

THE RANGER

Journal of the Defence Surveyors' Association
Winter 2003

Volume 2 Number 8



The new Geographic Engineer Group Officers' Mess painting - surveyor Captain Edward Leach winning the VC.



Registered Charity No. 221816

Sponsored by **BAE SYSTEMS**

Contents - Winter 2003

<i>Item</i>	<i>Page</i>
Editorial	2
The Defence Surveyors' Association	3
Bereavements	3
Chairman's Report to the AGM 2003	4
New Members	6
Operation TELIC Awards	6
DSA Prizes 2002	7
Commercial Satellite Imagery	8
Geographic Support to Operation TELIC II and Beyond	15
Soundings from the Devonport Flotilla	17
Sound Ranging Remembered	20
Sound Ranging on Operation TELIC	21
Association Technical Event	23
The Future of RA Survey	23
A Medal for Service in the Suez Canal Zone 1951-1954	23
PAIFORCE 1943	24
The Earth Moved	25
GPS Tracks Irish Sheep	27
Lands End to John O'Groats	27
Naval Party 1008	28
Naval Party 1016	29
Geo People	31
OS Apprentice Tradesmen Boys RE	34
Hydro's First Replenishment at Sea	36
Rommel Foxed by Faked Map	37
British Schools Exploration Society	39
The Shocking Tale	41
A New Painting for the Geographic Engineer Group	42
Captain Edward Pemberton Leach VC	43
Recent DSA Visits	44
Book Reviews	45
Obituaries	47

Cover picture reproduced by kind permission of the artist Peter Archer©

*Designed and typeset by David Johnson.
Printed by 1 Aeronautical Information Documents Unit RAF.*



This edition of Ranger...

yet again highlights some of the tumultuous events and changes that continue to impact the Defence Geographic and Hydrographic worlds and, as usual, we are granted a look at recent hydrographic and geographic support to operations. With the opening of the MacLeod Building at Feltham, the DGIA is at last down to three major sites in the UK. However, it appears that the only 'constant' in the defence world today is 'change' with the Agency now contemplating yet more changes of location. Meanwhile, Gunner Survey is still holding on pending a final decision before undoubtedly succumbing to the advance of GPS however.... sound ranging continues to thrive.

Our Gunner readers have been somewhat neglected of late but we have tried to make up for this with two submissions on sound ranging, a personal recollection of the Second World War system is nicely balanced by the write-up on the new ASP system and K Battery's experiences of using it during the recent Iraq War.

In line with the Association's objective of keeping members abreast of current issues in the geomatics arena, we are continuing the theme of including an in-depth article on the technology involved in the contemporary geospatial industry. The high standard set in the last issue by Cameron Japp's lucid dissertation on database enabled capability is maintained in this edition with a detailed examination of satellite remote sensed imagery by Jonathon Shears.

There appear to be very few books about surveyors and probably even less about hydrographers. However, this issue features a review of "Measuring America", a book which provides a truly fascinating look at not only the immense task of surveying a continent from scratch but also the background to the development of the instruments and techniques that will be familiar to many readers.

Next June sees the 60th Anniversary of the greatest invasion in history - Operation OVERLORD. The Royal Navy hydrographers, military surveyors and the photo reconnaissance pilots played no small part in ensuring that the liberating Forces were as well prepared as they could possibly be. The statistics of the landing are staggering and so, in their own way, were the achievements of the 'mappers and charters'. Our next issue, due to be published in early summer, will have a D-Day Anniversary flavour as befits such an occasion.

Have a good read.
Alan Gordon

Officers of the Association

President:

Major General EW Barton CB, MBE

Chairman:

Colonel JAN Croft

Royal Navy Representative:

Captain I Turner OBE RN

Royal Artillery Representative:

Captain J Melville RA

DGIA Representative:

Lieutenant Colonel JF Prain RE, MA, MSc, FRICS, MRIN

Hon Secretary:

David A Wallis HonRICS, FCIM

161 Cooden Drive

Bexhill-on-Sea

East Sussex TN39 3AQ

Tel: 01424 842 591

e-mail: secretary@defencesurveyorsassociation.org

Hon Treasurer:

Lieutenant Colonel MG Felton

Four Trees

10A Cumberland Gardens

Castle Bytham NG33 4SQ

e-mail: treasurer@defencesurveyorsassociation.org

Membership Secretary:

Lieutenant Colonel JF Prain RE, MA, MSc, FRICS, MRIN

Defence Surveyors' Association

c/o Royal School of Military Survey

Denison Barracks

Hermitage

Berkshire RG18 9TP

e-mail: membership@defencesurveyorsassociation.org

Editor of the Ranger:

Major AA Gordon FRGS, FRSPSoc, MCMI

1 Majorca Avenue

Andover

Hampshire SP10 1JW

Tel: 01264 359700

e-mail: editor@defencesurveyorsassociation.org

Official Address:

Defence Surveyors' Association

c/o Royal School of Military Survey

Denison Barracks

Hermitage

Berkshire RG18 9TP

Web Site: www.defencesurveyorsassociation.org

Registered Charity 221816

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 personnel 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 £15 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.

Anyone wishing to apply for membership should contact the Association at its registered address or e-mail the Membership Secretary at membership@defencesurveyorsassociation.org

GUIDELINES TO AUTHORS

Ranger is always interested in receiving articles for publication and encourages anyone with a story to tell or, a vision they wish to share, to contact the editor. Some simple guidelines are detailed below to assist potential authors.

Authors do not have to be a member of the DSA but should provide a 70-80 word potted biography that illustrates their links to the defence geomatics sector.

Subject matter should relate to defence geomatics, whether describing events that took place in years gone by or offering a vision of what might be in time to come.

Length should not exceed 2,500 words. However, after consultation with the editor, articles of greater length may be published in parts over several issues of the Ranger.

Format can be either hard or softcopy. Hardcopy can be hand-written or typed. Softcopy should be in Microsoft Word - PC version. Please do not format the article in columns or embed illustrations.

Illustrations are most welcome. The preferred option is for authors to provide hardcopy photographs that Ranger staff will scan. Original materials will be returned immediately by 'signed for' post.

If digital images are provided they **must** be of a high resolution - what looks good on a screen in PowerPoint will not lithographically print to an acceptable standard. Images must be high resolution JPEG or 300 dpi TIFF provided on CD. Please do not attempt to e-mail images over 400KB as they will block the editor's e-mail connection.

BEREAVEMENTS

It is with regret that the Association announces the death of Bill Hunter whose obituary by his lifelong friend Tom Phillips is published in this issue. This issue also includes an obituary to Tony Bomford who, whilst not a DSA member, was a former Military Survey officer with a worldwide reputation as a distinguished surveyor.

CHAIRMAN'S REPORT TO THE AGM: 28 JUNE 2003



A warm welcome to you all and thank you for coming. We should have an enjoyable day with a chance to talk over lunch, to meet our prize winners and to visit Blenheim Palace this afternoon. For those who were at Windsor Castle last Autumn viewing the Map Collection in the Royal Library and who have not been to Blenheim Palace before I recommend that if you do go inside you take particular note of the ten magnificent tapestries that adorn the walls depicting the Duke of Marlborough's Campaigns in Europe and relate them to the superb maps we saw at Windsor. The grounds of Blenheim are scenic, to say the least, and I suggest that you reserve some time to walk around them.

This is my first report to you since taking the chair last August at Chatham. You may recall that I said then that I considered it to be my aim that the Council should continue the good work that has been done in recent years in making the Association an interesting and worthwhile one to belong to. You will be the judge of that but I think we have had an eventful year so far.

Events of the Year

We have indeed had a number of excellent visits to date, all very well attended.

- a. For me, the year began with the tour around the Royal Engineers Museum at Chatham after the AGM. The Museum, rated among the top three military museums in the country, I believe had most of us happily diverted for the whole afternoon.
- b. On a sunny day in the Autumn we had a very pleasant and informative visit to the Tower of London preceded by an excellent lunch on board a river craft that took us beyond the Houses of Parliament and back in time for our guided tour around the Tower and adjacent buildings. The historic connection with the Ordnance Survey was not lost on us and we have Mike Stanbridge in particular to thank for arranging this so successfully.
- c. Two months later saw us in Windsor, when, after a good Italian lunch in the town we viewed the Map Collection in the Royal Library. All agreed that the exhibits displayed for us and the knowledgeable talk about them, given so eloquently by Yo Hodson, was an experience of a lifetime. We have Yo to thank for arranging this and David Wallis for arranging the lunch.
- d. In the Spring this year, by popular demand, we went to Bletchley Park. It was the second visit for the DSA to the Code Breakers Museum and was indeed very worthwhile. Much had changed since we were there a few years ago. On this occasion we enjoyed an excellent lunch in the Library with a spell binding talk and tour given by Brigadier Tim Pulverman, a retired sapper known to many of us. Again, for arranging this, we owe a large debt of thanks to David Wallis, particularly as we had the largest attendance ever with a party of 76.

It has also been my intention to increase contact with other professional bodies that have a similar interest to us in matters geographical. We already have a liaison with the Medmenham Club, some of whose members will be with us to day. I have been in touch with the Royal Institute of Navigators (RIN), probably the most discerning users of our products. Their Solent Branch has kindly agreed to let us join some of their activities. In February this year, as you know, they invited us to attend a lecture at the Ordnance Survey on the future development of GPS. Some of us went to Southampton and heard about the Russian and European as well as the US projects. It proved to be a fascinating evening for those still practicing and those who have retired.

Future Activities

Looking to the future:

- a. David Wallis is arranging for a tour of the Cabinet War Rooms in Whitehall on 4 October. They have recently opened a new section to the public, which extends underground across Horse Guards to the Citadel. It will be preceded by lunch in a local hostelry.
- b. Also in the Autumn, James Prain is trying to arrange a seminar on the latest developments in geospatial matters related to the battlefield. It is likely to take place in the Farnborough area and will involve one of the leading firms supplying the MOD. We hope this will be well supported by the Association, it should be a fascinating and revealing experience and of course is very much in line with our charitable aims.
- c. There will be another opportunity this Autumn to go on a battlefield tour to Europe, arranged by Brigadier Geoff Gathercole.

I hope you will agree that the Association is having a pleasantly, active year doing what its members want to do. One is conscious of the need to balance the desire for socialising among old friends with the interest in technical matters which is attractive particularly to those still working. I hope we are getting it right. We have a number of events proposed for 2004 but would very much welcome feed back from you on what you would like us to arrange and would also welcome more support in helping to run a successful programme. Please get in touch with our Honorary Secretary and encourage others to come to events.

