual production flowline to one using the same Laser-Scan system as the other FLIP products. Topographical data is supplied in Laser-Scan format on an annual basis from Ordnance Survey via the Defence Geographic Centre located at Feltham in Middlesex.

Pre-Press and Data Output

All FLIPs published by No 1 AIDU are processed on a state of the art pre-press system consisting of two BARCO Viking 8 computer-to-plate units. This system has software modules that allow export of all FLIP products to a variety of data formats, the principle one being TIFF. The same is true of the Laser-Scan software which also permits data conversion to a variety of importable formats. It follows then that as well as being an aeronautical paper producer and supplier, No 1 AIDU is also equipped to export data to a variety of customers and projects, and this in recent years has been a major expansion in the production flowline.

Cockpit Cartography

No 1 AIDU has been tasked with producing Terminal Approach Procedure and Airfield Landing Charts for display in aircraft cockpits. The driving project for this task is the Eurofighter 2000, however the design concepts and development have involved a number of other platforms, and in 2001 the Jaguar fleet became the first user of this new product. This project also highlighted a requirement to display En Route Chart information as a cockpit display, and both tasks served to create a separate genre of aeronautical charting techniques which No 1 AIDU refers to as Cockpit Cartography.

Unlike their paper counterparts, which are produced using high quality printing techniques, current technology cockpit displays are not particularly cartographer friendly. For example, the Eurofighter 2000 displays have a poor resolution whereby each display pixel is a huge 0.3mm. This means that line thicknesses have to be in increments of 0.3mm, 0.6mm, 0.9mm etc. This also means that to display clearly, symbology and text has to be that much larger to avoid 'filling in', which inevitably leads to chart clutter. The

poor resolution also precludes the use of tints and crosshatches which are familiar to aircrew using paper FLIPs. Therefore, speaking cartographically, the cockpit displays offer a demanding medium to display aeronautical charts, and significant redesign work has taken place at No 1 AIDU to produce the required charts, whilst striving to maintain a high degree of commonality with the paper counterparts.



A Harrier cockpit showing a digital display of a chart produced by No 1 AIDU.

An Object-Orientated Future

Despite the effectiveness of the current chart/document/database production system, No 1 AIDU is continually striving to find ways to improve its working practices, software, and computer systems. The Unit has concluded that in order to remove the repetitive nature of the current amendment flowline, a move to an object-orientated production system is required. Following a detailed competitive tendering process, a contract has been let to Laser-Scan for an object-orientated Aeronautical Production System (APS) and an Internet/Intranet based NOTAM Display System (NDS). Both systems will be based on Laser-Scans Gothic database, and will provide the capability to produce the many different charts from a one-stop worldwide database of aeronautical information. A high degree of automation will be achieved by using sophisticated display and reflex methods, together with a custom built text placement system.

This project will revolutionise the way in which No 1 AIDU conducts its business, and will give the Unit and its customers a mapping-on-demand type capability. The NDS will enable aircrew to log on to a PC using an industry standard browser, where they will enter the

details of their planned flight. The system will conduct a geospatial search for NOTAMS that impact directly on their flight, thus speeding up the flight planning process. The NDS will be hosted on the Internet, and will be accessed via the No 1 AIDU website (aidu.co.uk). It will also be hosted on the RAF LDCN Intranet.

A Confident Future

No 1 AIDU is constantly challenged by the highly dynamic nature of aeronautical information, and the current system, despite its maturity, has always enabled the Unit to meet its commitments. The migration to the new object-orientated system will no doubt have challenges of its own but the Unit is determined to maintain its position as a leading aeronautical chart and data producer. The Unit's motto is translated as "*The more fully informed, the safer*".

Andy Fuller joined the Royal Air Force in 1975 as an Air Cartographer, and has spent most of his career with No 1 Aeronautical Information Documents Unit at RAF Northolt in West London. His career has seen him involved with traditional cartographic skills, as well as word processing and database systems. In 1992 he developed a software package called GRAPHIS (Graphic Information System), which enabled the semi-automated construction of aeronautical charts from a relational database. Having spent the last ten years as the Units Head of Research and Development, he is now the Units Head of Special Projects with a remit to introduce the Gothic Object-Orientated database system.

FIFTEEN SURVEY STARS SAY FAREWELL TO RITA

By Brigadier Alex Matthews

Rita Holloway, the Personal Secretary to the Chief Executive of the Defence Geographic and Imagery Intelligence Agency was given a farewell lunch at the Royal Air Force Club in Piccadilly on Friday, 8 March 2002.

Attended by ten of the eleven Military Survey - DGIA Directors/Chief Executives she had worked for, this was a special event to mark her retirement after 33 years with the Ministry of Defence and most particularly, an opportunity for those same officers to thank her for all her dedicated support.

Brigadier Peter Walker our host, taking note of annual reports made by the Senior Officers she had served, had discovered that they were consistent in noting her willing and helpful attitude. He himself had good cause to be grateful for her outstanding speed of typing (as fast as you can dictate the text) when the occasion demanded, in this case PETROS documents, and all acknowledged her effectiveness with visitors. To quote one report, "Rita has developed a charming way of dealing with welcome and unwelcome visitors alike", a

valuable skill indeed! Brigadier Walker said that he would be sorry to see her go but the break had to be made at some point and this would seem to be a good time for her to enjoy a well-earned retirement, with a new grandchild and extensive plans for some international travel. To mark the occasion, Brigadier Walker presented Rita with six cut-glass tumblers and a vase and called for a toast to her good health and a happy retirement.

The following Senior Officers attended:-

Major Generals Eric Barton, Chris Thompson, Patrick Fagan, Roy Wood, Mike Wilson, Brigadiers Hugh Woodrow, Alex Matthews, Andy Hoon, Philip Wildman, Peter Walker, and Squadron Leader Mike Purse, our RAF sponsor who is currently the Personal Staff Officer for CE DGIA and has worked closely with Rita.

Brigadier Mike Silberrad was unable to attend, as he was having an operation on his hand, and sent his apologies.

DEFENCE SURVEYORS ASSOCIATION QUEEN'S JUBILEE MEETING and ANNUAL GENERAL MEETING

To be held on Saturday 1st June 2002 from 11.00hrs.

At the Headquarters Royal Engineers Mess, Brompton Barracks, Chatham.

The AGM will be followed by the presentation of the Annual Prizes, lunch and a visit to the Royal Engineers Museum in the afternoon. Members wishing to attend should contact the Secretary: David A. Wallis, 161 Cooden Drive, Bexhill-on-Sea, E. Sussex TN30 3AQ

BORDER SURVEYING IN OMAN 1964

By Patrick Fagan

"There is no oil in Oman". That was the stark report put out in the early 1960s by an oil exploration consortium, after seven years of searching in the deserts of Muscat and Oman.

That was the official story. Behind the scenes there was intense political activity, for very large reserves of oil



Cpl Gates and Spr Thorpe surveying near Umm az Zamul

had been discovered. But these were in the far west, in the Empty Quarter, where the border with Saudi Arabia had never been properly defined. American oil companies had the rights in Saudi, the British companies in Oman, and it was vital that this border be determined quickly.

Martin Buckmaster, a Foreign Office official and Arabist, travelled amongst the tribes in the area, determining which owed allegiance to which country, and in this way clarified the general position of the border. The task of doing the precise survey was handed over to the MOD, and led in turn to it being my responsibility with my Field Troop, based with 13 Field Survey Squadron in Aden.

Of course, Perfidious Albion had other intentions in the area once some two years of bargaining with the then ruler, Saïd bin Taimur, had cleared the way for us. We had long wanted to put in survey control for future mapping of the area, part of a larger scheme to link the surveys of Africa with those of the Survey of India, and this gave us our opportunity.

In January I flew up from Aden for a 3-week reconnaissance with my excellent Troop Sergeant, Dave Herriott, (who was later to found and operate a survey company under his own name). Two months later, after returning to Aden to plan the operation in detail, my Troop set out by sea with all kit, vehicles etc, for Dubai - which was then a picturesque little creek surrounded

by a few whitewashed mud-walled buildings. They were to be involved in Phase 2 of the task, but the border survey came first.

A smaller party of four flew up by air with me to Sharjah, where we were hosted by the Trucial Oman Scouts (TOS). For security reasons we were not permitted at any time to go near the coast or the larger population centres of Oman, but entered the country discreetly from the north, through Bureimi where Sheikh Zaid was in charge. Similarly all logistic support was to be through the TOS, and not through Oman. In Bureimi we met up with Martin Buckmaster, and were provided with Dodge Powerwagons for the border survey. These were 1-ton trucks with huge balloon tyres, necessary for travelling in these giant sand dunes just south of the Liwa area.

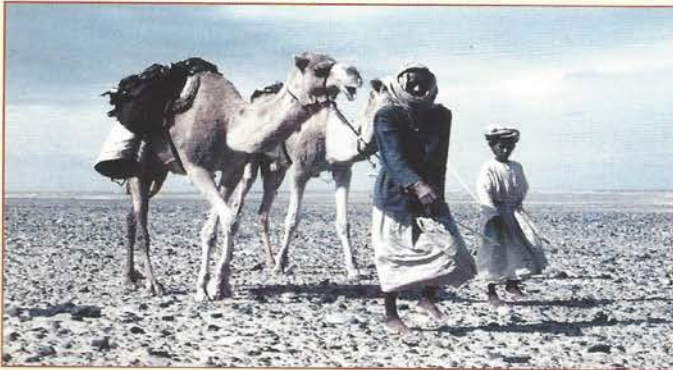
Our start point was a very remote well, called Umm az Zamul (mother of a camel), which was accepted by all three countries, Saudi Arabia, Oman and Abu Dhabi (then part of the Trucial States) as a point common to all. Trouble was anticipated, so our vehicles were mine-plated, and we had an infantry escort provided by the TOS. The well water was really horrible, but of course we had to try it. However, to our surprise the native drivers of the TOS escort refused to use it even to top up their radiators!



Fort Jahili, Buraimi Oasis

The nature of the survey is easily explained. The well's position was fixed from the stars by position lines observed over two nights, and an oil drum was then used to 'shutter' a concrete trig point left there. I remember one of the surveyors scratched "Kilroy was here" in the wet cement. Our route lay NE, across the grain of these very large dunes (one was measured at 450 ft high), and our route followed on aerial photos of

the area, taken by the RAF. We had two guides each from the tribes on either side of the border who agreed the limits of their tribes grazing, thus defining the border, and traced this carefully over the dunes shown on the photos. About every ten miles we did further astro fixes, pricking the location carefully on the photos.



Typical travellers in South Oman

We were just six Brits, including Buckmaster, and lived something of the life of the locals in this very remote area, sharing food between us and carefully husbanding water as there were only two wells on our route, and those close to the start and finish. It was very hot indeed, with temperatures eventually reaching 55oC, and on one night the minimum thermometer dropped only to 50oC (122oF). I was very conscious that Wilfrid Thesiger had been denied access to this area only ten years previously (see his book, "Arabian Sands"), as the ruler of the local Duru tribe was so hostile to foreigners. One has to remember also that in those days there were no surfaced roads anywhere, even in the coastal towns of Sharjah and Dubai. In Oman, no one outside Government was allowed to own a car as the ruler was proud of his country's reputation for outstanding camels and wished to preserve this valuable industry.

Later, back in Bureimi, we met up with the rest of the Troop now set up for the control survey phase of the operation. This was a second order tellurometer traverse, similar to that used in Aden and reported on in the previous Ranger, and ranged far to the south on the inland side of the Jebel Akhtar mountains. I would think that for most of us, this was one of the big highlights of our lives. Confident of our ability in our task, working in a very remote area, living a militarily relaxed lifestyle, with no temptation to spend, we travelled up and down this land doing what was necessary. Probably all of us have vivid recollections of events there, but I will share here just a couple.

One evening I had seen a survey off to the south, and was returning to Bureimi with my driver. Just before sunset, the front axle seized when the gearbox oil ran out - the forward facing drain plug had been knocked out by stones. In the distance we could see a camel caravan, even that a rare sight in the area. I left the driver, who was armed and had food and water, and set off for the camels who were about to be settled for the

night. I persuaded one chap to help me, and so the two of us set off into the night for Bureimi and help, about 35 miles away. My lack of expertise was evident when I fell over the other side of the camel after being given a leg up. After all, these were pack animals without saddlery, unused to being ridden; I had to ride bare back. My camel was tethered to the one in front, who led, while I sat like a sack of potatoes on the very sharp and painful spine of mine. We rode through the night, stopping for an hour only where another caravan had halted. They kindly fanned their campfire back to life, and milked a camel for me; no nectar could have been more welcome. We made it back to our Bureimi camp by breakfast, but my Lawrence of Arabia act disappointingly did not receive the acclaim that I thought it worthy of! On being helped down, I saw that my trousers were caked in blood from the painful rubbing on the camel's spine, and I could not sit comfortably for a week. I have resisted all offers to ride a camel ever since.

The Political Agent in Abu Dhabi was Col Hugh Boustead, a very remarkable man. He had deserted from the navy in South Africa in 1914, as he was seeing no action, but returned to England to join the army, later receiving the King's Pardon for this when the authorities caught up with him. By then he had been decorated for bravery. In 1924 he captained the British team in the Olympics, winning a Gold Medal in the Pentathlon, and in 1927 went to climb Everest on Ruttledge's expedition. Later he served with Wingate in Ethiopia, and after the Second World War commanded the Hadhrami Bedouin Legion in South Arabia. A very colourful character. One day he set up his camp near ours in Bureimi, and invited me to dinner. Out under the desert sky we had a delicious dinner of local dishes, served by his servants. These were as colourful as he, in that they had each been sentenced to death by their tribes for some offence, but reprieved by Hugh on condition they joined his service. Never has anyone had more loyal servants! They were from the Dhofar area in the south of Oman, and accomplished musicians who regaled us beautifully after dinner. We sat there, replete, out in the open on a hot night with the stars shining brightly out of the black sky, with this timeless singing working all kinds of magic on our minds. Now that really was an experience to savour, and one to end this account on.

Patrick Fagan was commissioned into the Royal Engineers in 1955, and started his survey career in 1961. He was surveyor on expeditions to the Karakoram and to South Georgia, and from Aden he led the party that did the border survey between Oman and what was then the Trucial States. After tours in BAOR and Barton Stacey, he obtained MSc in photogrammetry at UCL before spending three very happy years with the OS in charge of air surveys. Successive tours at Feltham led to tours with NATO in the Netherlands and then Belgium before returning to Feltham for the last time in 1985. He retired as Director General Military Survey in 1990.