Ranger

I am sure that it is now well recognised that Ranger is an excellent magazine and has been so, particularly over the past three years. Great credit for this must go to our editor Alan Gordon, David Johnson who puts it together and the AIDU at RAF Northolt who reproduce it to such a high standard, but also we must not forget those who contribute to its content.

It is worth remembering that the initiation of Ranger's improvement occurred three years ago when the Council, faced with a low and falling membership (146), looked at measures to increase awareness of our Association, its raison d'etre and its charitable aims. A website and an improved magazine to spread the word were considered invaluable assets to achieve this. It is pleasing to note that both have been very successful. More about the website later but Ranger must take enormous credit for the increased membership. In the last two years we have enlisted 46 new members, a 20% rise in our numbers. We now have 194 members with more joining and I hope that we shall be up to 200 before the end of the year. All seem to agree that Ranger is colourful, eye catching and full of a wide range of interesting articles about surveying, mapping and charting. It is the magazine that you pick up to read out of preference from a bundle of professional journals on a busy Mess table perhaps. It also acts as an attractive, well illustrated record of our profession and work, for future reference, for all time. It is circulated to all members and widely through out the MOD and Service Establishments.

So it has achieved and continues to achieve the objectives set, but this success comes like most things at a price. When the decision was made to improve Ranger the likely increase in cost was recognised and predictions were made as to future expenditure. These were to be offset largely by anticipated revenue from sponsorship and advertisements from commercial companies. The track record for this has been reasonable in the past. Unfortunately, as we all know, the recent period of economic decline that has be-devilled us in so many ways has also seen a reluctance by sponsors to spend money. Consequently we do not have enough revenue to meet our needs if Ranger is to continue to do its valuable work and we are to enjoy it.

The Council has looked into the situation very carefully and continues to monitor it closely. AIDU, who have already given us an extremely good deal for reproducing the magazine has, at our request, just reviewed its processes and costs and reduced the bill. The editor and typesetter do their work for far less than the commercial rate and we have reviewed distribution costs to members. Even so we need to increase our income. Inevitably the cost

of materials and services rises for all that we enjoy. The cost of house magazines of comparable content and quality, of similar organisations are in many cases now more than £15 per copy. After careful consideration and reluctantly the Council recommends that we should increase our annual subscription by £5. This is probably less than the cost of an average round of drinks. In fact the Council has been on the point of recommending an increase several times in the last few years. It has been almost six years since our last increase. A subscription of £15 will mean that you will get Ranger twice a year for less than £7.50p per copy when you include all the other benefits of membership of the DSA. I ask you therefore now to agree an increase of £5 so that our annual subscription will become £15 per member when it is next due in 2004. (After note: The AGM unanimously agreed to the increase of annual subscriptions to £15.)

The Website

Turning to the website. Its three-year development programme under Robert Dobbie's direction has just finished. Its success in increasing people's awareness of the DSA can be measured in terms of the number of visits, or hits, it gets and the more immediate way in which it provides news and information, that is of course worldwide. It also affords useful links to other organisations, in fact it is a good networking facility. Robert has reported that in January alone this year it received 6,434 visits and on one day 222 visits in the build up to the war in Iraq. The maintenance of the site is sponsored by EDS Defence Ltd. The Council recommends that the website continues to be maintained. I wish to thank Robert most warmly on your behalf for all the excellent work he has put into setting it up over the last three years. He has kindly agreed to continue running it. (Afternote: The AGM unanimously agreed that the website should continue.)

Other Matters

You may like to know that your Council has met three times this year. We have changed our way of working in that we now meet on separate occasions to the events that DSA holds. The Officer Commanding 135 Geographic Squadron RE has been kind enough to let us use the facilities of Mercator House at Ewell free of charge and this has proved to be most helpful to us.

Best Wishes,
John Croft
Chairman

NEW MEMBERS

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

Tony Painter joined Military Survey as a Map Research Officer and went on to pursue a successful 30-year professional career in Defence geographics. He was Director of Production for nine years during which period he was also the Head of Profession for the 550-strong Mapping and Charting Group. Tony's final appointment was as Director PICASSO Project. He is now serving as a geospatial advisor to DSTL at Farnborough.

Colin Chapman was Geodesy Manager at the UK Hydrographic Office from 1995 until 1997 when left to join Liverpool John Moore University as the Maritime Technology Lecturer. However, the call of the Fleet was so strong that in 2002 he took up the appointment of Mathematics and Computing Lecturer at the Britannia Naval College, Dartmouth.

OPERATION TELIC AWARDS

The President and members of the Association congratulate the following on their recent operational awards:

OBE

Lieutenant Colonel SL Farley RE - SO1 Geo PJHQ

MBE

Lieutenant Commander A Swain RN - CO HMS Roebuck

Warrant Officer 2 CN Underhill RE - National Contingent HQ Qatar

Queen's Commendation for Valuable Service

Captain LN Bell RE - SO3 Geo HQ 1 (UK) Armoured Division

Sergeant JRD McCurry 42 Engineer Regiment (Geographic)

DEFENCE SURVEYORS' ASSOCIATION PRIZES 2002

Nominations for the annual Association prizes for 2002 were debated at the May meeting of the Council. Once again there was no nomination for the Royal Artillery Prize as no work of a qualifying nature had taken place during the previous twelve months.

ROYAL NAVY

Lieutenant T G Foster, RN

Lieutenant Toby Foster has been involved with a broad range of operational hydrographic surveying tasks during the year and made a significant contribution to the development of front line surveying techniques in support of warfare. He recently completed an appointment as the first Officer-in-Charge of the Royal Navy's newly formed Mobile Survey Team (MST), which provides a worldwide, short notice military survey capability. Under his enthusiastic leadership this small team conducted detached surveys in Albania, Greece and the USA. His collaborative work in America was particularly successful and has resulted in the US Navy looking to adopt the MST model for their own rapid reaction survey forces.



Toby Foster is an energetic and highly competent individual who has made a significant contribution to the development of military tactics and doctrine for hydrographic surveying within the Royal Navy. Now on the Advanced Survey Course, he follows a long line of worthy winners of the DSA Royal Navy award.

DGIA

Staff Sergeant Peter (Tiny) M Simmonds

Staff Sergeant Peter Simmonds is employed as a Navigation Instructor in the Geodesy Department of the Royal School of Military Survey, Hermitage. His principal role is teaching both traditional navigation and the use and application of hand held GPS to All Arms courses. His award is based on his work, mostly in his own time, providing expert training in navigation to national technical institutes, charitable organisations as well as specialist units within the Armed Forces.



Over the past 18 months he has established the Navigation on Foot, Special Interest Group for the Royal Institute of Navigation (RIN). The benefits of Staff Sergeant Simmonds' work have assisted greatly in introducing navigation skills to as many as 350 affiliated organisations engaged in many aspects of outdoor pursuits, including orienteering, mountaineering and Safety-of-Life.

Peter Simmonds wrote the user guide on the use of GPS Navigation for RIN and advises on the use of GPS at RIN Outdoor Shows. He also advises the Expedition Advisory Centre of the Royal Geographical Society on navigation matters and has written a guide specifically for expedition leaders.

Through his involvement with RIN he has formed links to many charitable organisations to which he has devoted much of his free time, among these is the British School's Exploration Society. At its selection weekends and pre-deployment training meetings, Staff Sergeant Simmonds gives 2-day courses in the basic use of GPS as well as instructing on the traditional methods of cross-country navigation. He has always offered his services without any personal reward.

His expertise and reputation has brought him into contact with many military organisations. He regularly instructs Regular and TA Units as well as Special Forces and the Fleet Diving Unit in the many techniques of navigation.

Staff Sergeant Simmonds is currently advising and participating in the UK's GPS jamming trials, as part of the national NAWAR (Navigation Warfare) campaign to develop GPS equipment and systems to operate in more hostile Electro Magnetic Radiation conditions. This has involved extensive collaboration with Qinetiq and the Defence Procurement Agency and illustrates that he has the technical knowledge to support his very practical abilities in the field.

He brings great enthusiasm and depth of knowledge to all the courses he runs and is consistently praised for his technical excellence, style and delivery and his obvious desire to teach and pass on his knowledge and experience.

Staff Sergeant Simmonds has, more than anyone in his Department, raised the profile of Land Navigation and this enhances the RSMS's reputation as a Centre of Excellence, both within the Armed Forces and to the wider community engaged in outdoor pursuits.

COMMERCIAL SATELLITE IMAGERY - Prophet or Doom?

By Jonathan Shears: Infoterra Limited

In The Beginning...

Since the esoteric days of the initial ERTS-1 launch (later re-named Landsat) in 1972 when resolutions of 80 metres were heralded with awe and wonder, space based imagery of 1 metre or less is now accepted as the result of inevitable technological improvement. This is not to diminish the significant progress in remote sensing, but simply to put it in perspective.

From an Earth Observation (EO) point of view, excluding communications satellites, exploration probes, detection radars, space stations, navigation satellites and debris, there are something in region of 60 operational electro-optical/infra-red or Synthetic Aperture Radar (SAR) imaging constellations (Figure 1), of which Landsat would have been considered the grandfather had it not been for the premature failure of its ETM+ instrument on board Landsat 7 this May. The cost of developing space programs is immense, not only for the space segment and its launch, but also the ground segment infrastructure for telemetry down linking, processing, archiving and distribution of the data and derived products. With costs approaching the size of a modest national debt, the proliferation of EO satellites in the 1980's was not entirely market led. Governments tend to underwrite large and/or scientific projects, like Landsat (USGS) and ALOS (Japanese NASDA) to kick-start them in to a self-sustaining state or alternatively retain them as a semi-nationalised organisation, like France's SPOT (CNES) or as research programs like ENVISAT and ERS (ESA).

As demand for imagery has increased, so more programs can exist as privately owned ventures, such as Digital Globe, Orbital Sciences Corporation, Space Imaging and ImageSat International. Whether they have yet, or ever will, reach a point of sustainable revenue generation sufficient to provide a return on investment is debatable and certainly long-term. It fair to say however that the decision by US Department of Defense to leverage commercial imagery funding to improve national geo-spatial readiness and responsiveness has created the market conditions that all commercial imaging operators have been waiting for.

In January 2003, NIMA (soon to be known as the National Geospatial Intelligence Agency, or NGA) committed to spending up to \$500 million on high resolution commercial satellite imagery each from Digital Globe and Space Imaging over five years, under what is known as the Clear View contracts. This reduces the dependency on national collection resources, providing an independent military capability and an essential backup to national intelligence to satisfy the huge demand for overhead imagery. For the vendors, it provides a guaranteed revenue stream and helps accelerate the development of next generation satellites, especially as NIMA have since announced a follow-on contract called Next View for advance purchases of commercial imagery. With Next View NIMA is effectively investing in a next-generation Commercial Satellite Imagery (CSI) system and getting investor-level pricing.