EUROPEAN ARMY - FACT OR FICTION

By Lieutenant Colonel Angus Cross RE

When the telephone rings and you raise the hand piece to find Alan Gordon on the other end one feels how I imagine the Mafia guy feels when being kissed on the cheeks by the Godfather! Alan does it very well in that he rings on some other pretext and after the pleasantries he cuts to the chase with comments such as, "Well, you know I am also editing the Ranger, I was thinking it would be very interesting if you could do an article for us. A couple of pages would be good, and by the way if you can get it to me by next Friday I can get it into the Spring Edition." There it is, you've been netted and pinned to a board like an insect being prepared for display, do not even consider wriggling you are going to have to write.

It was only in August last year that I found myself knocking on the door of a plush looking office block in down town Brussels ready to join the European Union Military Staff (EUMS). Having done some preliminary investigation as to what this organisation was about I must admit to being none the wiser. I had received some fairly jaundiced views from a number of different quarters and could find no one outside the EUMS with any enthusiasm for the idea. I got the best leads from the newspaper reports about the "European Army" which, as I know now, it certainly is not. My arrival was greeted by a stunned silence, practically the whole of the staff were on leave for the next three weeks. In attempting to get myself established I was continuously reminded that it was August and Brussels goes on leave for August, I finally saw sense and departed on a couple of weeks leave myself. This, I thought, could be a very pleasant tour and had already taken on the hue of the UN in terms of the bureaucracy and convoluted means of achieving anything.

Before I go any further it will be useful to explain what the EUMS is and what it is not. The EUMS is a group of 122 military staff organised into divisions to provide the staff support to the EU Military Committee which is composed of the Chiefs of Defence (CHODs) of each nation but in reality represented by the military representatives. The EUMC in turn gives military advice to the political decision making bodies of the EU and thus when considering how to deal with crises military options can be considered along with the EU's more traditional instruments such as aid, sanctions or judicial actions. The EU has no forces as such but in response to the stated requirement to be able to deploy 60,000 men and equipment with the appropriate air and naval support, nations have offered up units and equipment against a shopping list to go into a pool from which a force can be generated if and when necessary. This force is to be deployable within 60 days and sustainable for a year. The range of activities for which the EU is developing its capability, known as the Petersburg Tasks, runs from humanitarian aid through to

peace enforcement, what it does not include is defence of Europe. That is the undisputed role of NATO.

The staff built up throughout last year and reached full strength during the autumn. The main tasks of the EUMS at full staff capability are; early warning, situation assessment and strategic planning and the target date for full staff capability is the end of 2003. However at Laeken, the end of the Belgium presidency, in December 2001 the EUMS was declared operational but this is clearly only for the simplest task. There is an expectation that the staff capability will ramp up over the next 18 months to the level at which the EU can operate within the full Petersburg spectrum.

So what of Geographic Support within the EU? Well clearly my job on arrival in Brussels was to determine what was required in respect of Geo Sp and then to establish the means of satisfying that requirement. All sounded pretty simple to my boss, an Irish one star when put like that and of course why should it not be? We have a great deal of experience in NATO and really the EU is just another grouping of nations, many of which are members of NATO, and therefore they already know that system. The concept was not to re-invent the wheel but to adapt the best of the existing systems and improve it where possible. In embarking on this quest the first thing I noticed was that I did not have a warrant officer which in any circumstances is a bit of an error! The second equally noticeable factor, but not so scary, was that I did not understand how things could be made to happen in the EU. Visions, concepts and plans are all very well but it very rapidly becomes an irritant to people who require maps and information if they are not getting it. It is in this area where the warrant officer in staff branches excels leaving the staff officer to ponder higher things such as those visions, concepts and plans. I had to do something so I started to break the problem down into more manageable bites.

Firstly, the problem falls into two distinct parts; support to the staff in the EUMS and then Geo Sp to operations. Looking at the timelines the support to operations could wait whereas there were areas within the staff, such as Intelligence and exercises which were trying to work up and required Geo Sp now. Then there was the need to develop a strategy for the long term support of the staff and thus I started to prioritise my work. The other task to factor in was of course that there was no golf society and this therefore had to be rapidly established!

In satisfying the day to day needs of the staff much was achieved through the good offices of the MOD map depot and library. As many of the requirements relate to producing Gucci briefings Encarta and the internet have been used extensively. Meanwhile the longer term plan to support the staff is now well established. The intention is to serve up geographic information over a

web browser onto the EUMS network such that staff officers can access mapping and imagery and perform simple functions such as overlaying data, measuring distances etc. There will be a need for some individuals to have greater functionality and that will be provided through a GIS yet to be determined. We cannot get away totally from the paper products yet and I still see a requirement for the EUMS to have a map store with a ready supply of planning maps. All this clearly needs resource to procure and manage and as can be expected there was absolutely no budget identified for 2002 and we are only just starting to build one for 2003. The great advantage of this of course is that it actually slows down peoples expectations because if the money is not there they understand that they will have to wait. Thus the plan envisages introducing a GIS and digital mapping onto the local area network in mid 2003. A line has been inserted into the budget proposals and a bid for additional manning and accommodation has gone forward, but nothing has yet been finally agreed. With regard to this year I have been allocated 20,000Euros for the purchase of geographic information which will be mostly used on planning maps and the beginnings of a map store with a small amount being held back for local purchase. I have yet to see the money but am assured the cheque is in the post! These preparations should enable the EUMS to operate and the next concern has been support to operations.

Various papers and documents are in development and a number of them require a geographic annex which has to be drafted and of course the owner of the document often needs convincing that it is necessary. The major area of course is the development of an EU Geographic Policy which is undoubtedly going to look remarkably similar to its NATO equivalent. The first tentative steps on this document have started but there is a long road to travel yet. I held the first EUMS Geo meeting involving delegates from most of the EU nations in February during which we ranged over the various areas of Geo Sp. The ever present question of release of information is one of my major preoccupations as this is the complicating factor in acquiring any mapping or geographic information. Many of the nations already have bi-lateral exchange agreements; the EU has no agreement and as yet no agreed policy such that information to the EUMS can be provided under that umbrella. The UK is being very helpful and other nations are looking at their procedures. My aim is not to

have to develop an MOU between the EUMS and fifteen nations. The other area of concern is that so much of the geographic information is owned by the US and of course the whole development of ESDP is to enable Europe to operate independent of the US. At present the US has not formulated their policy on dealing with the EUMS and thus access to anything but open source planning products is difficult to say the least. This brings me to the final area of interest and that is the European Union (previously WEU) Satellite Centre (SATCEN) at Torrejon, Spain.

The SATCEN is very much an image analysis centre, relying on commercial satellite imagery but with some capabilities on the geographic side. They have produced a number of combined digital products in support of operational areas which have been very well received. They do not have a significant geographic data production capability but as a final thought perhaps Europe should be developing its own capability to map crisis areas in support of its numerous activities. There are a number of other EU institutions which require and use mapping which could be service by a central agency.

In conclusion, as I am being unceremoniously removed from this post to return to Hermitage in July I see an embryonic organisation which I have no doubt will gain in effectiveness and importance during the future. In geographic support terms I believe there are great opportunities which we the UK are in a good position to develop and influence. Meanwhile the second golf society day takes place in April.

Angus Cross was commissioned into the Royal Engineers in early 1973, the next seven years saw him serve in England, Northern Ireland, Germany and Kenya on engineer projects and as a combat engineer. In 1980 he joined the Army Survey Course since when he has had many excellent tours including commanding 14 Independent Topographic Squadron RE, a NATO staff job, Chief Instructor Royal School of Military Survey and a couple of Balkan tours with the United Nations and then NATO. He is currently serving in Brussels as a member of the European Union Military Staff ("and it's not all beer and mussels I can tell you"). In July he returns to Hermitage to take Command of the Geographic Engineer Group.

RETURN TO NORMANDY

Members of 42 Engineer Regiment (Geographic), accompanied by DSA member Ron Takel, undertook a battlefield tour of the Normandy area during the middle of April. Ron, a Surveyor Trig with 2 General Field Survey Section attached to 521 Field Survey Company during the Normandy Campaign, gave today's military surveyors an idea of what it was like "to be there" in the early days of the liberation of Europe. His very readable story of life as a field surveyor during the advance from the beaches and then through the French countryside appeared in Ranger several years ago.

MAPPING GREAT BRITAIN AT ONE METRE Z VALUES

By Hugh MacKay

UK & European Sales Manager, Intermap Technologies

Imagine having access to over 8 billion individual high-accuracy elevation points of Great Britain. Imagine having access to over 129 billion individual high-resolution image pixels of orthorectified imagery of Great Britain. Impossible? No, not at all, not with the launch of NEXTMap Britain, an ambitious commercial program to provide detailed digital mapping for all of England, Scotland and Wales.

Intermap Technologies is well underway with the collection of both the elevation data and the imagery. Headquartered in Denver, Colorado, Intermap has deployed its proprietary airborne STAR-3i Interferometric Synthetic Aperture Radar (IFSAR) system to perform the mapping. Data acquisition began in December, and the first products will be available for commercial offering this spring.

The NEXTMap Britain project marks the first time detailed elevation mapping of an entire nation has been funded and carried out by a commercial organization on behalf of commercial interests. With a proven track record in Great Britain and 28 other countries, the STAR-3i IFSAR system is particularly well suited to the large-area elevation mapping requirements of the NEXTMap programme.

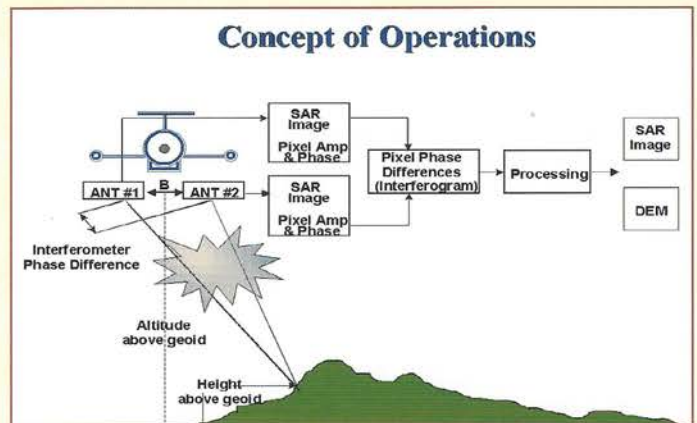
IFSAR Technology

The need for improved remote sensing technologies that can quickly determine accurate terrain elevations over large areas evolved from military requirements. Operational requirements dictate the need for an all (reasonable) weather, day/night, high-speed collection and processing capability. To address these needs, the United States Defense Advanced Research Projects Agency (DARPA) initiated a program in 1993 to develop operational airborne IFSAR capability.

In response to DARPA's mandate to ensure commercial utilization of the technology, Intermap invested several millions of dollars in the IFSAR technology. Intermap, which has been involved in airborne radar mapping since the mid-1970s, recognized the commercial benefits of interferometric radar to generate Digital Elevation Models (DEMs) and thus topographic map products, as well as fully Ortho-Rectified Radar Images (ORRIs). Since acquiring the technology in 1997, Intermap has been responsible for producing 1 million square kilometres of IFSAR generated DEMs and ORRIs.

The interferometric technology is based on utilizing two radar antennae displaced by a known distance. This antenna separation is referred to as the interferometric baseline. One antenna acts as both a transmitter and receiver; the second as a receiver only. The baseline

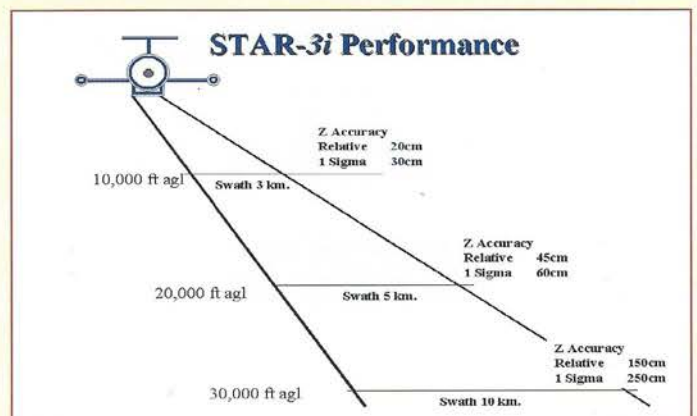
provides a slightly different path length in the reflection of the radar pulses from terrain points back to the antennae. This path length difference, or phase difference, coupled with precise aircraft positional data,



provides the information required to measure the terrain elevation points. Interferometry is probably best known through the radar imaging satellites such as ERS 1&2 and the Canadian Radarsat, but the Intermap STAR-3i system differs from the orbiting platforms and offers several distinct advantages.

Operational radar satellites have one antenna, which means that they must image an area on two passes to collect the two data sets required for interferometric measurement of elevation. The STAR-3i system, on the other hand, utilizes two radar antennae, enabling single pass data collection. The importance of a single pass system for commercial airborne operations is the significant reduction in time and resources expended.

The other main advantages of airborne IFSAR systems are the superior vertical accuracy and image resolution. The STAR-3i system is capable of collecting +/- 1-metre vertical data from a flight altitude of 28,000 feet



and +/-50-cm from a flight altitude of 20,000 feet. The image resolution, 1.25 metres, remains constant, regardless of the flying altitude.

STAR-3i IFSAR System

The STAR-3i IFSAR system is mounted in a Learjet Model 36. The Lear has a speed of 375 knots (730 kilometres/hour), enabling gross data acquisition rates of greater than 100 km² per minute on line.

Unlike aerial photography, STAR-3i is not dependent upon sunlight for viewing the target area, using instead the microwave energy transmitted from the aircraft for target illumination. This allows data capture by day or night. The ability to acquire data at night is a significant benefit when operating in an area of exceptionally heavy daytime air traffic. In fact, for the NEXTMap Britain programme, STAR-3i is collecting data during two 5-hour missions per day, primarily at night. IFSAR technology also avoids the schedule delaying data acquisition window of aerial photography, which is confined to just 2 hours +/- solar noon to prevent shadows in the imagery.

The system is also reasonably weather independent. This capability permits data capture in cloudy and rainy conditions that would ground optical systems, a significant advantage, not just in Great Britain, but also in any coastal or tropical environment. The only significant weather limitation is severe wind aloft.

Mission planning is a critical component of the data acquisition activity. Intermap has developed proprietary mission planning software that automatically determines the optimal overlap of flight lines and plans opposite look imaging so that mountains are imaged from two sides. This eliminates void areas in the data due to the shadow or layover effects inherent in radar imaging. Flight coordinates are feed into an onboard autopilot that actually controls the plane during data acquisition. The Learjet itself is equipped with both a GPS and Inertial Navigation System to ensure that planned flight lines are flown precisely and that accurate positional information can be recovered for data processing.