In about 30 years therefore imagery has eventually come of age. With US government endorsement and an edict from the CIA to "use US commercial space imagery to the greatest extent possible", commercial space imagery will become the primary source of data used for government mapping, while classified reconnaissance satellites will only be tasked under exceptional circumstances. There has also been a general legitimisation of imagery due to its pervasive nature - from its use to validate insurance claims, sell houses, develop properties, compute tax rates, select holidays, protect VIPs and support media

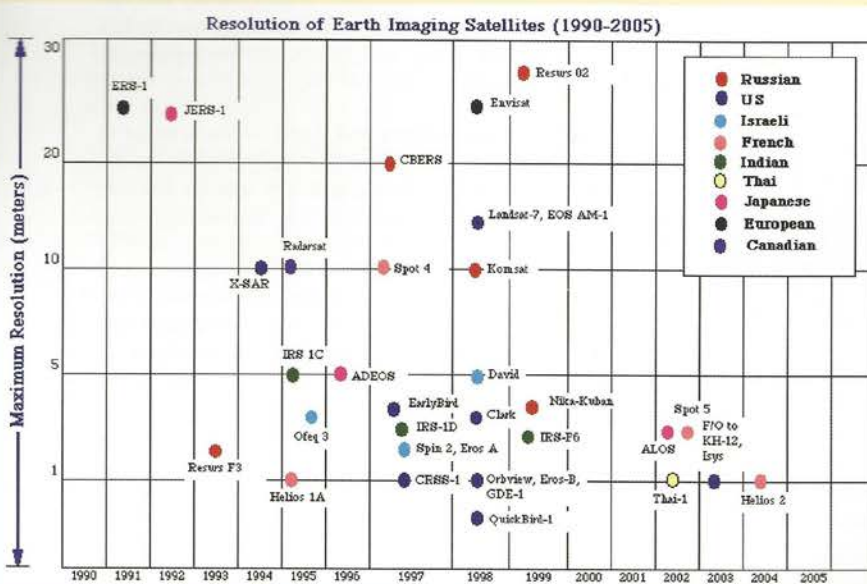


Fig 1: Remote Sensing Satellites (Source: Ardak 2000)

coverage. There is also a forthcoming image layer for the OS Digital National Framework, all of which further demystifies imagery, increasing its credibility and understanding.

Change Is Good

The way in which imagery is acquired has evolved very steadily and it impacts the way remotely sensed imagery will be used in the future. Some of the more significant technical, political, ethical and cultural developments and issues associated with commercial high-resolution imagery are;

- **Resolution** The feature most sensitive to sales potential and sexing up dossiers is pixel resolution. Whilst the highest resolution space based imagery is still the exclusive preserve of the military, commercially available resolutions satisfy all but the most demanding of applications. Military systems however will always be more capable than their commercial counterparts. Haim Eshed, head of space programs for Israel's MoD noted "in the military realm you strive to get higher and higher resolutions until you get to the diffraction limit and then you stop... That is the primary discriminator between military and commercial systems".

Digital Globe's QuickBird is currently the highest resolution commercially available imagery at 60cms (See Figure 2). Its early launch failures (optimistically called EarlyBird, now more accurately LonelyBird!) benefited Digital Globe, since by the time of QuickBird's successful launch in October 2001, the US government had issued sub 1 metre licences

which Space Imaging missed having already launched Ikonos in September 1999 with a 1 metre pan/4 metre multi-spectral mode. As part of the new US commercial remote sensing policy announced on 25th April 2003, the Bush Administration allowed a further increase in the resolution of sensors that can be carried on commercial satellites down to 25cms and Space Imaging is among the companies who have applied for a 0.25m licence from NOAA. For more information on licencing conditions of commercial remote sensing satellites visit www.licensing.noaa.gov.

With a defence market for CSI now in overdrive, the high-resolution end of the industry is quite busy. Image Sat International, an Israeli-owned, Cyprus-based company launched EROS A (Earth Remote Observation System) in December 2000, with a panchromatic 1.8m mode and EROS B, its scheduled successor, will have a 0.87m panchromatic resolution. In June 2003 Orbital Imaging successfully launched Orbview-3, which has a 1m pan and 4m multi-spectral sensor to increase the number of main high-resolution vendors.

- **Steerable Cameras** With increasing resolutions, the demand for on-board storage goes up. In the absence of either larger recorders (SPOT 5 has 90 Gb solid state recorders) or faster and more frequent telemetry downlinks, one solution is to image smaller footprints. To avoid indiscriminate data collections therefore, sensors are steerable so that they can point off-nadir to collect Areas of Interest (AOI's) up to 35 degrees either side. The norm now is steering the camera via fully agile platforms where the entire bus can be re-



Fig2: 60-centimetre natural colour QuickBird image of Port of Hamburg, May 10th 2002 (courtesy Digital Globe)

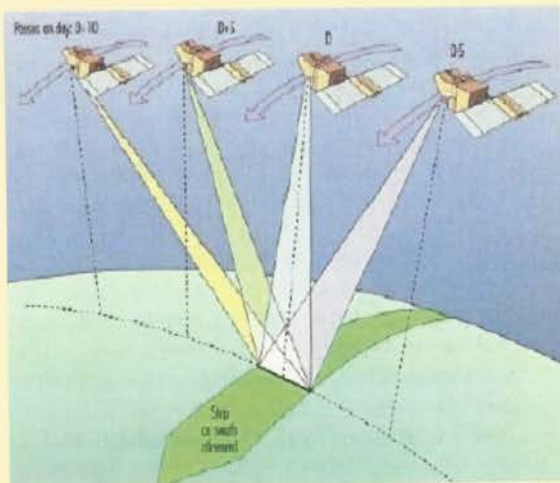


Fig 3: Satellite Agility - Spot 5 HRG across-track imaging (Source: Spot Image)

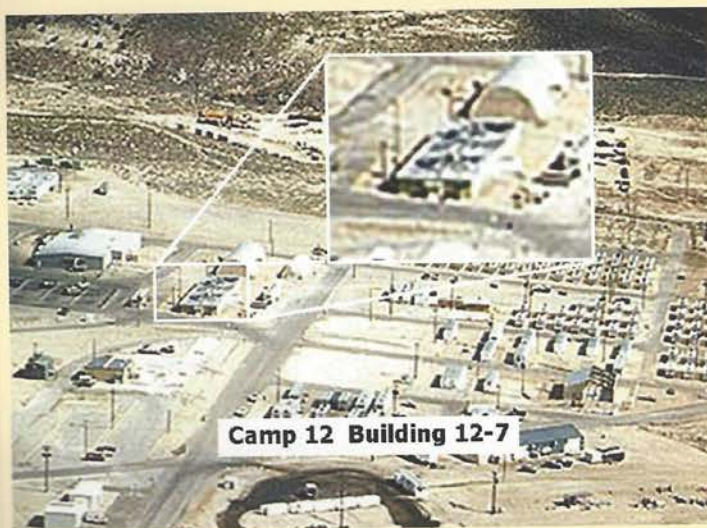


Fig 4: Low angle oblique reconnaissance image (Image courtesy: Global Security.org)



Fig 5: High oblique QuickBird image of San Francisco (Image courtesy: Digital Globe)

orientated, or alternatively a moving mirror in a fixed orientation platform as in SPOT 5 (HRG), which effects a faster side to side re-pointing (Figure 3).

There is a practical maximum angle away from nadir that can sensibly be collected, otherwise geometric scale distortions become too great for mapping applications, however oblique images still allow intelligence feature identification (see Figures 4 and 5). The ability to point sensors increases the number of images that can be acquired off-nadir for a given Area of Interest (AOI) (re-visit), as they can be collected on successive passes, once the AOI comes within an acceptable viewing angle. This is why US Forces were able to acquire multiple images in Operation Iraqi Freedom of the same area from CSI only hours apart.

- **Stereo** The ability to collect the same AOI from different look angles lends itself well to stereo viewing and hence height extraction. Early versions of Spot 3 and 4 acquired stereo pairs on successive passes, across-track left or right. Whilst the base:height ratio was sufficient for automated correlation, there is always a time difference between successive acquisitions of up to several weeks at best. Differences in intervening ground conditions cause problems for automated correlation, because the pattern matching algorithms used to locate the same point on each image (from which differential parallax and hence height is measured) cannot easily identify the same feature.

Along-track imaging as in Spot5 HRS solves this, where the time difference between a pair of stereo images is only 90 seconds. In this time it collects 72,000 km² of stereo imagery. Spot 5 HRS is capable of high throughput and intends to create DTM and ortho-imagery products, marketed as

Reference3D, for up to 5 million km² in three years. As a sign of future capability, the Japanese ALOS stereo instrument (PRISM) due for launch in 2004 has three along-track cameras, capable of continuous stereo data capture.

- **Orbital Accuracy** A significant factor in the mainstream uptake of imagery in GIS applications in the late 1990's was the 'GIS-ready' nature of remotely sensed imagery. As non-imaging specialists, GIS users prefer imagery to be fully geo-referenced, projected, mosaiced, colour balanced and possibly also tiled into convenient map sheets prior to use in GIS. Clearly as a GIS source, geometric accuracy is a fundamental given, however the absolute accuracy is governed entirely by the quality and availability of ground control, which conversely is **not** always a given. A time-consuming and error prone process at best, inputting ground control is fortunately becoming obsolete due to improvements in the ability of satellites to compute their own position and orientation in space down to a few centimetres. Knowing this precisely means that imagery can be geo-referenced using the on-board ephemeris data only, which is a huge advantage in places where it is hazardous, hostile or in urgent operational circumstances where time does not permit the sourcing of map data.
- For agile satellites to steer their optical axis towards small target AOI's, they need a high degree of positional accuracy for which they use star trackers - cameras that look up using astronomical triangulation for position fixing. SPOT 5 additionally uses a DORIS instrument, which applies further corrections using broadcasts from fixed terrestrial base stations. Spot Image now unofficially claim the HRS can achieve a horizontal accuracy of $\pm 25\text{m}$ RMSE without any ground control and they estimate that the SPOT 5 successor, Pleiades, will produce images accurate to $\pm 10\text{m}$ RMSE without any ground control, using two star trackers.

Micro-satellites As the asymmetric advantage of space observation is realised, so launch vehicles are at a premium. As the most costly (and risky) part of a space imaging program is the launch, satellites are becoming smaller, to reduce payloads and maximise each launch opportunity. Lighter payloads do not need multi-stage ballistic rockets to reach orbit, so alternatives like the air-launched Pegasus used by Orbital Sciences are a much more cost-effective option (Figure 6).