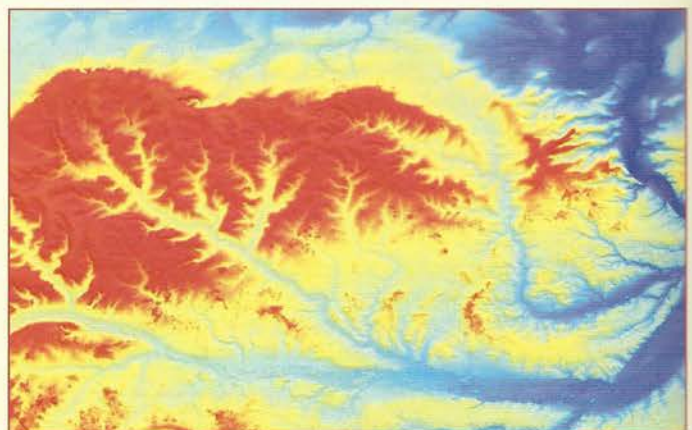
The elevation and image data sets, which are collected simultaneously and are fully georeferenced to each other, are stored on an array of disks onboard the aircraft and run through quality assessments in the field before being shipped to Colorado for processing. In Colorado, the data strips are merged and mosaiced into 10km x 10-km tiles, or map sheets, based on the Ordnance Survey National Grid.

NEXTMap Britain

Intermap's NEXTMap Britain programme began with a pilot project undertaken in 1998/99. Willis, the global insurance broker and risk consulting firm, hired Intermap to acquire elevation data in the River Thames

drainage basin for use in a new flood risk analysis system. The STAR-3i system was used to collect approximately 22,000 km² of DEM and image data in support of the project. Intermap's ability to use IFSAR for collection of a wide area in a short time at an affordable price made the project an unqualified success. Subsequently, every insurer with commercial or residential property portfolios in the Thames basin made use of the risk analysis system. In 2001, the insurance industry, led by Norwich Union Insurance, approached Intermap about flying all of the rivers and coastal areas in the country, as they were dissatisfied with the inconsistent data coverages and accuracies available from traditional data sources.

Intermap recognized that there would be wide spread interest in many other industries for a consistent, high accuracy national DEM. This prompted the firm to announce the NEXTMap Britain programme. The NEXTMap Britain programme is one of a series of NEXTMap programmes being undertaken by Intermap. The firm's intent is to capture high accuracy elevation data of the G-8 nations. The NEXTMap USA programme, announced in March, will commence its data acquisition phase in the summer of 2002. In preparation for this programme, Intermap recently procured a second airborne IFSAR mapping system.



Reading, England (both images): A shaded relief coloured by elevation data creates this view of Reading, England.

The STAR-3i Learjet has been based at Manchester for the NEXTMap Britain programme. Intermap has divided Britain into seven rectangular blocks for the purpose of data acquisition. A total of 221 flight lines are planned, comprising 40,077 line kilometres of acquisition. Intermap placed 56 precisely positioned radar reflectors throughout the project area to act as ground control for the data sets. To support the positional accuracy of the aircraft, a total of 35 GPS base stations are employed.

Most of the acquisition will be flown at 28,000 feet to provide a nine-kilometre swath with a 1.5-kilometre overlap in flight lines. The resulting vertical accuracy for the elevation data will be +/- 1.0-metres RMSE. Intermap will lower the flying altitude to 20,000 feet for the southeast of England and capture approximately 50,000 km² of elevation data with a vertical accuracy of 50-cm RMSE. Both data sets will have a DEM posting of 5.0 metres, resulting in 8,096,000,000 total sample points. The ORRI resolution will be a consistent 1.25 metres, resulting in 129,536,000,000 image pixels. The elevation data and the ORRI are fully georeferenced to each other, allowing

the ORRI to be draped over the DEM to support analysis in a 3-D environment.

Acquisition is expected to take only 120 days in total, spread over several deployments through the first half of 2002. The initial data products will

be offered online at Intermap's GLOBAL Terrain digital data store (www.globalterrain.com) beginning in June. The entire offering of DEM and imagery products for England, Wales and southern Scotland will be processed and ready for purchase before the end of 2002. It is expected that the remainder of Scotland, and likely Ireland, will be mapped in 2003.

Intermap processing generates two elevation products - digital surface models (DSMs) and digital terrain models (DTMs). The DSM is a first-surface measurement, including the elevations of trees, houses and buildings on the landscape. But in response to increasing demand for DTMs, Intermap has developed a proprietary algorithm that removes the surface features and produces a bald earth DTM.

The range of applications for the data is as broad as the entire geomatics industry. 3-D viewing and elevation modeling now play a major data analysis role for flight simulation, mission planning software, security, civil engineering, wireless communication, flood mapping and modeling, auto navigation, orthorectification of airborne and satellite image data, exploration geology

and map updating.

To validate the NEXTMap programme, Norwich Union Insurance has engaged Professor Ian Dowman of the Geomatics Department at the University College London (UCL) to undertake extensive testing of the IFSAR elevation data. Professor Dowman is taking field measurements of two test areas in Britain, one for the one-meter and another for the 50-cm elevation data. UCL is determining elevations in the test areas using both photogrammetry and GPS for comparison with the Intermap NEXTMap products.

Obtaining NEXTMap Products

Customers will be able to purchase digital and hardcopy products for delivery through the mail or they can log onto Intermap's GLOBAL Terrain warehouse (www.globalterrain.com) of elevation data for digital products. This archive can be used to search, order and download NEXTMap products, as well as 1 million square kilometers of data from other countries mapped by STAR-3i.

Elevation data products are delivered in 32-bit generic binary Band Interleaved by Line (bil) file format. This generic file format is easily ingested into the majority of image processing, GIS and visualization software packages. ORRI products are delivered in 8-bit GeoTIFF format. Data sets are delivered on ISO 9660 standard CD-ROM media, 8-mm tape or DLT tape media are available upon request.

Intermap has developed NEXTMap subscription relationships with several other firms in Britain that will help reach a variety of vertical markets. Although the project is noteworthy for its private funding and operation, Intermap plans to work closely with the central government agencies in exploiting the data. Based on the early orders placed by organizations through the subscription offer before the first products were even available, Intermap believes NEXTMap Britain will be a success for both private and public sector customers. Intermap is now looking to sign subscribing partners in other G-8 countries to solidify plans to expand NEXTMap beyond the British Isles.



Alcester, England: This 2.5-meter orthorectified radar image of Alcester, England was colorised using elevation data.



IKONOS Drape: Space Imaging, Inc. captured this winter scene south west of Denver using IKONOS satellite. The image was orthorectified to 3.5 meters horizontal accuracy using an Intermap DEM, and electronically draped over the DEM to create this perspective.

THE ROYAL ENGINEERS MUSEUM

By Colonel John Nowers, Museum Director



This article is intended to set the scene for the Association visit to the Museum on Saturday 1st June 2002.

Collecting began in 1870 and the Museum first opened in Brompton Barracks in the old chapel in 1912. However space was at a premium and public access was not easy. In the 1980s the Ministry of Defence became very enthusiastic about Military Museums. Regiments were encouraged to develop museums which would appeal to the public as well as their own members. If offered rent free accommodation which it would maintain. However the building of displays must be privately funded as would any building work which required prior approval and acceptance on completion from the Property Manager. MOD also offered to fund some of the staff.

Carried along on this wave of enthusiasm the Corps moved the Museum into the Ravelin Building in 1986. The Ravelin Building was designed by a Royal Engineer architect, Major ECS Moor, and opened in 1905 as the Electrical School of the Corps. In brick, on two floors around an open courtyard, the roof turrets were designed to mount searchlights. Today the building is listed Grade II.*

The new Museum was opened by the Colonel-in-Chief, Her Majesty Queen Elizabeth II, on 20th May 1987. At this time the galleries on the ground floor told the story of the Corps to the end of the Second World War.

The Royal Engineers Museum foundation was formed to raise the funds needed for further development. The foundation consists of a group of men who served in the Corps and went on to make distinguished careers in industry, engineering and the City. They give their time free for fund-raising and have run events literally around the world - in Hong Kong, Gibraltar, Berlin,

Scotland at Pitreavie Castle and London at the Mansion House and the Tower. Their biggest event was the National Service Reunion some five years ago which brought several thousand people together at Brompton Barracks with over 2,000 ex-National Servicemen on parade.

In 1990 the courtyard was roofed over at a cost of £250,000. New displays costing some £200,000 were opened in 1996 showing the post war history of the Corps. The scheme adopted was intended to make use of the enclosed volume rather than just the floor area and includes a high-level walkway.

Since then the Museum has won several prizes. The most important by far is the award of Designated status. The Designation scheme was introduced by the Government four years ago with the intention of identifying the most important museum collections in England. National museums are excluded. The award of Designated status places the Royal Engineers Museum amongst the top forty or so independent museums in England.

The Government also found £15m for a three year programme to help Designated museums develop further. The Royal Engineers Museum has benefited by some £200,000 including 20% partnership funding from the Foundation. The money has been used to modernize the Victorian galleries with improved lighting and labelling and to develop new audiences including schools - we now have an Education Officer - and the disabled with induction loops and wheelchair access throughout including a chair lift to the walkway in the courtyard.

Today there are sound effects, interactive touch-screens which include the history of military survey, video screens and displays especially for children.

The galleries show a chronological history of the Corps. Highlights of the collection include:

- The Gibraltar Gallery. This covers the Great Siege of 1779-1783 and includes models of The Rock and the King's Bastion, made shortly after the Siege, and over 200 years old.
- The Waterloo Map. This consists of a number of field sketches of the country around Waterloo, done by Royal Engineers and used by the Duke of Wellington to show the disposition of his troops.

- **Little Dog Snob.** He befriended the Engineer troops in the Crimea and returned to Chatham with them. When he died his skin was stuffed and presented to the Museum. The rest of his remains lie buried under the Crimea memorial arch in Brompton Barracks.
- The superb court dress presented to General Gordon by the Chinese emperor in 1864.
- The only surviving Brennan Torpedo, operational with the Corps for coastal defence from 1890 until 1905. Described as the Victorian Exocet, its inventor was awarded £110,000 in 1890 by the British Government for the exclusive use of this unique weapon.
- The theodolite used by Field Marshal Lord Kitchener as a subaltern on the survey of Palestine. He later did the first survey of Cyprus.
- A 1/5th scale model of a Bleriot XXI aeroplane, built by the Bleriot company in 1911 as a memorial to Lt Cammell RE, the first serviceman to be killed on flying duties.
- A 1/12th scale working model of an armoured Fowler traction train as supplied to the Corps during the Boer War. Built by Mr Jack Murrell from scratch it was presented to the Museum this year by his widow.

The First World War gallery includes special displays relating to tunnelling and chemical warfare. The Second World War galleries include contemporary working models of Mulberry Harbour. The post war displays in the courtyard include full-sized equipment such as a GR3 Harrier jump jet and an 11 ton Caterpillar D8 bulldozer, dropped by parachute in the jungles of Borneo during Confrontation.

The medal display is of national, if not international, importance. The Museum will always accept the medals of a Royal Engineer, ideally as a gift, and guarantees to display them. There are some 5,000 items on show including 25 of the 50 or more Victoria Crosses won by Royal Engineers, three George Crosses and the regalia of four of our five Field Marshals including Lord Kitchener. There is an almost complete collection of campaign medals and clasps won by Royal Engineers.

The Museum is also supported by a Friends organization. The Friends have several regional groups, based at Chatham, Colchester and Camberley, each running their own programme. Collectively the Friends do three things rather well.

First they have organized visits to places where the Corps has been active in the past, a chance to study the work of the Corps in agreeable company with expert guides. Visits have been made to Berlin, Spain, Portugal, Flanders, Malta, Gibraltar and the Channel Islands.

Second, they have sponsored the development of displays in the Museum to mark the contribution of specialist groups to the history of the Corps. Areas covered include Transportation in the shape of a working scale model based upon Cairnryan Military Port in Scotland, built and operated by the Corps in the Second World War, Bomb Disposal, the Malaysian Engineers, the Forces Postal Services and, currently in the planning stage, Airborne Engineers.

The third activity relates to the medal collection. The Museum does not normally buy medals but from time to time, medals come on the market which are not expensive but would fill gaps in the collection. The Friends invented the General Officers Medal Fund (GOMF) in which serving and retired Sapper generals were invited to pledge a sum of money for the purchase of medals. When a medal is purchased, all the names are put into the hat and are drawn at £50 a time until there is enough to pay the bill. When the first purchase was made, the first name out of the hat just happened to the chairman of trustees - amazing! GOMF has now run its course but it has acquired some very interesting medals for the collection.

The Museum is complimented by the Corps Library, established in 1813 and, today, a remarkable historical archive. As well as books and pamphlets it includes unpublished material, maps, plans and photographs from the mid 1850s to date. There is also a collection of several hundred letter books from Engineer offices around the world from the early 1700s to the 1800s. The Library is open to visitors by appointment on Mondays, Wednesdays and Fridays from 0900 until 1700 hours.

Both the Library and Museum will accept research enquiries but may charge for this important public service.

The Corps has a magnificent Museum of which it can be proud. But what of the future? The Museum has recently secured a 50 year lease at a peppercorn rent on its occupation of the Ravelin Building, thus securing the future of the site. Three challenges face the trustees and staff. The first is to establish the reputation of the Museum in the public mind to attract more visitors and earn more income. The second is to build an extension to increase the flexibility of the accommodation and the third is to collocate the Library with the Museum in the Ravelin Building. Watch this space!

Contacts: The Museum - telephone 01634 406397 or e-mail: remuseum.rhqre@gtnet.gov.uk and the Library - telephone 01634 822416.

Colonel John Nowers was called up from university in the summer of 1959. He converted to a regular commission and completed the full career, retiring from active service in the summer of 1992. He was Corps Librarian for one year and has been Museum Director since summer 1993. He retires from this appointment in May 2002 but hopes to be present for the Association visit on 1st June 2002.

AIRMAN WITH THE GUNNERS

The RAF Meteorological Unit with 1st Independent Sound Ranging Battery in 1942

By Geoff Woodhead

Background from Air Ministry Records:

Between the World Wars, from 1918 to 1939, permanent Meteorological Offices were established at Larkhill and Shoeburyness, the Royal Artillery training and research centres. The work consisted mainly of refining the techniques for calculating the corrections to allow for the air density, and wind speed and direction in the various layers of the atmosphere through which shells passed.

In 1937 the Met Office provided extra staff specifically to work on sound ranging with the 1st Survey Regiment at Larkhill and in November 1940 the sound ranging battery became an independent unit known as "The 1st Independent Sound Ranging Battery". Some two years later, in December 1942, the battery was disbanded and the personnel dispersed to other units.