Fig 6: Orbital Sciences Pegasus launcher on take off underneath L-1011 Stargazer with OrbView-3 (Image courtesy: Orbital Sciences Corporation)

Miniaturisation of electronics means that micro-satellites do not necessarily have less capability, far from it. Sputnik, which was launched in 1957, weighed 84 kg and its modern successors (like ENVISAT) clock in at several tons. TOPSAT (Tactical Optical Satellite) a joint UK BNSC/MOD funded program weighs 120 kg but is capable of producing 2.5m-panchromatic and 5m colour imagery. Much of the weight saving is on-board storage since it can only take 4 images per orbit, however it paves the way for even smaller payloads (nanosatellites) in the future, down to less than 10 kg (Figure 7).

Pico-satellites are the following generation, weighing the size of a cigarette packet at just 250g. They are concept demonstrators at the moment but could eventually be mass-produced like mobile phones. Future concept teams envisage network-enabled swarms of pico-based Unmanned Aerial Vehicles (UAV) fanned out to provide distributed sensing, for example, as agent-based deep strike reconnaissance assets in advance of



Fig 7: SNAP for 6 - 12 kg payloads with GPS orbit determination, three-axis attitude control and micro-propulsion (Image courtesy Surrey Satellite Technology Limited)

Unmanned Combat Aerial Vehicles (UCAV) or bombers, giving superior mission capability at reduced cost (Figure 8).



Fig 8: Modelling behaviours to create intelligent UAVs that communicate together in a swarm (Source: US Air Force Research Laboratory: 0556009)

- Government Endorsement** Whilst the US commercial Remote Sensing Policy states a desire to 'rely to the maximum practical extent on US commercial remote sensing space capabilities for filling imagery and geo-spatial needs for military intelligence, foreign policy, homeland security and civil users', the UK Space Strategy 2003-2006 published in January this year used more cautious words on the same theme, 'to help industry maximise profitable business opportunities in the development and exploitation of space systems...' That said, the MOD is looking to integrate space-based technologies in their future ISTAR strategy, which will hopefully reverse the trend of a declining UK industrial space technology base.
- Indigenous Capability** There is a wind of change in the Far East as these economies develop their own space based imaging technologies. Normally as follow-on programs to national research programs, the

primary justification for them is disaster monitoring, mapping and precise land coverage observation. The most ambitious and possibly one of the world's largest EO satellites, is the Japanese National Space Development Agency's (NASDA) plans to launch ALOS (Advanced Land Observation System) in 2004. ALOS replaces previous experimental satellites JERS and ADEOS and as an indication of its likely launch weight, its payload will include a dedicated 2.5m instrument for DEM collection, a 10m multi-spectral radiometer and a Phased Array Type L-band Synthetic Aperture Radar.

In Korea KOMPSAT-2 is being developed by the Korea Aerospace Research Institute. Due also for launch in 2004 and using its own launch vehicle (KSLV-1), KOMPSAT will have a 1m pan/4m multi-spectral camera designed to provide surveillance of large-scale disasters, natural resource management and mapping. Neighbouring Taiwan on the other hand has opted for international collaboration and has teamed with Orbital Sciences to build ROCSAT a constellation of six remote sensing (micro-satellites) to collect atmospheric data for weather prediction and for ionosphere.

Unfortunately the UK has neither its own indigenous imaging capability nor launch vehicle, however it is one of the world leaders in small satellite development (Astrium and SSTL), so an inherent capability, albeit it latent, does exist.

- Business Models** With the increasing use of commercial space based imaging for defence and national resilience, security issues begin to feature. In the case of Israel, the use of CSI came earlier than planned when Ofeq-3, Israel's military imaging satellite, which had exceeded its projected life span operating well into 2000, eventually ran out of fuel. Although it was known that its fuel would run out any day, its planned replacement - Ofeq 4 and its Israeli-built Shavit launcher were destroyed in a failed 1998 launch. Consequently the MOD had to rely on an unlimited and completely autonomous imagery source via commercial channels (Ikonos and EROS), which was their lifeline until the deployment of Ofeq-5 in May 2002.

Recognising the need for confidentiality, EROS operators, ImageSat International, now offer Satellite Operating Partner (SOP) status to its MOD customer, who essentially 'owns' the satellite over a designated footprint. This means the customer can task the satellite to collect anywhere in the cone with no control, involvement or even knowledge of the

commercial provider - providing complete security. But complete imaging rights, uplink and downlink to and from the platform at a price with complete autonomy and secrecy comes at a price.

The Driving Force

It is evident that Clear View and Next View contracts will pump-prime the US commercial remote sensing industry, which will benefit users world wide with continued improvements and possibly price reductions as competition between vendors is encouraged. The defence sector will continue to be the dominant consumer, due to trends in modern warfare. Western nations are very risk averse, using imagery technologies wherever possible to minimise the need for front line combat and collateral casualties. Overhead imagery is seen as the force multiplier and the US employed much more ISTAR during OIF than was used than in Desert Storm, with Blue Force tracking, GPS guided munitions for precision strike (Figure 9), even through cloud, and the use of high bandwidth networks to share information wider and faster than before to deliver effects.

By virtue of the increased bandwidth in theatre and secure satellite communications, 94% of the Combined Air Operations Center (CAOC) staff during the recent Gulf War were based in garrison in the US, with only a core contingent needing to be in Prince Sultan Airbase. Nonetheless CAOC staff in the US at Langley and Beale Air Force Bases, via deployable ground stations,

were able to fly and collect Global Hawk and Predator UAV imagery in theatre. The rate of imagery collection meant that it was untenable to deploy the entire intelligence analyst staff. The US Air Force flew three concurrent U-2 missions twice a day and Global Hawk every other day. In one instance an analyst at Langley spotted a SAM system in new imagery of an airfield acquired five hours earlier and within one hour it had been destroyed.

Double Edged Sword

But Open Skies and the use of commercial remote sensing is a double edged sword, since it becomes harder to control the distribution of CSI and the intelligence information it contains once it is in an uncontrolled domain. The new policy encourages US commercial remote sensing companies to bolster the industry via export sales and develop increasingly capable systems - albeit it under NOAA licence restrictions - and there is a strong case for saying we are merely arming our potential adversaries such as Al Qaeda, by creating a level playing field. In the case of nano-satellite technology, it is now more accessible and more affordable for any nation or organisation to design and build very capable space assets. Ultimately the permissiveness of the policy still requires appropriate control measures and government to government bilateral agreements tightly control the release of imagery but it places a higher reliance on export controls than ever before.



Fig 9: Precision strikes require highly accurate geo-positioning to deliver munitions this effectively - Republican Palace, Baghdad, 1st April 2003 (Image courtesy Space Imaging Eurasia)

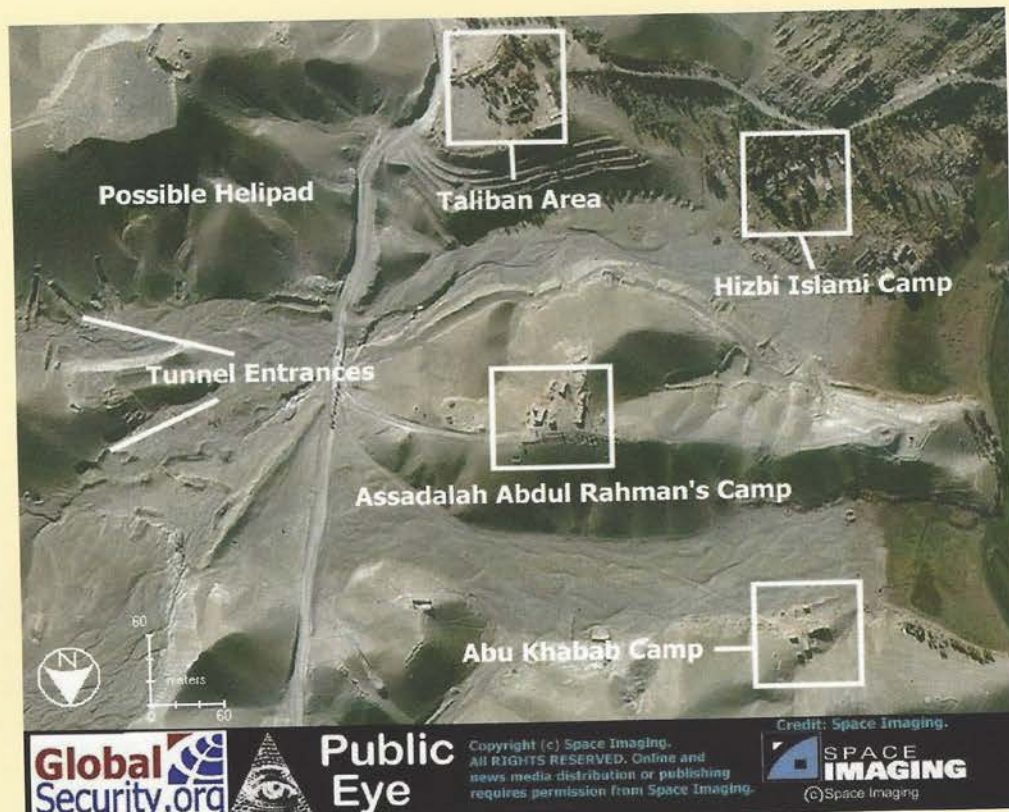


Fig 10: If we can see them.... (Taliban Training Camps in Darunta, near Jalalabad, Afghanistan)

...And It Came To Pass

The US are acutely aware of this problem as it relates to imagery and have resorted to various means such as shutter control, delayed delivery or 'cheque book' control. Shutter control was invoked during Afghanistan when Washington signed an exclusivity contract with Space Imaging that precluded them from selling, distributing or sharing imagery over the theatre with anyone outside the US government - expensive but effective. In Iraq however it was the worldwide media coverage that posed a real threat for compromising intelligence. As it was prohibitively expensive, even from the US point of view to corner the market, they exercised shutter control by prevailing upon US satellite operators as well as those the French SPOT5 to impose a 24-hour delay on all imagery captured over Iraqi territory.

Imagery is powerful stuff and getting more powerful. The emphasis must therefore shift to exploiting imagery more effectively and hence deliver its effects more accurately and rapidly. It is not information superiority anymore, but decision superiority that will prevail.

Jonathan Shears features as a "Geo person" in this issue of the Ranger.