The Met Units attached to the Royal Artillery were in a somewhat unusual situation. Although staffed by RAF personnel, they were seconded to the Royal Artillery and designated as part of the unit's establishment. However, they were still technically responsible to the civilian Meteorological Office of the Air Ministry. Some of the Met Units retained a measure of independence from the Army whilst others became more integrated to varying degrees.

Personal Recollections

After completing the course at the Met Training School in Gloucester, in early February 1942 I was posted to the RAF Special Duties List, Uxbridge, for secondment to the Met Unit with the 1st Independent Sound Ranging Battery. As a twenty-year old, inexperienced Met Assistant, my recollections of the time spent with this unit are inevitably of a "shop floor" nature, and as such will have some deficiencies.

The observations are based on personal notes made a short time after the end of the war. Having in recent years become involved in military history research, I would have liked to check my memories against the official records of the unit. Unfortunately I have been informed that "the log of the 1st Independent Sound Ranging Battery can no longer be found", so my memories may be of some use for record purposes.

I joined the unit at Sellinge, on the A20 about halfway between Ashford and Folkestone. The Battery HQ was located in a large country house just off the main road. The Met Unit was billeted about half a mile away, along a country lane, in an outbuilding of a farm owned by the Alexander family. The premises had probably been a

stable and living conditions were somewhat primitive. There was no running hot water and shaving requirements etc were boiled on a coke stove. We were allowed one bath per week in the farmhouse, provided that we hand-pumped water to fill the storage tank. Our meals were prepared by and eaten with the White family, in another farmhouse on the opposite side of the lane. Ration allocations were collected daily from Battery HQ and handed over to Mrs White. We contributed a small weekly charge for this service which was a very satisfactory arrangement for both us and the White family.

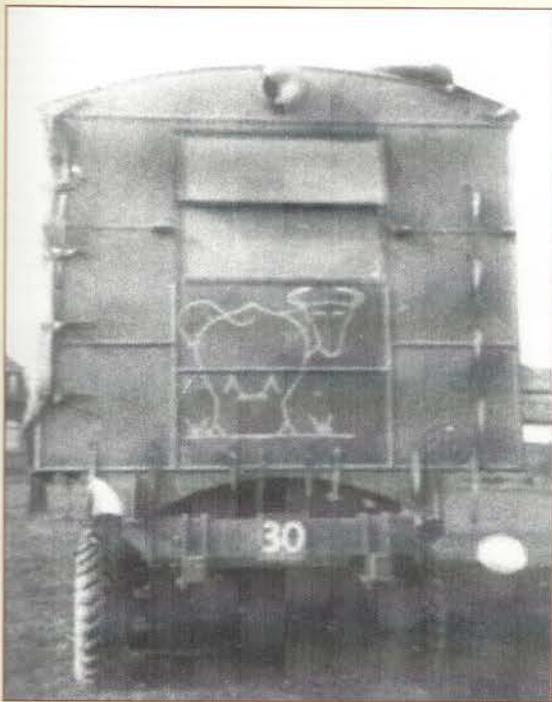
The main function of the Met Section was to provide the necessary meteorological corrections for sound ranging on the enemy cross-channel guns. The Met Section attached to the 1st Independent was in some respects "special". Firstly, although based in the UK it was classified as "On Active Service", and subject to confidentiality and security restrictions. Secondly, the standard (CD 201) procedures used by Met Sections with other sound ranging units were not suitable for the cross-channel distances and conditions. The standard wind graphs based on the Goodwin formula were not suitable. The prediction of sound path corrections from the enemy guns on the French coast involved advanced calculus mathematics. The theory of the calculations was far too complex for those with mathematical skills similar to my own. However, procedures had been developed so that calculations could be done without understanding the theory.

When I joined the unit the officer in charge was Flight Lieutenant JE Blamey, a specialist mathematician who had been recruited from Cambridge University. (It was said that he was a "senior wrangler"). He had developed the "Blamey" formula and the associated calculation procedures for this specialist work. He was a pleasant, mild, scholarly person not particularly well suited for the discipline and authority of service command. His main leisure pursuit appeared to be levelling a field to make a rugby pitch, using explosive charges to blow up trees. Shortly after my arrival he left the unit when the Met Office decided to replace the officers with senior NCOs.

Shortly afterwards the Battery moved to Seabrook, near Hythe. Here, the Met Section was housed in a cliff top bungalow named "Kyleogue", which had been the summer residence of Sidney Horler, the crime book author. The Battery HQ was located in another big house nearby adjacent to one of the local golf course greens. The members of the Met Section at this time were: A Sergeant - Harry Target, from Chipping Norton, Oxfordshire, who had represented his county at

both tennis and bridge. He had been evacuated from Dunkirk, whilst serving with the 2nd Survey Regiment. Many years after the war I was watching Wimbledon on television and Target was the umpire. A Corporal - Alec Crombie, a professional golfer in civilian life, with whom I developed a close friendship based on a similarity of interests, especially sports. After leaving the 1st Independent he went to one of the Survey Regiments (the 6th or the 8th I think) and was in the Italian Anzio campaign. After the war he was the Professional at Beaconsfield Golf Club, where I visited him in the 1960s, whilst on a golfing holiday. I then lost contact with him and when I tried to re-establish this in 2001, was told that he retired in the 1980s and died several years later. There were also three or four LAC Meteorologists, including myself. I can only remember two of the names Stedman and Whiffen.

The Met Section had its own transport and had two driver/mechanic/despatch riders. One was called Desmond May, from Devon I think, and the other, a Yorkshire man called Dick, whose surname I cannot remember. The transport consisted of a 15 cwt Bedford truck, a motor bike and a large mobile 30-cwt office truck. The latter had a large painting of a cow on the back and a name on the front "La Vache Espagnole", which I understand was a French idiom for "Clumsy Cow". (A description that was certainly true, as I later found out when using an identical vehicle in Burma). According to my notes, this office truck was 21 feet in overall length, 10 feet 7 inches high and 7 feet 8 inches wide.



Mobile Met Vehicle - "Clumsy Cow"

The 1st Independent had three microphone bases - East, Central and West - each about 5 to 10 miles long with each base having five microphones. There were forward OPs to activate the equipment. When a base was activated to record a "bang" from in, or across, the channel, a rough plot of its source could be obtained fairly quickly. A more accurate prediction involved the complicated calculations, already referred to, and could take up to two days to complete. The predicted sources were then compared with aerial photographs. At the time it was said that a large proportion of the gun sites on the French coast, identified from the air, never fired throughout the war and were possibly dummies - I do not know how true this is.

I have recollections also, albeit somewhat vague, of the battery being on full-time standby for the dash through the Channel by the German battleships, Scharnhorst and Gneisnau. Many of the reported bangs were subsequently thought to be thunderclaps!

The main source of our met data was from pilot balloon observations for wind speed and direction. We made two or three observations per day and occasionally at night. There was ongoing competition between members of the Met Section as to the length of time a balloon could be followed by the theodolite. I think I once held the record of over 60 minutes i.e. to 30,000 feet, achieved on a cloudless sunny day.

We also received upper air data from a cylinder, shaped like a torpedo and always referred to as "the tin fish", attached to the cable of a barrage balloon over Dover harbour. I think that data included temperature, humidity and wind speed. The information was collected by the despatch riders but the frequency was somewhat irregular.

Presumably we may also have received weather forecasts and upper air data from the main area Met Office in Tonbridge. If so I do not know how it was received as I cannot recall any teleprinter or radio facility. I think it more likely that the upper air temperature and humidity data used was based on estimates, using surface temperature, the time of the day, the season and visual observation of the weather and the form and height of any cloud.

The other main function of the Met unit was to provide gun meteors for RA units in south-east England. The Corps HQ was in Tonbridge. General Montgomery was in command at one time and introduced rigorous "keep fit" programmes, e.g. 30-mile overnight marches, for all personnel, irrespective of rank or job.

Alec Crombie and I did almost all of the RA "gun shoots", about one or two a week. Many were field exercises on Romney Marsh; others ranged all along the south-east coast from Sheerness to Bognor Regis and others were calibration shoots, such as the guns in Fort Grain on the Isle of Sheppey in the Thames Estuary.

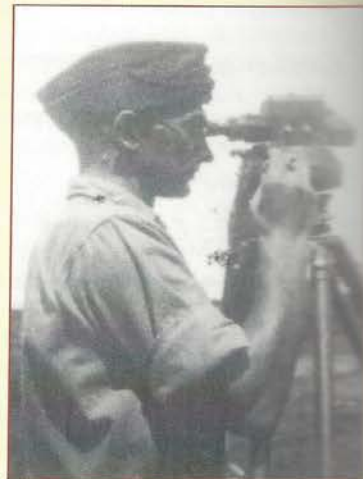
The most memorable calibration sheet we attended was for an 18-inch railway gun, known as the "Boche

Buster". This was located on a spur line at Bishop's Bourne near Canterbury. The gun was some 60 feet long and fired shells weighing over a ton. The calibration was by a method we had not experienced before. This was by trip wire or electrically operated cameras which measured the muzzle velocity over a very short distance from the gun muzzle. It was said that the shells were dropping in the English Channel and were being checked and recorded by a flash-spotting unit. Whether this exercise was to calibrate the gun or to check the method of calibration I do not know. This gun is now on public display in the Woolwich Artillery Museum.

Another recollection is that in the long grass and bushes around the spur line there were scores of grass snakes, and being from the north of England, I had never seen one before. Other random recollections are: being strafed by a low-flying Messerschmitt whilst on an exercise on Romney Marsh, fortunately without casualties and visiting Dover Harbour early one morning when a patrol of MTBs arrived after a mid-Channel engagement. Some of the boats were almost wrecks and ambulances were lined up on the quayside for the wounded.

I left the 1st Independent in September 1942 on being

posted to 2nd Survey Regiment preparing for overseas service. The seven months I spent with the 1st Independent were both interesting and enjoyable. Probably helped by the fact it was a glorious sunny summer. The experience established in my mind a firm opinion that the work of met units in supplying gun meteors was at least as important, if not more so, as that associated with sound ranging. This conviction was later reinforced by my experiences in Burma. However I have to say that contact with members of other met units, since the war, has indicated that not all were involved in providing gun meteors to the same extent.



Geoff Woodhead 1944

Geoff Woodhead joined the RAFVR in 1941 as a meteorologist and then spent most of the War attached to a variety Royal Artillery units in England and Burma. Demobilised in 1946, he resumed his career in the textile industry, mainly with Courtaulds, travelling extensively on behalf of the company and presenting papers at international conferences and representing UK on several international committees. Awarded the MBE "for services to industry" in 1980 he retired in 1989. Interested in local history and has published work on the subject.



The Boche Buster railway gun

NAVAL MINEHUNTING

Optimising the search for objects on the sea-bed

By Chris Skinner

Some of the problems associated with naval mine hunting are not new. The repetitive searching of the seabed for possible mine threats to ensure that key routes are kept safe is not without risk and there is no doubt that in the future the use of unmanned vehicles will increase. In AMS we have been developing our anti-submarine warfare oriented NECTA sonar performance tool to provide planning and tactical support for minehunting operations, specifically where unmanned and remotely operated vehicles are being deployed.

- The operators will plan a mission in advance establishing a series of way points which the vehicle is to follow. At this stage the primary consideration is to ensure that the proposed search plan will provide complete coverage of the sea-bed as efficiently as possible. One of the major problems here is the sea-bed topography and the creation of shadow zones.
- During the search mission, the operators will be controlling the vehicle and attempting to ensure that it follows as closely as possible the planned route. Deviations in attitude, heading and position will all impact on the search coverage on the sea-bed. The operators may decide to divert the vehicle path (perhaps to gain more data on an identified contact) but will then resume the planned search path.
- After conducting a search operation of this kind it is essential to build a coverage map identifying any areas of the sea-bed which might have been missed - perhaps because the ROV diverged from the planned course or because of the sea-bed topography.

Our NECTA product is a sonar performance prediction tool, originally designed for anti-submarine warfare applications. We have been using the core capabilities of the NECTA product to model the sonar performance and generate reliable search coverage maps. Given the parameters of the search sonar, some knowledge of the characteristics of the water column and most importantly, high resolution sea-bed data, it is possible to calculate the search coverage on the sea-bed for any sonar, in any position and with any particular orientation in space. Repeated calculations along the vehicle track give the progressive area of coverage and provide the basis of building up a coverage map.

At first the requirement to have a high-resolution seabed topography may seem severely limiting because of the limited availability of such data globally. But in reality it is not as much a problem as might be expected. Minehunting operations of this kind are conducted in shallow water, which is more likely to have been surveyed to a high resolution. Equally, the repetitive nature of minehunting and clearing operations makes it possible to build up data progressively.

The tools we have developed provides the following specific capabilities:

- a) Prediction of the expected sea-bed coverage of the search operation based on a particular planned search path. By allowing users to

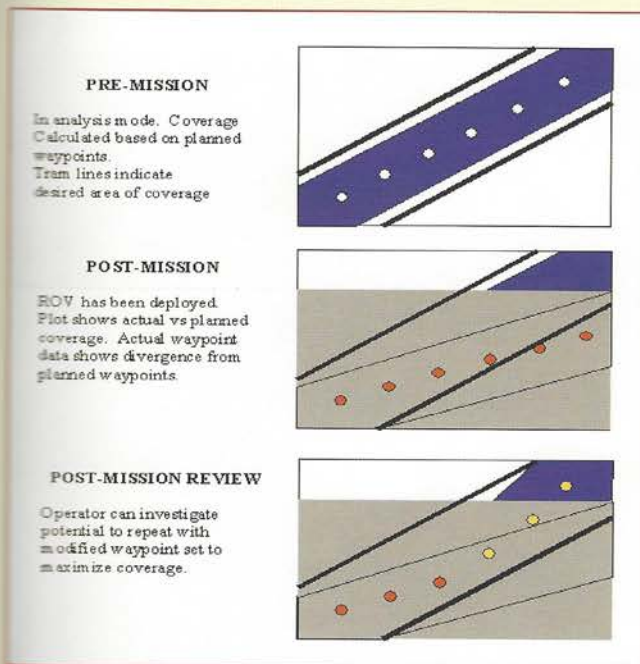


Figure 1: Coverage calculations can be applied both before and during search operations to assist with maximising the area coverage. Post-mission analysis allows actual achieved search coverage to be determined.

Unmanned minehunting vehicles (remotely operated or autonomous) have the advantages that they can be operated some distance from the parent vessel which can then maintain a safe distance from the search region, and they can operate close to the sea-bed providing very good detailed search coverage. However there are also some disadvantages, primarily a consequence of their relatively small search coverage and the difficulty of ensuring complete coverage of a desired area.

For a minehunting operation using a remotely operated vehicle a typical sequence of operations might be:

modify the mission way-points and recalculating the coverage may (in much greater than real-time) it is possible to very quickly establish an optimum search plan, taking into consideration all that is known about the environment. This is a major step forward compared with the use of standard search patterns regardless of the sea-bed topography.

- b) The ability to monitor the area of coverage as the search progresses and warn of areas which may not be searched adequately.
- c) Given a mission history, calculation of coverage maps showing the area actually covered and any areas where there is a risk of undetected mines.

For the Royal Swedish Navy *Visby* corvette we are providing these facilities as for integration into the sonar suite. They are integrated as part of a package of software which provides the operators with a series of 3D views of the underwater environment in which they are operating. The key element of this is a 3D viewer application which provides a near real-time (2Hz) view of the in-situ underwater environment and is capable of showing planned coverage data analysed prior to deployment along with 'live' actual coverage data. At the end of deployment actual coverage is also available.

To date we have concentrated on the mission planning and support functions needed for remotely operated vehicles deployed in minehunting scenarios. The combination of the acoustic modelling capability with the available data sources and the 3D visualisation of the underwater operating environment has proven to be a powerful planning and analysis tool.

Much of this work would equally be applicable to remotely operated vehicles deployed on other types of search operation where the topography of the sea-bed is an important factor and to autonomous vehicle mission support. We are also using similar modelling approaches to investigate the potential to optimise hydrographic surveying activities, where the basic objectives are the same - i.e. to identify relatively small objects on the seabed.

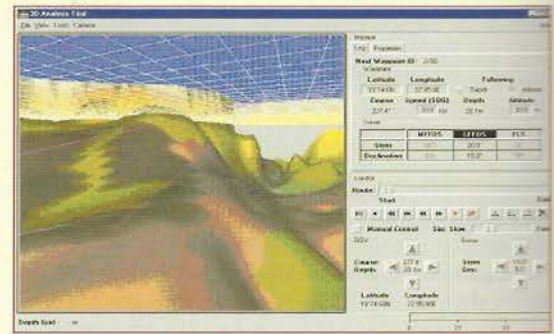


Figure 2: The 3D underwater viewer is a powerful tool enabling vehicle operators to understand the impact of the sea-bed topography on achieved search coverage.

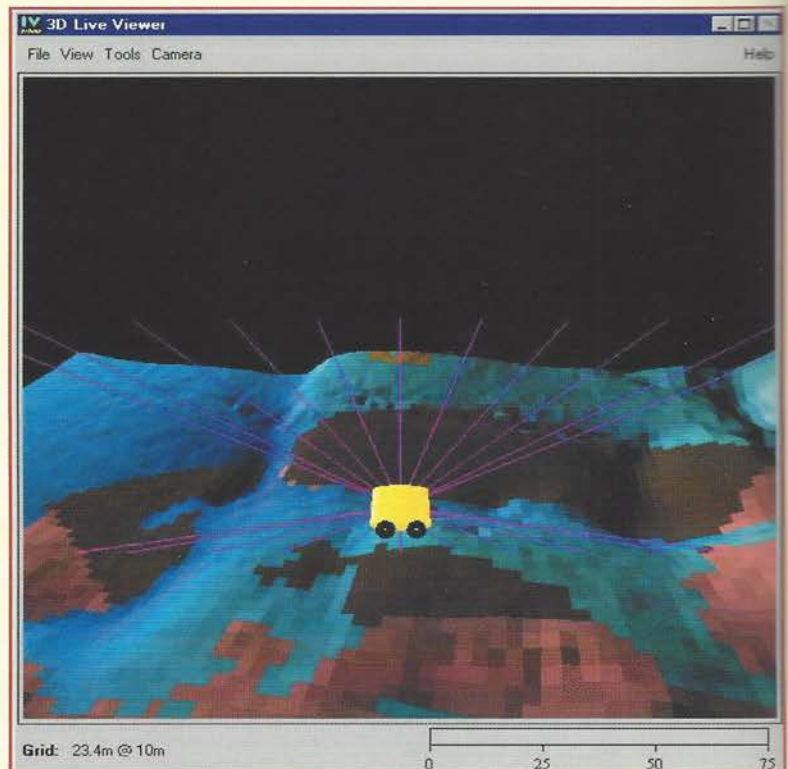


Figure 3: The modelling allows sea-bed search coverage to be plotted directly onto the 3D terrain display for both planned and actual vehicle paths.

Chris Skinner has for the last ten years been involved in a wide variety of projects where the common theme has been the acquisition and utilisation of data describing the underwater environment. The emphasis was initially on the support to Anti-Submarine Warfare tactical applications but has more recently extended to include minewarfare applications, and specifically the problems associated with minehunting. He currently has a business development role working for AMS where one of his responsibilities relates to the ongoing development of product capability.

DON'T BE A LAST MINUTE DOT.COM

Plan your transition from service to civilian employment ... and improve your chance of success!

By John Green, Managing Director, Face Group



Reaching the end of a job interview, the Human Resources Manager asked a young surveyor in the process of leaving the Service "And what starting salary were you looking for?"

The Surveyor replied, "In the neighbourhood of £45,000 a year, depending on the benefits package"

The Interviewer said, "Well, what would you say to a package of six weeks vacation, full medical and dental cover, non-contributory pension and a company car, perhaps a BMW."

The Surveyor sat up straight and said, "Wow! Are you kidding?"

And the Interviewer replied, "Yes, but you started it"

Setting the Scene

Just over five years ago, I was exiting the Armed Forces and, looking back, I was probably in the classic mould of 'how not to do it' when making that transition from serviceman to civilian, especially in relation to employment. There should have been no excuses: I was supposedly intelligent, a senior officer, staff college trained and had been involved in the career management of others. However, from my now vantage point as MD of a specialist recruitment company who deal on a regular basis with those exiting the Services, rank, training, Service ... and anything else you care to add in, is no safeguard against otherwise sensible individuals totally failing to plan for, what will be, a very major change in their life.

Pressures of work, 'gosh is that the date' syndrome, arrogance, ignorance of the system and, sometimes, just plain apathy, cumulatively add up to hundreds of servicemen each year, failing to maximise their chances of civilian employment. To illustrate the point, on an annual basis over 4,000 servicemen who are eligible for free resettlement assistance either fail or choose not to use the system. Equivalent advice/assistance provided in the private sector would cost individuals anything from £2,000 upwards!!

Get Going Now

If you are within six months of leaving and are just starting to think about future employment prospects,

you have almost certainly wasted valuable time. Service resettlement is geared from two years prior to exit because that is the thinking, planning, and execution time you need to get it right. Remember the old 'Orders' Group Aide Memoir ... 'Situation, Mission, Execution, Service Support' - yes, you have probably spent a career giving or being involved in the process; well, don't discard it when it comes to planning your own resettlement.

Establish what the 'situation' is (you are leaving, what next?), be clear on your 'mission' (to find civilian employment), work out 'execution' (how am I going to do it), then see what 'service support' (free training and assistance) is available. Yes, it might sound simplistic, but it nicely illustrates the point and I make no apology for it. So, back to the beginning.

Service Resettlement Assistance

Service personnel who complete three to five years' service in the Armed Forces qualify to use the Career Transition Partnership (CTP) and its Jobfinding service. The CTP brings together the MOD, Coutts Consulting Group, the Officers' Association and the Regular Forces Employment Association, and acts as a bridge between Service Leavers seeking employment and organisations who need competent, capable staff.

The CTP has ten Regional Resettlement Centres (RRCs) in the UK and Germany, a Resettlement Training Centre, thirty eight Regular Forces Employment Association offices and two Officers' Association offices, each providing a local point of contact with employers. Within this structure, it also has over sixty Employment Consultants who are happy to discuss your particular needs and how these might be best met. The Advisors and Employment Consultants should be your first point of contact.

Individuals may register with the CTP up to two years prior to date of exit and remain registered for two years following entry back into civilian life. Once registered on the CTP database, the 'system' will link you up with potential employers or recruitment companies who are seeking people with your particular skills and the service is free! In addition, if you have a minimum of five years service, you will also qualify for resettlement training. The message is clear - get registered as soon as you are eligible.

For those individuals who do not qualify for registration with the CTP ie. have served for less than 3 years, other assistance is available. A brief analysis of Army exit figures for FY2000/2001 indicates that in the age

bracket 21 to 30, well over 1,000 soldiers were not eligible to enrol with the CTP. If you are in this category, you can still make use of your Unit Resettlement Officer and all three Services have equivalent appointments.

Job Fairs and Briefings

Via the Services, two further opportunities also offer you a point of entry into the job market. First, throughout the year, the CTP, through its network of RRCs, sponsor a number of Employment Fairs - in 2002 there are 13 planned and at each Fair companies and recruitment agencies will have taken Recruitment Stands and will be vying for your skills. Second, the RRCs also afford individual companies the opportunity to run one off briefings and seminars specific to their employment opportunities. Again both these outlets can provide you with invaluable points of contact to further your career in civilian life. Face Search and Selection, which I head up, have used both of these conduits to good effect.

Use Of Agencies

Aside from Service assistance, recruitment agencies and even 'headhunters' may be interested in the skills you have to offer. However, rather than a scattergun approach, it may pay you to be selective in who you choose to register with. Agencies earn their fees by making placements and many can be unscrupulous in marketing you to companies; often this is done very crudely on the basis that if they 'throw' enough CVs at a Client, one will eventually stick. When you speak with an Agency, make sure you ask questions and that you are comfortable that they understand your skills base and the type of employment you are seeking. Insist that your CV details are not forwarded to a potential employer without your prior agreement/knowledge. If you are invited for a job interview via an Agency, again, make sure you are well briefed on the position. Far too often candidates find that the position they are actually interviewed for, bears little resemblance to the Agency briefing. To safeguard against this, you should carefully consider using a more specialist service, perhaps with a company that are sector specialists who know the marketplace, and maybe with established clients. After all, if a consultant doesn't understand your career background and technical skills, what chance has he/she of marketing you in to the 'right' position!

Your CV

However you finally enter the job market, it is almost inevitable that you will need a CV. As a key document in furthering your career aspirations it still amazes me how badly presented many are. The aim of the CV is to sell yourself and it is the tool that will get you that all important job interview. There are various recommended formats for CVs but most summarise either by employment history or functionally (eg,

training and development, management etc). It may pay you to put together two or three versions reflecting your skills in various ways. Some basic tips for CVs are

- Make sure you translate service terminology into civilian parlance: very few civilian organisations will know what a Troop Commander is, but they will recognise the term 'middle manager'! TACISYS crewman will not mean much to a local authority GIS manager looking for staff but he would understand 'three years experience with ArcInfo'.
- Fine tune the CV, and make sure it has the right emphasis depending on the job applied for.
- Technical skills are highly valued by civilian employers - make sure these are appropriately recorded eg. if applying for a technician appointment state "fully conversant with Ashtec ZFX RTK GPS" rather than a general statement about operating GPS equipment.
- Try and keep the CV to two sides of A4. There is not a greater turn off, than a rambling, badly focused five page CV.
- If you are including a Career Profile (which I recommend) in the CV, remember, this is the hook to make people read on. Make sure it contains good, proactive terms throughout eg. planned, executed, managed, and directed ... are the sort of terms you should be using.
- Remember it is normally your current experience over recent years that is of most interest to prospective employers. Give this appropriate space. As a general rule, the further you go back in your career, the more it should be just summarised. For example, I recently had an ex-RAF officer who asked me to advise on his CV. He was a pilot and had led the Red Arrows. His Career Profile waxed lyrical about his flying skills - all very impressive - but when I got in to the meat of the CV, it became clear that he hadn't flown for over 10years!!
- Finally, it is my experience that employers are particularly keen on 'evidence of achievement'. Most servicemen have these but are not very good at identifying or articulating them. Pick out four or five 'career achievements' of which you are particularly proud and make sure they are given 'profile'.

Applying For A Job

Having finely honed your CV, if you are applying direct for a position, you need to make sure that the CV is submitted under a good covering letter; carefully

crafted, this will help distinguish you from the competition and assist in getting you to the all important interview stage. Job vacancies are now advertised in a much wider range of ways. Aside from traditional hard copy advertising, there are increasing ranges of sector specialist publications that carry employment vacancies (including Ranger!!) and this is particularly the case with Survey and Geomatics. Job opportunities are also flourishing on the Internet and these can be posted direct on company web sites or on a wide range of job sites.

Read all job adverts as widely as possible, and try and get a sense of the market. In this way you will gain valuable intelligence on how marketable your skills are, ascertain where you might fit in the civilian promotion chain - are you a surveyor, senior surveyor, principal surveyor or party chief - get a feel for salary levels and find out where, geographically, the action is. On the last point, it is my experience that 'location' is often the single biggest factor in recruitment. Time and again, I deal with excellent candidates who often unwittingly restrict their employment prospects because they have just bought a house and do not want to relocate.

By keeping the job market under review, you will also come to a better understanding of what the various job adverts actually mean: there can be a hidden code ... and beware.....

You will work in a team with 2 or 3 other people in a fast paced environment. Adherence to strict deadlines is critical as well as the ability to learn and be innovative....

translates as

" We're behind schedule. **Really** behind schedule. We'd like to convince you to join these other poor suckers"

Ability to carry a pager and perform after-hours and weekend work required.

Really means

" We're too cheap to actually hire as many qualified people as we need, so we are going to try and squeeze unpaid overtime out of you at the expense of your personal life".

The Interview

Assuming you have been short listed for job interview, do not waste all that effort by not preparing properly for the meeting. Remember, as far as possible, to try and make the interview a genuine 2-way exchange and, in most cases this will be welcomed by the potential employer. The overall aim of the interview situation is for the respective parties to assess the situation: do you have the skills, experience and motivation that the employer is seeking; and is this an organisation and people that you can work for and with?

In your preparation, key aspects are:

- Make sure you know yourself, including strengths and weaknesses, and have a good awareness what you can offer the particular employer.
- Research the organisation, using website, annual reports etc. Remember - the adage "time spent on reconnaissance is seldom wasted" still applies.
- Carefully analyse the job on offer.
- Make sure you have a number of key questions prepared. This will demonstrate that you have thought the situation through, show that you are discerning, and will also help guard against awkward silences.
- Establish the type of interview you are going to face eg. One-on-one, Board interview, Group interview, Dinner interview and whether there is going to be any technical or other testing.
- Anticipate the type of questions you are going to face and practise the answers.