GLOSSARY

- ADEOS - Advanced Earth Observing Satellite
- AOI - Area Of Interest
- ASTER - Advanced Spaceborne Thermal Emission and Reflection Radiometer
- BNSC - British National Space Centre
- CSI - Commercial Satellite Imagery
- CNES - Centre Nationale d'Etudes Spatiales
- ERTS - Earth Resources Technology Satellite
- ESA - European Space Agency
- GCP's - Ground Control Points
- HRG - High Resolution Geometric
- HRS - High Resolution Stereoscopic
- ISTAR - Intelligence Surveillance Target Acquisition & Reconnaissance
- JERS - Japanese Earth Resources Satellite
- KOMPSAT - Korean Multi-Purpose Satellite
- Landsat ETM+ - Enhanced Thematic Mapping
- NOAA - National Oceanic and Atmospheric Administration
- OIF - Operation Iraqi Freedom
- PRISM - Panchromatic Remote-sensing Instrument for Stereo Mapping
- ROCSAT - Republic of China Satellite
- SAR - Synthetic Aperture Radar
- SAM - Surface to Air Missile
- SNAP - Surrey NanoSat Applications Program
- UAV - Unmanned Aerial Vehicle
- UCAV - Unmanned Combat Aerial Vehicle
- USGS - United States Geological Survey

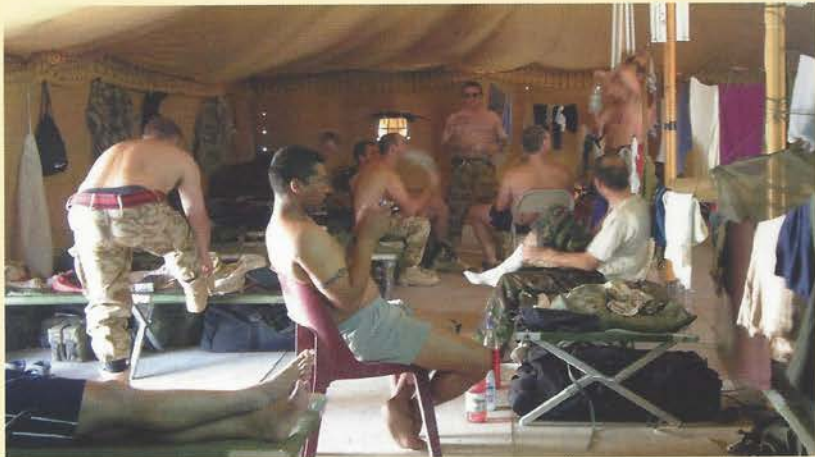
GEOGRAPHIC SUPPORT TO OPERATION TELIC II AND BEYOND

By Captain Peter Richardson RE

Operations Officer Geographic Engineer Group

One of the most notable characteristics of operations in the Gulf in 2003, compared with the first Gulf War for the liberation of Kuwait, has been the speed of the build up and deployment of forces. Whereas in the first operation there was a relatively slow build up of forces over many months followed by an extensive air war prior to the deployment of the land forces, this latest operation ran at a very fast pace from the start. As with all units that deployed, much effort has been put into relieving troops that were involved in the fighting phase. This has meant that a soldier's tour in theatre has varied from a few months to over six months depending on the formation that the Geographic specialists were supporting.

The lead land formation, 1 (UK) Armoured Division, was relieved by 3 (UK) Division in July. With this change over of formation the number of British troops in theatre was greatly reduced, a situation that was reflected by a reduction in the number of Geographic specialists supporting the new headquarters, although importantly, the scope of capability of the Geographic support was maintained. This was a commendable achievement at a time when the size of the Divisional operational area doubled due to a number of units from other contributing nations deploying into the UK-led area around the city of Basra with the headquarters becoming the Multi National Division (SE). The headquarters, with its Geographic staff, was sited at the main airport and the principal UK Brigade with its Geographic team found accommodation in the former president's palace within the city of Basra.



Typical Accommodation at Camp Eagle 1

With the withdrawal of the Geographic Support Group (14 Geographic Squadron) from theatre as the Divisional headquarters changed over, the Geographic support in theatre for the British area was centred around the organic Geographic staff from 3 (UK) Division, plus a troop from 13 Geographic Squadron. The numbers involved were further reduced as the situation settled down in theatre.

The rotation of troops in and out of theatre may seem chaotic to the casual observer but a great deal of effort is being made to fit Regiments and Brigades back into their normal cycle of commitments. The soldiers deploying from 42 Engineer Regiment (Geographic) for OP TELIC II and beyond are deploying for six months at a time. The only exceptions being those returning from theatre for career courses, of which there are an ever-growing number for the young soldiers, and those on their second tour in the region this year. A number of Geographic specialists will have two tours under their belt in 2004.



There is still unrest in the area of operations.

With the operation moving into Phase Four, with the stabilisation of the theatre and the growing concentration of the rebuilding of Iraq, the Geographic staff have been able to develop a number of initiatives in their support to deployed forces. One of the most significant of these initiatives was the deployment of the Digital Pre-Press (DPP) into theatre. This is a newly developed vehicle-mounted system that delivers a modern digital route for the processes previously delivered by a number

of vehicles including the Helio vehicle. The system completed acceptance trials just hours before being put onboard ship in Southampton Water for shipment to Iraq. The Geographic specialists in theatre have done much to develop the working practices of this vehicle which has improved productivity and quality in this area of production. The Production Technicians have taken on many of the traditional cartographic aspects of map and associated product production. Speed of the production stage of work has greatly improved, increasing the number of times that the decision to go to print is made. If a product is required in quantities over fifty it is now quicker to print than to plot. At the same time and in line with an ever-increasing demand, the quality of image maps has been greatly improved with the use of the DPP. With further experience, the Production Technicians knowledge of the DPP will result in the extension of the capabilities of the Geographic support to operations.

Other initiatives in progress include the networking together of systems to facilitate the transfer of work between technicians without an air gap. This allows technicians to make use of the multiple plotters available in the different vehicles and provided the ability to move datasets between vehicles as air conditioning problems developed.

Finally, this reduced size GSG has proved itself able to respond to all that was asked of it, drawing praise from all levels within the headquarters and from staff of the other nations deployed within MND(SE). As in the initial deployment of OP TELIC, the Geographic Technicians have proved themselves to be well trained, flexible and remain our greatest asset, often being able to translate the requirement into a product that more than met the customers' expectations.



Local children - Az Zubayr



Earthing the generator - one of the mundane tasks during field deployment



Working in Digital Pre-Press

SOUNDINGS FROM THE DEVONPORT FLOTILLA

By Commander Steve Malcolm RN

Commander Hydrography and Meteorology Devonport Flotilla

Another eventful period for the survey ships in the Devonport Flotilla, some good news, some frustrations, as is the way, particularly with new build ships. Starting with the positive, *HMS Echo* is now at sea under the White Ensign having been accepted into service on 10 October 2003, with *HMS Enterprise* being commissioned on 17 October.

HMS Roebuck, extended in service following Operation TELIC as reported in the last edition of *Ranger*, has been in Devonport throughout the period catching up with leave and essential maintenance. The ship worked extremely hard in the Gulf and it was no surprise to find that the maintenance load was much greater than might have been expected, however, it is looking hopeful that the ship will be back on the survey ground this side of Christmas. *Roebuck* will be working much closer to home until the next programmed maintenance period as the main survey priority areas around the UK have been low on the list of jobs to do given the demands of the Middle East.

Having achieved over 300 days available for sea in the past year, *HMS Scott* made a rare appearance in Devonport to conduct a planned maintenance period in the ship's nominal base port before returning to surveys in the Northern hemisphere. A crack in the starboard engine's sump caused unacceptable oil loss and *Scott* returned to Devonport for emergency repairs. However, it was possible to combine this with other activities which required the ship to be alongside therefore little time was lost. The ship sailed again on 7 November to warmer and sunnier parts of the globe to continue where they left off in the Spring.

The squadron's smallest ship, *HMS Gleaner*, has been actively involved in surveys off Portsmouth as a precursor operation to the viability of Portsmouth as the base for the Navy's two new aircraft carriers, the CV(F) project. Part of the work involved looking at a potential new route into the port which would pass very close to the wreck site of King Henry VIII's Flagship, the *Mary Rose*. This has caused much interest from environmental and archaeological lobbies who are understandably concerned that dredging a new channel so close to this historic site may not be advisable. *Gleaner's* role was to survey the area in conjunction with the Integrated Project Team for CV(F) and other interested groups using an array of sensors to establish the bathymetric and geological makeup of the area. On completion of this task, *Gleaner* returned to Devonport to start a routine re-survey of Plymouth and approaches as part of the ongoing safety programme for the Vanguard Class submarines and, at the time of writing, was making good progress.

Naval Party 1016, a team of surveyors embarked in the commercial vessel *MV Confidante* has had a remarkably successful period over the Summer months, completing all the allocated surveys in record time to an impressively high standard. More work was issued to the unit to ensure that they were kept busy all year. I am sure they appreciated it! Naval Party 1008, the larger unit based in *MV Marine Explorer*, have also enjoyed a productive season, however, due to a re-think and rationalisation within the Maritime Coastguard Agency who fund the programme, 2003 will be the last year that NP 1008 will exist. NP 1008 de-mobilises on 12 December 2003 for the last time after eighteen years in



Enterprise and Echo - the two new hydrographic vessels

service, which promises to be quite an emotional occasion for the merchant crew and RN members of the Naval Party.

As previously mentioned, *Echo* is at sea in naval service, however, this came at a price to *HMS Enterprise*. Due to a problem onboard *Echo*, both of the ship's 'Azipod' drives, the underwater electric motors and propellers at the stern which provide both motive power and directional control, were seriously damaged, so the only way to keep *Echo* on track was to remove them from *Enterprise*. Unfortunately, this has delayed *Enterprise* who is now at the mercy of the original equipment manufacturer and cannot sail until the replacement pods arrive. Frustrating for the ship's company who are eager to take their new ship to sea and start bringing the new technology survey systems on line, not to mention going for a good foreign "run ashore"!

The six Hydrographic and Meteorological teams attached to the Devonport Flotilla have been kept fully employed in Frigates and Destroyers across the world. These teams embark in warships to provide environmental advice to the Command mainly in meteorological and oceanographic terms to give the commanders tactical advantage as well as providing safety weather briefs for embarked aircraft. The use of these teams is being expanded to include the ability to conduct hydrographic surveys in support of amphibious exercises and operations from within a task force that

does not have access to a dedicated survey vessel. The equipment procurement teams have already developed and purchased the Portable Survey System (PSS) and sidescan sonar to be embarked in a boat of opportunity such as a landing craft or other ship's boat. A recent development has been the investigation into how Unmanned Underwater Vehicles may be utilised to collect environmental data in a more covert manner negating the need for ships to be put up-threat. It is early days for this new concept, but the HM Teams will be fully involved in the project as it develops and will be one of the main users of the equipment once introduced into service matched with PSS.