From my experience of debriefing with employers, common candidate mistakes at interview are: overselling; underselling; lack of honesty; negative attitude; lack of preparation; 'flat' with no enthusiasm; and general lack of preparation. At least if you have an awareness of the foregoing, you will increase your chances of success!

And on a lighter note ... how the employer makes the final selection!

On conclusion of the interview, the employer takes the candidates and places them in a room with just a table and two chairs and leaves them alone for two hours. At the end of that time, the employer returns ...

If they have taken the table apart, they are put in engineering

If they are counting the butts in the ashtray, assign to finance

If they are waving their arms they are obviously consultant material

If they are wearing green glasses and need a haircut, IT is their niche

If they are writing up the interview, send them to the Technical Documents team

If they don't even look up when you enter the room, assign them to Security

If they are sleeping, they are management material!!!

Conclusion

Service geomatics specialists are extremely well trained, disciplined and have a lot to offer in civilian employment terms. However, for the better jobs, the market remains extremely competitive. To maximise your chances of success, make sure you plan ahead, use the array of 'free' assistance that is available, get to know the marketplace, establish the type of job you would like, then carefully prepare ... be it your overall

John Green served for twenty years in the Royal Air Force specialising personnel management. He left the service with the rank of Wing Commander and continued to pursue a career in personnel and career management, first with a well-known headhunting company and then by launching his own sector specialist recruitment consultancy, Face Search and Selection. The business, previously covering the aerospace, defence and airports sectors, has recently expanded and now includes geomatics and logistics divisions.

MORE ABOUT THE TAVISTOCK

The Tavistock Theodolite, the subject of Admiral Ritchie's excellent article printed in Volume 2 Number 4 of the Ranger, is the subject of numerous articles dating from its trial and introduction to service through to the 1950's.

Readers interested in this subject may also like to know of the following articles in what is probably not an exhaustive list:

The Tavistock Theodolite

By Captain ERL Peake RE

Geographical Journal No 6 June 1929 pages 513-528.

The Tavistock Theodolite

By Major G Cheatham RE

Geographical Journal No ? Jul-Dec 1931 pages 442-454.

Jottings - The Tavistock Theodolite

By Colonel Spring

Empire Survey Review Volume V 1940 No 35 pages 304-307.

The Genesis of a Theodolite

Empire Survey Review Volume VI 1940 No 40 pages 105-107.

The New Geodetic Tavistock Theodolite

By E Wilfred Taylor FRAS

Empire Survey Review volume VI 1942 No 43 pages 258-269.

The New Geodetic Tavistock Theodolite - Fresh Data

By JL Rannie & WM Dennis

Empire Survey Review Volume VI 1942 No 46 pages 458-461.

The Coincidence Reading Geodetic Tavistock Theodolite

Empire Survey Review Volume XIII 1956 No 191 pages 298-309.

Mike Nolan

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(and.....getting something back from the Taxman!)

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Members should have received an explanatory letter and proforma towards the end of 2001. If you have not returned your Gift Aid proforma, please do so at once. If you have not received one (or have lost the original), please make contact with Lt Col Morris Felton whose address appears in the Members List or e-mail him at mgfelton@hotmail.com

GEO PEOPLE



Commander Steve Malcolm

Commander RN Hydrographic and Meteorological School HMS DRAKE

Commander Steve Malcolm has been in command of the Royal Navy HM School (DRAKE) since July 2000, conducting hydrographic training for Royal Navy customers, foreign navies and more recently, the commercial surveying sector.

Born in Glasgow in 1959, Steve Malcolm joined the Britannia Royal Naval College as a warfare officer in 1979 and on completion of basic training elected to sub-specialise as a hydrographic surveyor. Early appointments involved working on poorly charted areas of the Caribbean, Central Atlantic, Baltic, Mediterranean and most memorably in the Antarctic onboard HMS Endurance. Having completed advanced survey training in 1988, he took command of the navy's smallest ship, HMS Gleaner, working from the East of the Isle of Wight to Portsmouth and Southampton. After a short period with the frigate HMS Cumberland for warfare training, he became the Squadron Operations Officer to Captain H in 1992 - 94, responsible for the programming and efficient operation of all thirteen survey ships and Naval Parties in operation at the time. In 1995 he was appointed to the United Kingdom Hydrographic Office (UKHO) in Taunton as Staff Officer Survey Planning as the interface between the UKHO and front-line ships as well as running commercial contract surveys on behalf of the Maritime Coastguard Agency.

Returning to sea in 1996 in command of the mine countermeasures vessel HMS Bicester, Steve brought together minehunting and hydrography, taking the opportunity to trial newly developed Electronic Nautical Charting (ENC) systems on behalf of the Hydrographic Office. He attended the first 'Joint Command and Staff Course' to be conducted at the Joint Services Command and Staff College at Bracknell, which was an excellent opportunity to work with the other Services and international military community. A spell as the 'enemy' between 1998 and 2000 appointing all Hydrographic and Meteorological officers (HMs) to their jobs was a challenging and often vocal time trying to balance the needs of the Service, HM Officers' aspirations and their career development.

Promoted to Commander in July 2000 on taking command of the School, he became a Fellow of the Institution of Marine Engineering, Science and Technology and a Chartered Marine Scientist earlier this year. He is due to move on shortly and to become Commander HM, working for Captain HM and Hydrographer of the Navy from Devonport Dockyard in September 2002.

Steve Malcolm married Jane in 1982 and they have one daughter Helena, who was born in 1985. They live in an old farmhouse in Cornwall where home maintenance, Jane's passion for horses, Helena's education, Steve's motorsport antics and charity fund raising ensure that all spare time is accounted for.



Lieutenant Colonel Mike Gilson

Chief Instructor, Royal School of Military Survey

Lt Col Mike Gilson installed himself in the Chief Instructor's office of the Royal School of Military Survey rather cleverly just before last summer's block leave. He was shocked to be reminded that it was 18 years earlier that he had joined the Army Survey Course.

It is characteristic of a young Royal Engineer officer's career that he becomes a jack of all trades and master of none. This was certainly true of your new Chief Instructor - he had provided Sapper support to battle groups in Germany and built pill boxes (sangars to the enthusiast) in Northern Ireland. He had run a troop of bulldozers and dump trucks, and just before his Army Survey Course, had had to take command of the bomb disposal detachment in the Falklands when his boss stepped on a mine and lost a foot.

Even before visiting the penguins he had decided he wanted to specialise in something. Just over a year later he was on the threshold of a career in Military Survey. Once a Sapper, always a Sapper goes the cry; but now, though still a jack-of-all-trades, was he perhaps a budding master...?

Over the intervening years he has knocked about a fair bit - always in the Geo sphere (pun intended). Tours with 14 Topographic Squadron (including a four month 'Long Look' at Australia), the Army's Land Headquarters, UCL (from which he escaped with a MSc), the Royal School of Military Survey as a senior instructor, the ACE Rapid

Reaction Corps (including its first deployment to Bosnia), and then back to base at Feltham, had led up to this most recent appointment. And now? Master? He still doesn't really know what triple differential GPS is all about, so maybe not. But he knows a man who does.

And that is the thing about the school - the wealth of knowledge and experience invested in its staff. It used to be said that a soldier technician class 1 qualification was equivalent to a bachelor's degree. Whilst that may not be said today, it is more because of the exciting growth in university geomatics courses available around the UK, than a decline in standards. Indeed, here at Hermitage we are negotiating with a number of universities concerning the award of degrees to soldiers. We strive as ever, to provide the best technical training. Some may recall that young Sappers used to be called FREDs - 'fit for Royal Engineer duties'. The name may have gone but the idea remains. Surprisingly, we are arguably the only UK training establishment dedicated to providing geographic technical training (rather than education). Amazing but true, and our potential to provide training to the commercial sector is more than just a pipe dream.

Mike is married to Nicola who is a community physiotherapist and homemaker when not dancing. They live in a Tardis-like Victorian semi in Shepperton which houses a variety of means of musical excess - three guitars and a piano (Mike is taking lessons), trumpet (Luke 12) and drums (Ben 15). They are involved in a local Baptist Church, feel rather settled, and look forward with interest to see what the future holds.



Michael Barnes

Group Vice President of Marketing, Thales Geosolutions, Houston, Texas

Michael is an executive with a world-class commercial survey company. Formerly Racal, and before that Decca, the company provides geoscience, engineering and positioning solutions to offshore oil and gas, telecommunications and government agencies. The forty global offices employ more than 2,000 professional surveyors and engineers.

Michael joined Military Survey in 1978 and completed Field Survey Technician Class 3 course during the transition from the "old school" to the new build at Hermitage. Newly qualified, he was a member of the 1979 Northern Ireland covert field survey team. Serving in 19 Squadron in Barton Stacey and 14 Topo in Dusseldorf, he travelled extensively cumulating in Exercise High Trig 84 as the leader of the high altitude Black's Azimuth team (he is the often published red cagoule with T3 at 18,000 feet in Nepal).

He was very active in regimental sports and adventure training, a regular sailor and winter mountain expedition leader, and represented the Corp at sailing and water polo, and although a moderate rugby player, he toured with BAOR XV as "sponge man".

Leaving Military Survey in 1984, he joined Geohydro UK Limited with some well-known field survey personalities: Roger Jones, Barrie Hogarth, Ted Price, and Willie West. He managed operations in Saudi Arabia for three years during the National Geodetic GPS Survey. By 1990, Michael secured a sales and marketing position with Racal and has progressed through the ranks to his current position based in Houston with international responsibilities contributing to their \$250 million annual turnover.

Along the way, he qualified as a chartered surveyor and completed executive business education courses at Rice and Harvard Universities, where he specialised in strategic marketing management. He has published eight professional papers at technical meetings. He has just finished his two-year tenure as National Vice Chairman of RICS in "The Americas", as one of the rare Geomatics professionals in the sea of 1,400 RICS members that are resident in the USA. He has held various organisational positions as an active member of the Americas Petroleum Survey Group, International Association of Geophysical Contractors, Institute of Navigation, the Hydrographic Society and the Society of Exploration Geophysicists. He joined the DSA recently after meeting his former SSM to discuss the survey recruitment needs of Thales Geosolutions.

He attributes his successful civilian career to the core values instilled by military service, with an emphasis on Hermitage rather than the parade grounds of Cove or Lympstone. Today he remembers well those character building days as a junior NCO at many a remote survey station "turning angles" and breaking the ice at Peter's Pool during his green beret commando course back in 1974. Although he has retained his Britishness, Michael did go native in 1994 and married a Texas Lawyer, D'Lisa Simmons. Michael can be contacted by e-mail on michael.barnes@thales-geosolutions.com, for business or social reasons."

THE FOVANT BADGES



Historical Background

At the beginning of the First World War a huge training and transit camp was created in the valley extending three miles through the Wiltshire villages of Sutton Mandevile, Fovant and Compton Chamberlayne. Construction of the camp began with wooden huts and metal roads with a spur of a military railway from the main line between London and the west. The basic requirements were followed by parade grounds, firing ranges, and then by amenities such as a hospital, a post office, a cinema and even a YMCA.

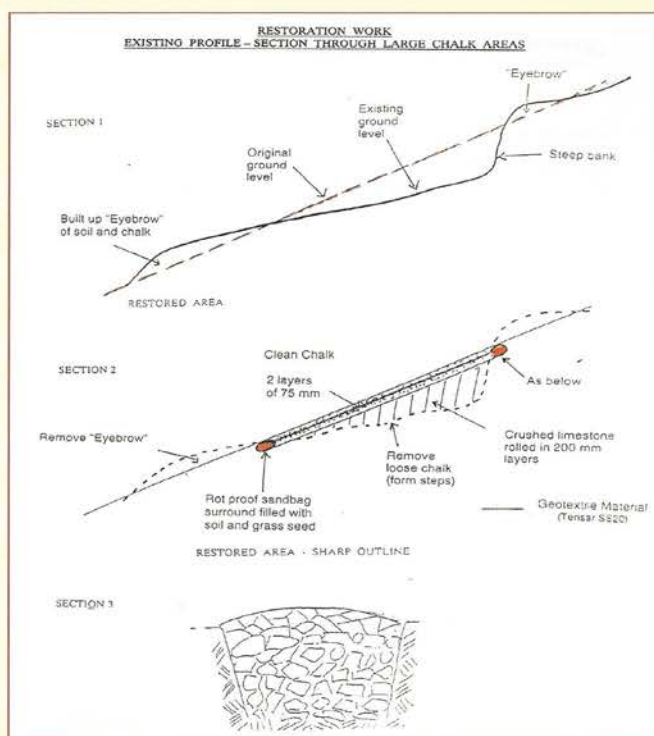
The history of the badges themselves began in 1916 when men of the London Rifle Brigade, who were recuperating from wounds and due to return to France, had the idea of cutting a facsimile of their cap badge into the chalk down to mark their presence in the camp below. Each badge took about three months of hard, tedious labour to complete, the largest badge being half the size of a football pitch. The outlines of the badges were first cut from the rough tussocks of grass on the hill to reveal soil underneath. Contrary to what is generally thought, chalk was then brought in from nearby pits and the badge outlines built up proud of the surface of the turf to make the badges visible from the valley below.

For many young men waiting to go to France, the creation of their regimental badge was a form of recreation and relief. It also demonstrated pride in their regiments, comradeship and loyalty to their country. Some twenty badges were originally made. However, over the eighty years since they were created many have disappeared, obscured by natural weathering, by grazing cattle and by grass reclaiming its territory.

Very little work was done on the badges until after the Second World War. With the disbandment and amalgamation of most of the regiments, restoration and

maintenance was carried out by members of the Fovant Home Guard, who also made two new badges in the early 1950s (The Royal Wiltshire Yeomanry and the Wiltshire Regiment).

In 1963 the Home Guard volunteers handed over responsibility for all work on the twelve remaining badges to the Fovant Badges Society - a registered Charity. In 1970 the last badge was constructed on Fovant Down to commemorate the 100th anniversary of



the formation of the Corps of Royal Signals. In June 2001 the Government, on the recommendation of English Heritage, scheduled the badges as Ancient Monuments in recognition of their national significance as a historical site.

Slope Problems and Restoration

All chalk hill slopes are subject to slumping and slippage, and the Badges are no exception. They have now become distorted and blurred when viewed by the Public from the A30 road below the Down. To restore the badges major corrective engineering, using contractors, is now required - volunteer labour is no longer a viable option. This task will be very costly. It is an extremely labour intensive operation largely carried out by hand on a 35° slope. On one large badge alone, some 75 tons of old chalk will need to be removed and replaced with new chalk, incorporating geotextile materials to help stabilise chalked areas. The total cost of the project is estimated to be £200,000 over the next two to three years.

Coupled with the massive restoration effort, the society still has to carry out annual maintenance work to prevent badges from becoming overgrown with weeds and grass and to surface rake the chalk which quickly dulls with time. Faced with these considerable costs, the society has embarked on a major fundraising appeal and has been forced to reduce the number of badges it looks after in the future from the present twelve to eight.

These remaining emblems will be those on Fovant Down which can best be seen by the Public.

If you would like to help the Society preserve and maintain these historic and somewhat unique memorials, please send your donation to:

Sir Donald Stringer CBE,
Treasurer Fovant Badges Society, Beech Cottage
Barford-St-Martin, Salisbury SP3 4AS

For further information see our web site:
www.fovantbadges.com.



THE ODYSSEY TIMESHIP PROJECT

Let History Know You Were There

This is a unique invitation to all serving and ex-service men and women, their dependants and relatives to join those already on board the Odyssey Timeship. Whatever your story, it is a great opportunity to travel forward in time and secure your place in the history of the Armed Forces.

The Royal Star and Garter Home have created the Timeship in association with Abbey National plc. It's a "living history" time capsule that will hold the digitally recorded memories and photographs of service men and women. Whatever your service experiences, The Odyssey Project will give future generations a unique insight into what membership of the Armed Forces meant during the 20th and early 21st centuries. It will provide definitive personal, "I was there" descriptions of all aspects of life in the Armed Forces. When the Timeship is full towards the end of 2002, it will be sealed and stored safely at the Imperial War Museum for the next 100 years.

This unique project has received the personal endorsement of Her Majesty Queen Elizabeth II, the Chiefs of Staff and General Sir Mike Jackson, Commander-in-Chief British Land Forces.

No conventional history book could bring to life what it was really like to take part in battles like the Somme and The Normandy Landings, or conflicts like The Korean War and The Falklands. These accounts will bring to life the experience of shared adversity; the apprehension of your first day in uniform, waiting for your first posting or the pride and camaraderie associated with service life. This is your opportunity to tell it how it was! You can book your seat on the Timeship for just £10. All proceeds will go to The Royal Star and Garter Home, a registered charity providing essential residential and nursing care to disabled and incapacitated ex-service men and women, regardless of their background or length of service. By taking part in The Odyssey Project you can help the Home to develop its wide range of support.

Log on to the Odyssey website www.odysseytimeship.com for details of how you can make your contribution to this extraordinary archive. Alternatively, contact Tony Maher, the Odyssey Project Manager, at The Royal Star and Garter Home on 020 8439 8114 for a postal application form and further information on the project.

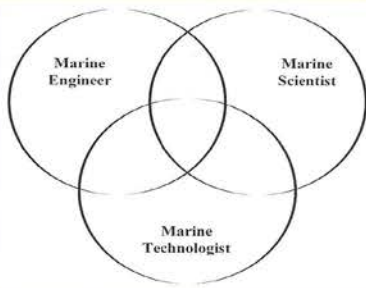
NEW PROFESSIONAL RECOGNITION FOR HYDROGRAPHIC SURVEYORS

By Lieutenant Commander Tony Jenks RN

For many years, hydrographic surveying officers have had the opportunity to join the Royal Institution of Chartered Surveyors (RICS) following successful completion of their Long Course. Senior Rate surveyors have also had the opportunity for technical membership of RICS but the author is not aware of any who have taken this up. Those officers who have become Associates or Fellows of the RICS have found that their area of expertise lies within a sub-section of the minor Geomatics Faculty of the RICS, whose wider membership largely comprises those connected with land, property and construction.

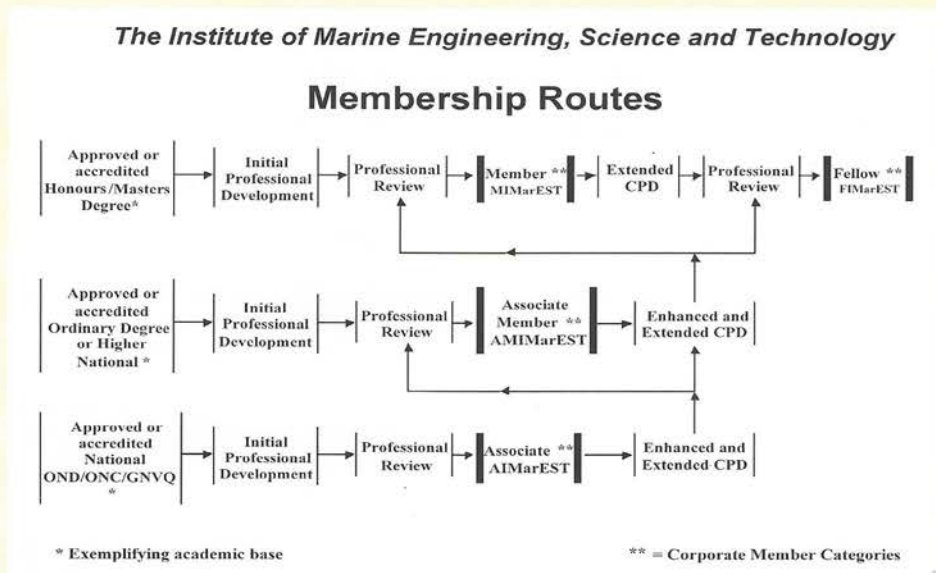
Recent development within another institute now offers the potential for professional recognition of greater relevance to the employment of both officers and senior ratings in the spheres of hydrography and oceanography, in the form of the Institute of Marine Engineering, Science and Technology (IMarEST).

The Institute of Marine Engineers has long been a well-respected institute, to which many RN engineering officers belonged. A long term vision by IMarE's council has resulted in its recent metamorphosis, to become IMarEST, which neatly provides a focal point for many discrete professions that all share the common "marine" working environment. Figure 1 illustrates the interaction between disciplines offshore, wherein both the right hand and lower circles are pertinent to Hydrographic and Meteorological officers and ratings.



IMarEST has well-appointed offices in central London that house a comprehensive library in addition to conference and secretarial facilities. The Institute has both a regional and an international structure, with 47 staff supporting 17,000 members, and it is able to award chartered status. Their bimonthly "Journal of Offshore Technology" will be of particular interest to non-engineering members.

Figure 2 illustrates the routes to the various categories of membership and shows how, through "ladders and bridges", it is possible for people joining at any level ultimately to progress to Fellowship, based on proven professional experience, rather than academic background.



Although full details are not given here, the salient requirements for membership at the various levels are as follows:

Fellows (FIMarEST) [Entrance fee £45, Annual Sub £93]

Reserved for those members who are at least 35 years old and who have held positions of superior responsibility engaged in the design, management or execution of important work in a marine related profession for at least five years.

Members (MIMarEST) [Entrance fee £40, Annual Sub £86]

Normally already Graduate members, they must be at least 25 years old and will have to demonstrate competence and commitment acquired through a structured programme of professional development, involving responsibility engaged in the design, management or execution of important work in a marine related profession.

Associate Members (AMIMarEST) [Entrance fee £30, Annual Sub £65] and **Associates (AIMarEST)** [Entrance fee £27, Annual Sub £57]

Similar to Members, but with age restrictions of 23 and 21 years respectively.

Membership or Associate Membership for non-graduates

Be at least 35 years old and have at least 15 years' relevant experience; also required to submit a paper on an approved subject, leading to an oral examination on it.



Dr John Chudley, Chairman of IMarEST's Professional Affairs & Education Committee, signing applications by Cdr Steve Malcolm (right) and Lt Cdr Tony Jenks

Commander Steve Malcolm, Commander of the HM School at Devonport, and his Director of Training, Lieutenant Commander Tony Jenks, have both recently been elected Fellows of IMarEST and been awarded Chartered Marine Scientist status. As the first surveyors to join IMarEST, their task will now be to work with the membership committee to develop requirements for membership at various levels and to assist in the establishment of services that will be useful specifically to the Scientist and Technologist membership.

In line with government policy on awarding civilian recognition of skills held by armed forces personnel, provision has recently been made within the Royal Navy for membership fees of appropriate professional institutes to be paid by the public purse. It is expected that this, coupled with the relevance of IMarEST to hydrographic surveyors, will generate considerable interest in membership.

Further details to those given above may be found on the website: <http://www.imarest.org.uk/>

THE EVOLUTION OF THE MILITARY ENGINEER GEOGRAPHIC TECHNICIAN

By Major Tony Keeley, Training Adjutant, Royal School of Military Survey

Introduction

Most of those within the survey community have been more familiar with 'Military Survey' to describe the geographic support to the defence community, a term which goes back many years. The current title for Royal Engineer soldiers providing this support is the **Military Engineer (Geographic Technician)** which more accurately describes their current role and has less connotations of the soldier in the field with his theodolite mapping far flung locations. Also the days of the geographic technician's routine production responsibility are long gone. The trade structure and content of geographic technician training have been subject to many changes over the past few decades, as have the rest of the Royal Engineer employments. Radical changes in technology and fundamental changes in the role of the geographic technician have resulted in very far reaching changes to the trade structure to produce the present system.

Recent Trade Reviews

The decision that the uniformed, then, Military Surveyors, would not be routinely involved in production work had already been taken when in 1990, Lt Col Geoff Parks was tasked with reviewing the trade structure. At that time the structure quite clearly reflected the former production role of production. There were five technician trades, Field, Air, Cartographic, Photographic and Print and a non-technician trade, that of Combat Surveyor (formally Map Storeman). A significant factor in the review was the emergence of Terrain Analysis, a science which had started to evolve within the Cartographic Technician trade, specifically at formation headquarters.

Map supply, somewhat the Cinderella trade, was quite often the main function that certainly the Field Army recognised as being Military Survey. It was realised that all Military Surveyors needed map supply skills. The role of the Field Surveyor in support of the Royal Artillery was being questioned. The Air Surveyor's role in the map production process was no longer viable. To

top it all, the impending cuts under the 'Options for Change' review meant smaller trade groups and it was already difficult to manage six trade groups particularly having to match as best as possible to an uneven promotion roster.

Hence the resulting new trade structure of the Terrain Analysis (TERA) Technician, primarily from the Cartographic Technicians, Reprographic (Repro) Technician formally Print and Photographic Technicians and the Topographic Technician (Topo) mainly from Field and Air disciplines though this third group was sub-divided into imagery and field elements rather defeating the object of fewer trade groups. All three trades were also trained in map supply. A further advantage was that all Military Survey soldiers attracted the same higher technician rates of pay and the possible divisiveness of the Combat Surveyor on a lower rate of pay disappeared.

Training was structured such that all the soldiers received training up to Class 3 and were allocated their trade on recommendation/aptitude/vacancies for training at Class 2 and finally at Class 1, more about the training structure and Class later. Further tinkering resulted in the imagery element of the Topo Tech being subsumed into TERA. This had the result of the TERA trade growing disproportionately large and again difficult to manage.

Within six years of the most fundamental review Military Survey soldiers had experienced for half a century, the speed of technological advance and yet again the imbalance of trades was forcing a re-evaluation. Hence in 1996, the Employment Structure Review was initiated. The review not only considered the then current requirements but also tried to anticipate down stream influences and came to the conclusion that all Geographic Support would be based on digital data. Therefore, all Geo soldiers - by now the term Geo has



replaced Military Survey - would require knowledge of the creation, storage and manipulation of digital geographic data whether in the production of standard map products, large-scale plans, point positions or specialist TERA solutions. In addition, this data, as the 'Geo Database', needed specialist management to ensure its availability in an acceptable condition.

All existing requirements were then included in this framework. The difficulties soon became apparent, as the legacy requirements were still as diverse as ever, irrespective that there was so much common grounding. There were too few soldiers to divide into four trades by leaving the three existing trades and adding Database managers, and too many functions to move to what many believe the inevitable outcome, one specialist Geographic Technician. The decision was made to continue with three trades but align the functions more sensibly.

Present Trade Structure

The **Geographic Data Technician** would be responsible for the collection and the generation of geographic data from field techniques and imagery, and the management of the Geo database. Included within this responsibility would be the provision of position and azimuth and large-scale 'camp plans' all part of the collection process. The **Geographic Terrain Analyst** would focus on the provision of enhanced terrain information using high-end techniques combined with previously unavailable multi and hyper-spectral imagery. The **Reproduction Technician** would convert to **Geographic Production Technician** to encompass all of the skills associated with product design and compilation as well as the traditional press operation.

Training/Career Path

Each trade review until now has involved three formal full time taught phases of training, common throughout the Army, the basic level Class 3, which will allow the soldier to work under supervision and Class 2 allowing work unsupervised, sometimes this just being on the job training. On completion of his Class 1 course, which has supervisory elements, the soldier is considered to be fully trained and this is normally the end of the soldier's formal technical training apart from individual bespoke training. Increasingly training directly to Class 2 is the norm.

The aspiring Geographic Technician has a long journey ahead before he or she even starts any geographic training. For a start, all are Royal Engineers hence after 12 weeks basic recruit training the soldier has to undergo 15 weeks Combat Engineer training followed by 10 -12 weeks driver training to achieve a C+E licence. Only then after a year's training, if all goes well, does the soldier arrive at the Royal School of Military Survey. It is a long time to keep the soldier focussed on his future career as a geographic technician and for those who are initially aptitude tested for this career there are many pitfalls and distractions on the way.



Geographic Technician Training

All prospective technicians undergo common training for the first 19 weeks, the **Common Skills Phase**. This initial phase includes map supply and foundation training common to the three technician streams. They are then streamed into Data, TERA or Production dependent on aptitude, vacancies and individual preference. After successful completion of this phase the three possible courses to take the soldiers to the Class 2 level are 25 weeks for Data, 26 weeks for Production or 24 weeks for TERA. Following their courses the soldiers will be typically employed in one of the Geographic Squadrons where they should receive experience working at the whole range of their trade. However this often easier said than done as there are other military duties and operations which may dictate that only part of their technical expertise is exercised.

After at least two years with a field unit the soldier will return for his upgrade training, these courses being even longer. The Class 1 course lengths are 35 weeks for Data, 30 weeks for Production and 34 weeks for TERA. Before attending the course soldiers will sit diagnostic tests basically to assess the level of competence in those subjects taught at Class 2. These tests are for the benefit of commanders and students alike in order that remedial action can take place before start of the appropriate course.