This is a swift roundup of life at the tactical end of 'HM' in Devonport. Plenty to keep us occupied, some good progress with new ships, tinged with frustrations of equipment failure, excitement with new developments and sadness at the loss of Naval Party 1008 and *Marine Explorer*. By the time of the next *Ranger* magazine, there should be plenty to report on the Simrad Multibeam systems as *Echo* gets to grips with the technology. I will keep you informed.



HMS Enterprise, second of the two new ships



KONGSBERG



The HUGIN 1000 Autonomous Underwater Vehicle concept



- Mine Counter Measure (MCM) route survey
- Mine reconnaissance
- Mine detection and classification
- Mine positioning
- High quality bathymetric mapping
- Overt and covert Rapid Environmental Assessment (REA)

www.kongsberg.com

Norway: +47 33 02 38 00, USA: +1 713 934 8885
Canada: +1 902 468 2268, UK: +44 1224 22 65 00
Italy: +39 06 65 57 574, Singapore: +65 68 93 50 00

Kongsberg Maritime AS

E-mail: subsea@kongsberg.com

WORLD CLASS - through people, technology and dedication

SOUND RANGING REMEMBERED

By Stan Tress

I am not privy to what might have happened to Sound Ranging but the pages of "Gunner" disclose many esoteric acronyms which suggest the emergence of a new technology. I think it is called "Surveillance and Target Acquisition".

It is not that Sound Rangers lacked technical expertise of the ability to innovate. In its early days, a fundamental break-through was made by WS Tucker's concept of a hot-wire microphone. The hot-wire grid, covering the aperture of the resonator remained to the end although the resonator was reduced from something like an oil drum to a much smaller and more elegant tin can.

The early recorders must have been very much D.I.Y. In my days, the Cambridge Instrument Company made compact, well-designed models. To me there was always a sense of magic from the process whereby impulses from the mike grids were converted into a line on a film by means of the recorder. Cable from the microphones came to the recorder and then passed through relays to reach the six fine filaments suspended within the Eindhoven galvanometer. Signals from the mikes caused the filaments to kick and this movement was caught in a beam of light which then passed through the spokes of a time wheel. The beam finally fell upon a moving strip of "film" (thin cardboard about 1½ inches wide with a light-sensitised surface). The film passed on through developer and fixer baths. The result was a strip of film with lines representing the six mikes going along it and time lines crossing at right-angles. The operator's control panel incorporated a window through which the movement of the six filaments could be seen. There was a facility for wiping and cutting the film. The recorder could also be started by the observer at the Advanced Post (well forward of the base) immediately hostile gunfire was heard.

Another innovation was the comparator, a machine about the size of a typewriter which allowed the time intervals set up by the fire of a hostile gun to be compared with the intervals created by the burst of shells being fired at it. Corrections for the guns could quickly be given.

Laying and maintaining cable in a war of movement always presents difficulties. An attempt to solve this problem was made in 1941-1942 with the introduction of "Radio Link". Signals from the mikes were sent by radio to receivers in the Operations Room from where they were fed into the recorder. Unfortunately, this required permanent manning at each mike. We tried it out and then, like an old soldier, it faded away. I did see it again in a shop in the Charing Cross Road which traded in surplus army electronic equipment.

Well before the first V2 landed, detailed knowledge of its capabilities were known, thanks to sources inside

Poland. 11th Survey became part of the organisation set up to try to minimise this threat. The Sound Ranging system devised required our mikes to pick up the sonic boom thus enabling points on the trajectory to be fixed. The first base was a lattice of squares with mikes on the corners running through parts of Kent and Sussex. They were wired back to an Operations Room in the Dean's Yard at Canterbury Cathedral. My memories of the technicalities are now unreliable but I seem to remember a large plot of the base in the Operations Room in which each square had a pen-light pivoted on a central swivel. When adjusted for the film readings, beams of light came together to indicate a plot.

When we moved into Europe we realised that a continuous base was not necessary and we set up four small grids, (at Breda and Eindhoven in Holland and Genk and Huy in Belgium), wired back to Malines. I had charge of 12-mike grid (4 wide and 3 deep), thus making a 6 square base. At each mike, a small transmitter sent signals by line to the Base Control, where the batteries powering the mikes were held. The signals were then relayed through one cable some 60 miles to Malines. Assuming that a plot was obtained, and in conjunction with other agencies, it fell to the RAF to bomb the suspect area. To maintain close liaison, a RAF Detachment was stationed at the Malines Operations Room; and very nice girls they were.

Towards the end of the War, the "4-Pen" system was introduced specifically to enable short, 4-mike bases to be set up for mortar location. The "pens" (the sort you see on seismographs) moved in sympathy with the mike signals and burned lines along a sensitised card strip. The time marks were dots. This system could be deployed quite quickly with the minimum of movement.

Admittedly, Sound Ranging was not well-suited to mobile warfare but, nevertheless, we could usually put out a 6-mike base within three hours and there were times when the front was static for weeks, if not months.

I have attempted to show that Sound Rangers were progressive and innovative. I have not mentioned film-reading or the mathematics and use of plotting boards because, apart from the V.2 bases, these remained much the same throughout.

I had originally thought of calling this article "Requiem for Sound Rangers" but I do not know whether the craft might not be continuing in some other form.

Editor: The following article shows Sound Ranging to be thriving in today's Royal Artillery.

SOUND RANGING ON OPERATION TELIC

By Major Alastair Parkinson RA - Battery Commander,
K (Hondegghem) Battery RA

K (Hondegghem) Battery Royal Artillery was formed in 1809 at Acra in India. It won its Honour Title in Hondegghem, France on 27th May 1940 when it delayed the German advance to Dunkirk by holding off a vastly superior force for eight hours at not inconsiderable loss and with great gallantry. It is currently part of 5th Regiment Royal Artillery, based in North Yorkshire, the British Army's only Surveillance and Target Acquisition Regiment. It is equipped with both Sound Ranging and Weapon Locating Radar.

In February 2003 the British Army's new Sound Ranging system deployed on war fighting operations for the first time. What follows is a brief account of both how the new system works and its performance in the harsh environment of the desert.

The British Army took delivery of the Advanced Sound Ranging Programme, or ASP system as it is known, in 2002. ASP replaced the HALO (Hostile Artillery Location) system and represents a technological leap forward in capability. The principles and mechanics of Sound Ranging may remain constrained by the laws of physics but technology has produced a fast and responsive system able to support all phases of war.

The old days of long and complex deployment procedures have come to an end, replaced by a system requiring the minimum of survey, that generates its own meteorological picture and is capable of communicating between microphones without line. Indeed so advanced is the system that it is capable of rebroadcasting data between microphones to ensure the operator receives it. In terms of time to deploy, a Sensor Post can be put out in 20 minutes and an initial baseline of four in about an hour although this is very much dependant on the area to be covered and number of Sensor Post parties available.

A fully deployed system consists of twelve Sensor Posts whose frontage could vary between a few kilometres to in excess of 100. Each sensor post consists of three microphones laid out in an equilateral triangle and connected to a processing unit and radio. Two masts are erected, one for communications and one for local meteorological conditions, and once deployed each Sensor Post is linked by radio to a Command Post. Survey is provided by GPS and

entered directly into the system for each microphone. Acoustic events that are then detected are passed to and processed in the Command Post where they are displayed graphically on a computer screen. The operator is then able to interrogate the system to both pinpoint the origin of the sound and "read" the sound wave. The system is both accurate and sensitive - it will display all events detected by two or more sensor posts. Detection ranges vary, being constrained by the prevailing meteorological conditions and terrain, but 25 kilometres proves to be about the norm and a fair planning guide. In order to assist deployment a computer programme is used. Once entered with weather and terrain details this will optimise performance by indicating the best areas in which to deploy and in what configuration.



Inside the ASP Command Post

No system is perfect and the Achilles Heel of Sound Ranging systems is always one of power. ASP is powered by batteries that are both bulky and require constant maintenance; they must be fully charged on deployment to ensure they can power the system for long periods. To counter this two new power systems have been brought into service.

Firstly a battery that utilises better technology and is able to power the system for up to 70 hours without recharging and a generator that can be left to power the system independently. Furthermore Sensor Posts can be remotely turned on and off so as to allow power to be conserved in quieter periods or to maintain only a minimum of Sensor Posts active, switching all on at the first indications of firing.

In late 2002 the deteriorating situation in Iraq and the imminence of a conflict focused the mind of the soldiers employed with the equipment; Iraqi forces had extensive artillery assets and a willingness to use them. In any future conflict it was expected that his indirect fire systems would be the prime means by which he would deliver chemical munitions. The threat to any operation would be significant and so ASP had clear utility in the detection and engagement of hostile artillery. To that end the finding and neutralisation of Iraqi artillery would become a critical task. With this issue in mind K (Hondegghem) Battery deployed with

ASP to Kuwait in February 2003 with a clear idea of what the probable mission would be - detect, classify and locate hostile batteries in order to cue strike assets to engage and neutralize.

With this mission in mind, by 13 March 2003 the ASP Troop was complete in a Forward Assembly Area (FAA) in Kuwait approximately 15km south of the Iraqi/Kuwaiti border. Their mission was as anticipated and they were preparing to establish an ASP baseline south of the Iraqi deep-water port of Umm Qasr. This baseline was to be established on orders to detect hostile batteries located on the Al Faw peninsula that were in position to engage US and UK troops who would be assaulting the peninsula to secure the oil infrastructure. Once this was complete they would move rapidly north behind the lead Brigades to establish a second baseline southwest of Al Basra prior to any assault into the town.

On 20 March 2003, with the ground war imminent, the ASP Troop deployed from their FAA to a deployment area south of Umm Qasr. In no short order the baseline was established and operational. On commencement of the air and ground campaign it became evident that the system was incredibly responsive; the sheer volume of detections by the system was huge. The opening hours of the conflict generated in excess of 500 detections, all of which required interpreting.