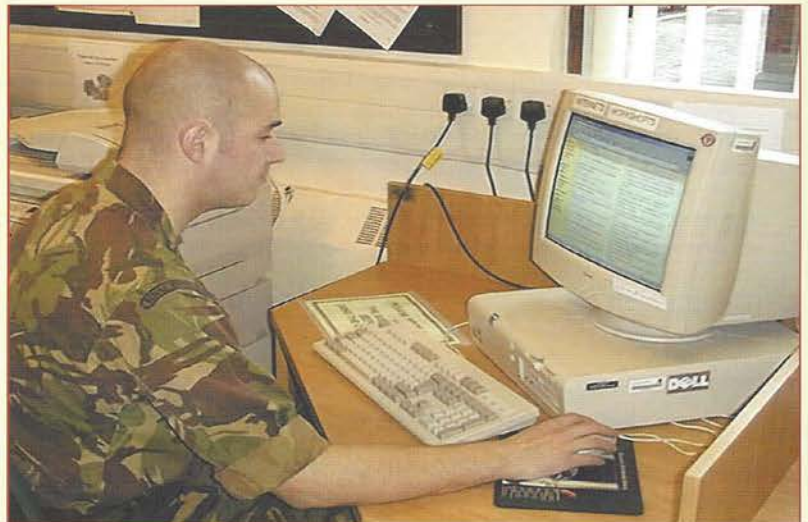
Further Geographic Career Training

Until recently it has been apparent that our soldiers received very intense technical training in the first few

years of their career and very little formal training thereafter. From last year a new course was instigated for sergeants, the **Geographic Sergeants Course**, which lasts 5 weeks. It particularly benefits those sergeants who fill formation HQ appointments. It will be undertaken by young sergeants and corporals selected for promotion to sergeant. While not formally recognised as a mandatory qualification it is the intention that all sergeants will attend the course. It is also the intention that the first **Geographic Warrant Officers' Course** will run next year at RSMS which will fill a perceived need.

Future Reviews

One would hope that there are no more trade reviews on the horizon as they always lead to immense retraining loads. But if 'Printing in the Field' ceases as a concept in five years - who knows!



Tony Keeley served with the British Antarctic Survey before commissioning in the Royal Engineers where he specialised in Survey. During his Military Survey career he was posted twice to 512 STRE, the USA and Germany and enjoyed several tours Feltham and at Hermitage where he was first Assistant Instructor Cartography, then Senior Instructor Air Survey/Cartography and later OIC Training and Development Team. Recently retired from the Corps he has returned again to the Royal School of Military Survey, this time in the role of Training Adjutant.

HYDROGRAPHIC TRAINING IN THE ROYAL NAVY

By Lt Cdr Steve Shipman MBE RN (Retd)

Business Development Manager, RN HM School (DRAKE)

Historical

The formal provision of hydrographic information in the United Kingdom began in the late 18th Century with the appointment of Alexander Dalrymple as the first Hydrographer of the Navy. Prior to this it was the responsibility of each and every Captain to acquire whatever charts he could. This was a very unsatisfactory situation, for example at the Battle of Quiberon Bay in 1759 Admiral Hawke complained that all his ships had different information and he doubted that any of it was correct. In order to carry out his duties Dalrymple was allocated the magnificent sum of £650 per annum.

Training

Initially training in hydrographic survey took place at sea whilst surveying and it was not until 1948 that it was decided that this might be conducted more effectively in classrooms ashore. This was largely due to the advances in technology made during the Second World War. The first School, for rating Survey Recorders, was set up in Chatham but it was to be another 18 years before formal classroom training was introduced for Officers, by which time the School had re-located to its present site in HMS DRAKE, Plymouth.



Digital side scan sonar in a boat

Organisation

The RN Hydrographic, Meteorological and Oceanographic School (DRAKE) [RNHMS(D)] formerly the Royal Naval Hydrographic School, offers a wide range of courses from the Seaman Survey Recorder course where new recruits are introduced to the basic skills of operating hydrographic equipment to the Officers' Advanced Survey Course which carries a Post Graduate Diploma award from the University of

Plymouth. Despite this wide range of courses, the RNHMS(D) is a relatively small organisation. It has a total staff of twenty-two, fifteen uniformed and seven civilians. Nine staff are routinely involved in lecturing with a further eleven directly involved with supporting the delivery of training and the remaining two providing administrative support. Of the seven civilians two, the Budget Manager (part time post) and the Secretary, are employed by the MOD, whilst the remaining five are employed by Flagship Training Ltd., of which more later.

Programmes

RN training follows a Just-Enough-Just-In-Time (JEJIT) principle and therefore the students will return to the School several times during the run of their careers. Each course builds on the previous course and the experience gained by the students at work during the intervening period. The length of time spent at sea between courses will depend on several factors such as student ability and ambition, and the naval requirement. All courses run by the RNHMS(D) are of a very intensive nature and student numbers on each course are normally restricted to nine. This ensures that each student gets sufficient hands-on time with the equipment and that the course officer is able to devote enough time to satisfy the individual needs of each student.

Students

Notwithstanding this small class size the places available on each course are usually greater than the RN requirement and the spare places are, wherever possible, sold to overseas navies. This brings numerous benefits not least of which is the income stream, which significantly reduces the cost of training to the RN. The students (and staff) benefit considerably from sharing practical surveying experiences in different countries and conditions. Overseas students routinely make up 25 - 35% of annual student days at the RNHMS(D) and on one occasion they accounted for over 50%. Since its establishment in Plymouth the RNHMS(D) has seen over 500 students from 30 countries pass through its doors.

Accreditation

One of the major attractions for overseas students is the FIG/IHO accreditation of the Officers' courses. Accreditation, which can be at either B, lower level, or A, higher level, certifies that the course delivers, as a minimum, a recognised syllabus, known as the Standards. The Advanced Survey Course was the first

ever course to receive Category A accreditation which it achieved in June 1980. The course was re-accredited against the 6th edition of the Standards in 1994 and again in 1999 against the 8th edition of the Standards. It should be noted that the Category A accreditation requires students to have completed the RN HM(H) course (or another FIG/IHO category B course) and to have achieved several years practical experience before they can be accepted onto the Category A course. The HM(H) course, was accredited as a Category B course in 1994 and will be re-accredited in 2003/4 against the new 9th Edition of the Standards. Successful students on the Advanced Survey Course are awarded a Post Graduate Diploma from the University of Plymouth.



Boat with multi-beam sonar

Equipment

Whilst it is vital that hydrographic surveyors have a good theoretical knowledge of both the natural processes occurring in and beneath the water column and the physics of any measurement process, hydrography remains a very practical subject and any training/educational establishment must make a significant investment in equipment. This is a particular strength of the RNHMS (D), which operates an extensive range of modern equipment. Undoubtedly the largest investment is in four modern purpose-built 10.5 metre survey launches, which are fitted with an array of surveying equipment including two multi-beam echo-sounders, a SIMRAD EM3000 and an ATLAS Fansweep 20. RNHMS (D) also operates single-beam echo sounders; data logging and processing systems; digital side-scan sonar; geodetic, differential and RTK GPS; theodolites; total stations; EDM; levels; tide-gauges and current meters.

Commercial Activities

Defence budgets have been reducing for some years and this trend will no doubt continue. The Naval Recruiting and Training Agency (NRTA), of which the RNHMS(D) is a part, needed to reduce the cost of naval training whilst maintaining capacity in case of a regeneration

requirement. To achieve this the NRTA entered into a partnering arrangement with a company called Flagship Training Ltd. The agreement provides three methods of producing income and savings for the NRTA:

- a. Income generation - the utilisation of spare capacity within naval training to provide commercial courses.
- b. Service provision - services, previously provided within the MOD, to be provided by Flagship at a reduced cost to NRTA.
- c. Private finance initiative - The provision of capital projects at a reduced cost to NRTA.

As mentioned earlier Flagship currently employ five staff at RNHMS(D), two of these have been taken on to market the School within the commercial sector and assist in the delivery of both commercial and RN training whilst the other three fulfil a service provision role. Notwithstanding this, the primary role of the RNHMS (D) remains to train naval personnel in the discipline of hydrographic surveying. The partnering arrangement allows this to be done to the same high standard but at a reduced cost.

Numerous commercial courses have now taken place and the number of clients is steadily increasing as the facilities and capabilities become more widely known. Clients to date include:

- Fugro Geoteam.
- Nottingham University.
- The United Kingdom Hydrographic Office.
- The Geological Survey of Ireland.
- The United States Corps of Engineers.
- Thales Geosolutions (formerly Racal Survey Group).

The course for the US Corps of Engineers was delivered in the USA and negotiations are currently underway with other US companies regarding the delivery of



Training in the USA

training in the USA. The RNHMS (D) is also looking to develop distance learning courses and would be happy to discuss any requirements that business or

academia might have. The author can be contacted by e-mail at shipman.mhs@gtnet.gov.uk or by telephone on 01752 286046.

(Any views expressed are those of the author and do not necessarily reflect those of the MOD or Flagship Training Ltd.)

Steve Shipman joined the Royal Navy in 1968 specialising as a Hydrographic Surveyor in 1972. He has served on many ships and been involved in hydrographic surveys throughout the world, commanding the survey vessel HMS FOX from 1987 to 1989. He twice served on the staff of RNHMS (D), from 1984 - 1986 as Senior Instructor, where he was primarily responsible for running the Advanced Survey Course, and from 1993 - 1999 as Director of Training. On retiring from the RN in 1999 he joined Flagship Training Ltd as the Business Development Manager for RNHMS(D). In 2000 he was awarded the MBE for services to Hydrographic Education.



Surveying in the surf zone

OBITUARY

ERNEST HODNETT



Ernest Hodnett, a very long-standing member of the Association, passed away on the 7th of April. He was Senior Partner for many years of the London firm of architects, Slater, Hodnett & Partners and was involved during his career in the design of such notable buildings as Peter Jones in Sloane Square and the John Lewis and Bourne and Hollingsworth buildings in Oxford Street.

Ernest decided to pursue a career in building at an early age, gaining a place at the tender age of 13 at the Brixton School of Building, then the premier building school in the country, travelling daily from Eltham. When only 16 he completed the course with distinction and despite this being at the height of the Great Depression, he secured a job with one of the most notable architects of the day as an Architectural Assistant. As with most men of the time, he had to work long hours which increased substantially when he started evening classes to gain architectural qualifications. However, his studies were disrupted when Britain went to war with Germany.

Ernest joined the Royal Engineers and then specialised in Military Survey where, as a Captain, he saw active service in Burma and India. He was a keen walker and whilst in the sub-continent took the opportunity to scale some of the mountains of the Himalayas. After the war Ernest continued his studies and eventually qualified in 1948, some thirteen years after he first started. He stayed with the same company throughout most of his working life eventually rising to become Senior Partner. He was a Liveryman and Freeman of the City of London, devoted husband and dedicated family man.

BOOK REVIEW: KITCHENER'S SURVEY OF CYPRUS

Kitchener's Survey of Cyprus 1878 - 1883: The first full triangulated survey and mapping of the island
Rodney Shirley. 2001. 70 pages 30 x 22.5 cm format. ISBN 9963-42-096-6
Published by the Bank of Cyprus Cultural Foundation.

In the last issue of the *Ranger* there appeared a short article on Kitchener's work for the Palestine Exploration Fund during the years 1874 to 1878.

Descriptions of Kitchener's early career as a surveyor in both Palestine and Cyprus appeared in the earliest biographies of Kitchener by Sir George Arthur (1920) and Arthur Hodges (1936). However, by coincidence, there has been published a new account of Kitchener's Survey of Cyprus, executed between September 1878 and March 1883. This account is the text of a lecture, the fifth in a series of Cyprus Cartography Lectures, given in Cyprus on the 17th November 1999 by the noted carto-bibliographer Ronald Shirley.

The account gives the historical background to the British occupation of Cyprus in the autumn of 1878 under the Treaty of Berlin and the need, stated by the then Governor, Sir Garnet Wolseley, for a hasty revenue survey to be available in early 1879. Kitchener's plan and advice was for a map based on a thorough triangulation, but he was ordered to proceed with a number of village surveys which could be pieced together as directed. Kitchener appealed to the Foreign Office under whose mandate he was appointed and was supported by Lord Salisbury thus the survey proceeded on the model of the Ordnance Survey. However, the rugged south-west of the island made progress slow prompting Kitchener to request two more assistant officers. This prompted the Governor to propose recall of the survey party if Imperial funds could not be found for the task. Predictably this proved to be the case and in early 1879 Kitchener left Cyprus with the task unfinished. However, Wolseley left Cyprus in May 1879 for South Africa and was replaced as the High Commissioner by Colonel Biddulph, and as a result Kitchener resumed the survey in early 1880 under the direction of the Colonial Office. Kitchener's relations with Biddulph were smooth and he completed his survey and tour of duty in Cyprus in March 1883.

It may be of no interest to Defence surveyors that Kitchener's initial salary as Director of the Survey was £550 per annum in addition to his regimental pay, later increased to £672 under Biddulph and that, according to Kitchener, the excess of Cyprus Government income over expenditure in 1882 was £82.36, no mean sum at that time. Also, although it is probably well known that Kitchener survived an assassination attempt during the Palestine Exploration Fund's survey of Palestine, it may now be so well known that he also survived being shot at by a Cypriot near the village of Pissouri in February 1881. How the course of history might have been changed!

From 1881 Captain SCN Grant RE accompanied Kitchener on the survey, being responsible for the hill-shading and after Kitchener's departure, he remained in Cyprus until April 1885. Grant was to go on to become a military surveyor of some note. He was responsible for the notable 'Military Sketch of Biggarsberg' and of 'Communications in Natal north of the Parallel of Ladysmith', which was to be the cause for bitter recrimination in the Commission on the Boer War.

Kitchener's one-inch map of Cyprus was ultimately published in sixteen sheets by Edward Stanford Ltd in 1885.

The monograph is profusely illustrated in colour including 14 maps or map extracts, a triangulation diagram, photographs of the then Governors of Cyprus, Sir Garnet Wolseley and Colonel Biddulph, and Kitchener himself, the theodolite used on the survey, and the survey team including Kitchener, Sergeant Sutherland RE, Corporal Beck RE, Lance Corporal McLaren RE and four early Cypriot surveyors. It is believed that a Sapper Kirkbride, not mentioned in the monograph, was also employed on this survey. The illustrations are all described in detail.

The monograph comprises 70 pages in approximately A4 format, of which 24 are the text of the lecture. Appendix A is Kitchener's "Notes from Cyprus" originally published in *Blackwood's Magazine* August 1879. Appendix E is Kitchener's final report on the survey dated February 1883.

This monograph is commended to DSA Members interested in the history of Military Survey. It is believed that copies may be available from the Bank of Cyprus Cultural Foundation, 1st Floor 86-88-90 Phaneronenis Street, Old Nicosia, PO Box 21995, 1515, Cyprus, cost £7.

It is thought that copies are also in the RE Library, the British Library, the Bodleian Library etc. All else failing, Mike Nolan has a copy available for loan.

Mike Nolan

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