Following operations on the Al Faw peninsula the troop collapsed the baseline and moved north to positions around Al Basra. The prosecution of the Counter Battery battle within Al Basra and its environs throughout this period was a complex affair. The volume of sites on the No Fire Area (NFA) list coupled with the difficulty of detecting within the urban environment made targeting difficult. Successes were had by ASP against mortar and gun targets but intelligence indicated that the Iraqis had placed mortars on to flat bed trucks to aid survivability. Whilst inherently inaccurate, such a modus operandi, prevented friendly Counter Battery fires being employed. Only when indications of static firing point's existed occurred were targets engaged

Whilst many detections were made, the following is of note: On 24 March 2003 at 1109Z ASP detected an Iraqi Battery firing from North-East of Al Basra with impacts being recorded within the 7 Armoured Brigade Area of Operations. The decision was taken to engage with 24 guns from 3rd Regiment Royal Horse Artillery but without corroboration of the target from other means. L20 bomblet was fired at the extreme limit of AS90 range. Simultaneously the Divisional Air Support Cell (DASC) tasked a pair of Harrier GR7 to the target. They visually confirmed the presence of enemy artillery with numerous other vehicles. This resulted in two further pairs of GR7s being tasked and the US ANGLICO tasking two pairs of A10 Thunderbolt aircraft. The targeting of Hostile Batterys following detection by ASP and

without confirmation by other means was contrary to the Attack Guidance Matrix (AGM) and Target Selection Standard (TSS) issued by the Divisional Headquarters. However, the range between the firing point and the impacts was indicative of GHN-45 artillery pieces. The status of the GHN-45 as the premier Iraqi artillery piece and its chemical capability made it a leading target of the High Pay-off Target List (HPTL), and was therefore engaged without recourse to confirmation. In the event GR7 was able to verify the presence of towed artillery and it is this confirmation that led to such a large volume of firepower being delivered to the target.

On 7 April 2003 Al Basrah capitulated and both 7 Armoured Brigade and 3 Commando Brigade moved to occupy it. An intelligence assessment indicated that no artillery threat existed and the troop came off task, subsequently recovering back to Kuwait and thereafter to the UK.

In conclusion ASP proved itself as a robust and capable system. Over six hundred detections were made in a three-week period during which, with the exception of an 18-hour period to move, the system remained operational. The heat of the desert and unforgiving sand and dust did little to degrade the system. The terrain proved to be favourable to detections; largely flat ground and a favourable wind allowed for detections out to 50+ kilometres - well outranging nearly all other British Army surveillance and target acquisition systems and proving that Sound Ranging is a credible capability whose place in the modern army is without contention.



Deploying a Sensor Post during training prior to deployment to the Gulf

ASSOCIATION TECHNICAL EVENT

In keeping with the objectives of the DSA we are pleased to announce that there will be a professional gathering on the afternoon of Thursday 15th of January 2004 at Farnborough. The event will commence at 1330 and is planned to end by 1700.

The meeting will comprise a presentation by Lieutenant Colonel James Prain on "*Delivering Intelligence, Reconnaissance and Surveillance Capability*" followed by a tour of BAE SYSTEMS' Battlespace Management Evaluation Capability, described in the Spring 2003 issue of Ranger, and technology demonstrations from leading defence contractors Ultra Electronics and EDS Defence.

This event provides a rare opportunity for members to see a number of leading edge developments in defence technology and as such will be relevant to those still active in the defence arena as well as of interest to those who have retired. Given the professional nature of the event, it is not open to spouses but DSA members are encouraged to bring professional colleagues who would be interested and might be keen to join the Association.

THE FUTURE OF RA SURVEY

Unfortunately the publication of the much awaited paper on "Royal Artillery Pointing and Fixation" which will decide the future of Royal Artillery Survey has still to be ratified. Final questions are now being answered and it is likely to be endorsed in the very near future. Ranger will include an article and comments on the policy in the issue immediately following the publication of the endorsed policy.

A MEDAL FOR SERVICE IN THE SUEZ CANAL ZONE 1951 - 1954

Many military surveyors, both Regulars and National Servicemen, spent several years serving with 42 Survey Engineer Regiment in a hot, dusty and generally unpleasant patch of desert sandwiched between the Suez Canal and the Nile. Here the British Forces posted to Egypt lived and worked in a large collection of camps known as the Suez Canal Zone. Throughout the period the Canal Zone suffered from terrorist attacks by Egyptian nationalists who wanted the British Forces to leave Egypt.

A medal for service in the Suez Canal Zone has finally been granted. Applications in letter form quoting number, rank, name, date of birth, details of enlistment, discharge, regiment and Corps should be sent to: OIC Army Medal Office, Government Buildings, Worcester Road, Droitwich WR9 8AU.



A view of part of Fayid Camp. The camp was home to 42 Survey Engineer Regiment throughout the qualifying period for the medal.

PAIFORCE 1943

The mention of the Persia and Iraq Force - PAIFORCE - in the last issue of Ranger sparked a chord in Brigadier Fraser Scott's memory. Below he recalls his experience of the sound ranging troops in that short-lived campaign.

1st Survey Regiment RA arrived in Egypt at the end of 1942 and, in January 1943, was ordered to PAIFORCE (with me in it as a flash spotting troop commander). So we set off along the desert road through Transjordan (by the oil pipeline - I had seen the steel tubes for this being made in the Midlands in the thirties). We passed Habbaniya and reached Baghdad where we were camped near the Tigris with a bridge across to the city. Every morning we would load up ready to move only to be told that it had rained and we couldn't go (the roads weren't all tarmac surfaced). Every vehicle

carried four days of hard rations in case of rain. We would then unpack and play football before unleashing the men onto Baghdad. Eventually it dried out and RHQ and one battery went north towards Kirkuk, past Tuz Khurmatli (where Corps HQ was) to the Aqsu River where we set up a permanent camp by the road south of the river. The other battery went to Qum in Persia. The weather was cold (it even snowed), there were wonderful flowers including acres of red tulips. We were on the edge of the hills and, behind them to the east, you could see the snow-capped mountains in Persia. I don't remember any formation exercises, just me taking my troop into the hills, deploying a base and locating flashes I made by lighting 25-pounder Charge 3 bags in a metal tube. In March 1943 1st Survey went back ending up in Syria.

DO YOU USE e-MAIL?

Many of us now have computers and have discovered that e-mail is a really super way of keeping in touch with family and friends. It is simple quick and cheap. We are just users of the internet and don't need to understand its technical complexity and the dangerous world of viruses.

If we received a 'VIRUS WARNING' from a friend telling us to immediately unplug our keyboard and put it in a bucket of water because our hard disc was about to spin out of control and explode, I hope that we would all realise that it was just a silly hoax! However there are some rather nasty little hoaxes going the rounds which we might believe and when we are told that we must warn everybody in our address book we panic and obediently jam the internet by spreading our panic to others. The 'Teddy Bear' virus is one such message which is still circulating and tells us to dump part of the computer operating system into the waste basket thereby destroying the 'Java Debugger' programme (jdbmgr.exe) which we will probably never use anyway.

Here are some simple rules that will help us to protect ourselves:

- Invest in a good anti-virus programme and keep it up to date.
- Treat all e-mail with suspicion, especially that from an unknown sender. It may have an enticing title and invite us to open an attachment. Don't open it - Dump it.
- Don't propagate warnings about viruses without first checking if they are genuine.

And here is how to check if a virus alert is genuine:

- Log onto a search engine such as Google (<http://www.google.com>).
- Type in some keywords such as, 'Virus Teddy Bear' and click 'search'.
- You will get a list of sites that will tell you far more than you need to know! A quick read will confirm if you have been hoaxed or if you need to take action to protect your computer.

I use the internet for business and get attacked by viruses three or four times a year. So far my caution and anti-virus programme have protected me and I trust them to continue to do so.

Robert Dobbie

THE EARTH MOVED - THE MOD MAP LIBRARY RELOCATES

By Ron Shepcar: MOD Map Library Relocation Project Manager

A previous edition of The Ranger contained an article on the proposed relocation of the MOD Map Library. This article brings the story to its conclusion and with it, the realisation of the vision to site all the major elements of the Defence Geographic Centre (DGC) together at Feltham in Middlesex.

For those who missed the previous article, the Map Library, which moved to Tolworth, Surrey in 1950, fulfils the geographic needs of the MOD and other government departments. The Library's worldwide collection of current topographic mapping is the largest in Europe, containing around 700,000 different maps. Also held are 34,000 sets of reproduction material (Repmat) and 80,000 geographic documents including over 2,000 gazetteers.

The accommodation at Tolworth was long past its prime and the move to purpose built accommodation at Feltham has been eagerly awaited. The new building, named after Major General Malcolm Neynoe MacLeod, is sized to also house the DGC's Reprographics and Stores facilities. They too were very keen to leave their long-term makeshift home in Redman Building which is to be demolished and replaced by a new car park.

David Sullivan of Symonds was appointed by Defence Estates (DE) to manage the overall project and following an innovative DE-managed land deal (and the necessary MOD tendering procedures), the contract was awarded to Warings Contractors Ltd, as a design and build project, including all relocation arrangements. Warings' Site Manager, Richard Martin, marshaled the construction which began in January 2002 with the swift demolition of C Shed (which virtually fell down!) and some other smaller buildings

to clear the site.

Foundations and ground works were completed by the end of March and the massive steel frame was erected in just a matter of weeks. Construction of the external walls followed and in early July, the roof panels were fabricated on site (at eaves level!) and were soon fixed into place. External cladding began in August with the exterior more or less complete by the end of the year. Internal block work and all the heating, ventilation, plumbing and electrical services were installed from August to December. Interior finishing took place from November to the following February, with some minor delays, mostly due to manufacturers supply problems.

The first DGC asset to occupy MacLeod was the large format printing press, which began its move in December with dismantling, relocation, reassembly and recommissioning spread over several weeks. All print machines and the associated reproduction equipment, IT & staff moves were completed before the end of March.

The move of the Map Library, which represented a major logistical challenge, began in January 2003. Over one and a half million maps were shipped the 11 miles to Feltham over a period of fifty days. This involved storemen decanting maps from each drawer into specially made large format heavy-duty cardboard boxes, which were then stacked 12 high, strapped onto a pallet and securely wrapped.

Up to twenty pallets were transported by articulated lorry to Feltham each day. The contents of the boxes were then transferred into the new map presses the same afternoon or the following morning. That's an average of 30,000 maps moved every day, a sterling



Tolworth Map Store - Before

MacLeod Map Store - After

effort by all the DGC storemen and the North American Nexus removal team, who were mustered energetically by Lee Chapman, whose resolve to tackle all the unforeseen problems experienced, was key to the success of the move. The first major challenge arrived on the second day of the move. The only map presses to be relocated in large numbers were those which held the Repmat collection. Following the removal of the second lorry load, a fragment of suspected hazardous asbestos material was discovered. An unscheduled environmentally controlled operation had to be quickly implemented, to clean up the contaminated areas.

The removal schedule was swiftly reviewed and amended to switch attention elsewhere, with only minor delays experienced overall. The other major challenge was to ensure the new map presses were in place ready to receive the maps as they were relocated. This also required some changes to the relocation programme as the map press supplier's delivery and installation dates changed. However, the move wasn't adversely affected and was still completed on schedule, before the end of March.

As the move of the map collection took place over several months, the relocation of the offices and staff was also phased to ensure there would always be someone around to gain access to any part of the collection, on whichever site it resided. This also helped reduce the daily impact on the Nexra IT relocation team, who had to disconnect, relocate, reconnect and reconfigure all the computers, printers, plotters and servers in as short a time as possible, to minimise the disruption to each individual. Downtimes were usually kept to a day or so with contingency plans in place to ensure that computer access was available to all those with an urgent need.

The move to an open plan office environment required detailed office planning and although satisfactory solutions were eventually developed, in hindsight, it might have been a swifter process if the project had

employed a professional office planner. Other improvements gained on the substandard Tolworth accommodation include a large, very well equipped conference room and breakout areas adjacent to kitchen facilities in each of the four large open plan offices.

MacLeod Building was officially opened on 23rd May 2003, by 2nd PUS, Mr. Ian Andrews, in the presence of several members of General MacLeod's family and many DGC staff. Early impressions of the new accommodation are of a well-designed structure with plenty of flexibility for the future and a good standard of finish. The comfort cooling was very much appreciated during the long hot summer, especially by those used to a fierce summertime baking at Tolworth.

Well done to all those who worked hard to complete the building and the move itself on schedule, particularly as there was the small matter of a major operation to support in the middle of it! The relocation has already enhanced working relationships with the many users in DGC's production areas and an improved appreciation



MacLeod Print Hall April 2003

of the information contained within all the evolving geographic collections is now assured.

The Tolworth site was handed over to its new owners on 27th June and is currently earmarked for housing and a large supermarket.



MacLeod open plan office with roof lights May 2003

GPS TRACKS IRISH SHEEP

No, they aren't members of an illegal organisation - just sheep that are eating too much. A report on the GIS Development web site reads as follows: "Military satellites previously used to direct missiles to their targets have been drafted in to help stop sheep over-grazing in the west of Ireland. Sheep on a government farm have been fitted with transmitters to track their movements round the clock and try to find out why they graze on some areas but not others. The farm is laid out on a computer grid so that the global positioning satellite system (GPS) can track sheep movements to the nearest meter. The experimental farm in County Mayo is at the forefront of efforts to preserve the natural environment under threat from soil erosion and pollution. GPS has been able to open up the whole issue of why sheep concentrate in particular areas for grazing rather than others, and what part the weather plays. Five sheep have been fitted with radio collars and the others have been given fake collars so as not to feel left out. Preliminary findings suggest sheep frequent certain parts of a mountain because of family tradition, and can travel up to 1.6 km (one mile) a day."

It's nice to know that sheep have feelings of jealousy when they see their fellow sheep wearing collars, and that they have a "family tradition". Incidentally, Ranger is keen to discover the daftest application of GPS published in the open literature (including the www) - please send the editor the details should you discover another bizarre use of the technology.

First published in the RSPSoc Newsletter

LES MORGAN'S WALKATHON LANDS END TO JOHN O'GROATS

As you read this former field surveyor Les Morgan will be well over 600 miles into his training routine for his lifetime ambition to walk the length of the land for charity. The 67-year old 'grandadian' is no stranger to gruelling efforts to raise funds for worthy causes having in the past successfully run 11 marathons, two completed whilst pushing his young friend, Craig Bedford, who is confined to a wheel chair. Craig is keen to support Les and will be joining him for some of the forthcoming epic journey.

Les joined the Army as an apprentice tradesman at Harrogate, a decision that opened the door to a full and world-spanning career. He was with 19 Topographic Squadron in Iraq at the time of the overthrow of the monarchy and was incarcerated at Habbaniyah during the siege where he drew one of the really short straws to become a member of the rear party. After spells in Cyprus and Fernhurst he joined a Royal Navy Beach Survey Party but again chose the wrong straw - spending his time in South Wales rather than the Pacific. His career progressed with postings to the Gulf, Cyprus, Chepstow Barton Stacey, Northern Ireland and Germany. After leaving the service as a WO1, Les then enjoyed a second career with Twinings, the world-renowned tea company.

Support to charitable causes has been a constant thread through the ex-sapper's life for many years. As well as long distance running for charities, he was for many years the honorary treasurer of the Andover 'Save the Children' shop and was the initial treasurer of the Military Survey branch of the REA.

Les would appreciate support of any kind towards his 870-mile trek. Cash towards the three charities that he is supporting, Cancer Research UK, Leukaemia Research and Naomi House, the children's hospice not far from Barton Stacey, is of course the main aim but support to the walk itself would be very much appreciated. Details about the walk are at www.lesmorganswalkathon.org or can be obtained from the Fund Raising Committee at 2 Azalea Court, Andover, SP10 3PS. Donations can be sent to this committee or direct to NatWest bank account number 45511322 at sort code 60-01-17.



Twenty six miles later - Les Morgan with Craig Bedford after the Basingstoke Marathon



AN INTRODUCTION TO THE OPERATIONS OF NAVAL PARTY 1008

By Lt Cdr Jeremy Churcher RN, Commanding Officer (30Oct 02 - 23 Sep 03)

With the tasking focus for the majority of the Royal Navy's Survey Ships having shifted dramatically in recent years, from the routine conduct of hydrographic surveys in support of the Defence Survey Requirement to the Direct Support of ongoing Military Operations and Exercises, the two Naval Parties have become the bastion of core hydrographic skills within the Royal Navy. Naval Parties 1008 and 1016 both consist of small teams of Royal Navy Hydrographic Surveyors, embarked on merchant vessels, conducting routine hydrographic surveys in support of the Civil Hydrographic Programme, sponsored by the Maritime and Coastguard Agency (MCA).

Naval Party 1008 are currently embarked on *MV Marine Explorer*, a converted 2000 tonne deep-sea stern trawler, owned and operated by Eidesvik Shipping Ltd. The crew of the vessel remain responsible for its operation and the provision of all services whilst the embarked Naval Party provide the tasking and direction which drives the ship's programme, focused purely on the conduct of Hydrographic Instructions (HI) generated by the United Kingdom Hydrographic Office, in response to the requirements of the MCA.

The Naval Party traditionally embarks on the chartered vessel from early February through to early December and, notwithstanding the occasional equipment defect or the vagaries of the British weather, remains operational for the entire period, returning to port only once every two weeks to conduct a crew change. This high operational tempo is maintained by operating a crew rotation system similar to that now seen in most Royal Navy survey ships, with the naval personnel split into three four man watches, each watch spending 4 weeks onboard followed by two weeks off. The specialist equipment employed by the team is in line with the standard equipment employed by the Royal Navy's Survey Ships in recent years with the core tools being:

SIPS(NT) - The central processing system which integrates the various sensors and facilitates the processing and quality control of gathered data.

Echo Sounder 780 - Single beam Echo Sounder, supported by a heave compensator to subtract the effects of ship motion from the recorded depths.

Sonar 2094 - Towed sidescan sonar producing seabed imagery and ensuring full seabedinsonification.

MRDGPS - Commercial Differential GPS system providing accurate surface positioning.

Although the waters around the UK are considered to be reasonably well charted there remain many areas which are still not surveyed to modern standards, where 100% coverage of the seabed is ensured through a combination of sensors, as well as numerous areas such as the Dover Straits where the mobile nature of the seabed drives the requirement for routine re-surveys. Naval Party 1008 recently completed HI 799 - Approaches to the Bristol Channel, tasking that was first issued back in 1998. The area was completely exposed to the predominant south-westerly air stream and the Atlantic swell, a combination which brings surfers flocking to the beaches of north Devon and Cornwall but which makes surveying often uncomfortable and occasionally impossible.

The current survey, HI 1051 - Approaches to the Firth of Forth, is far less exposed and to date progress has not been hindered by the weather. The area became a priority as a consequence of the Donaldson Report, commissioned after the *MV Braer* grounding in the Orkneys, which designated it as a Marine Environment High Risk Area. The nature of the seabed has proved somewhat more diverse than that of the Bristol Channel, with a significant rock ridge bisecting the



MV Marine Explorer alongside in Leith - Scottish National Assembly Building in the background

area, and numerous depths significantly shoaler than those represented on the published chart. The change of location for the fortnightly crew rotation from Swansea to Edinburgh has also proved refreshing, with several people enjoying the ambience of the recent Fringe Festival.

Time does not stand still however and although the Naval Parties have been of value to the Royal Navy in recent years, providing an appointment where specialist officers and ratings alike have been able to focus purely on their core professional skills without the distraction of other General Service activities, their existence must continue to be validated against the broader needs of the service. Indeed with the remainder of the Royal Navy's Survey Ships being fitted with the latest generation of multibeam echo sounders and with crew rotation and contractor logistic support enabling the units to spend more time operational at sea, it ensures that a greater proportion of their time is likely to be spent on core hydrographic tasking. This in turn negates some of the value of the Naval Parties outlined above. It is essential that the

Naval Parties move forward to this new technology and with the current charter contracts due for renewal at the end of this season it is expected that this change will take place over the forthcoming winter lay-up. Notwithstanding this transition however, the pressures on manpower within the service may lead to a reappraisal of the long-term benefit the Parties provide to the service.

As already alluded to, the end of this season will see many changes and challenges for the Naval Party, as the current charter contract for *MV Marine Explorer* comes to an end. Contractual negotiations are ongoing with the lead authority within the Ministry of Defence being the Director of Naval Surveying, Oceanography and Meteorology however, there is a strong drive from the Maritime and Coastguard Agency to move the Naval Party onto a multibeam platform from the start of the 2004 season, a change that will require considerable training over the winter period and a complete rethink of the way business is done onboard.

NAVAL PARTY 1016

Inshore Survey - Hugging the Coast

By Lieutenant Commander Colin Thompson RN

Commanding Officer 2002-2003

In the middle ages, the Vikings were great sailors and voyagers. They were the scourge of Britain. When these fearless reapers set sail to rape and pillage our shores, they hugged the coast. They never ventured far from land for fear of the fog, and the danger of sailing away from land and across the Poison Sea. Without a shadow of a doubt, had the Maritime and Coastguard Agency (MCA) been around they would have had their hands full.

Sailing close inshore has it's own dangers, and with

today's deep draught vessels shallow water can be considered to extend some distance off shore around much of the UK. So, whereas the Vikings had no need for a dedicated inshore survey programme, the MCA most certainly does. That is why Naval Party 1016 is tasked with inshore survey operations.

On the 4th of February, Naval Party 1016 embarked onboard *MV Confidante*, a 'ship taken up from trade' (STUFT) vessel contracted to the Royal Navy to commence the 2003 inshore hydrographic survey season. All ten of the allotted routine re-surveys were rapidly completed whereupon surveys around Selsey Bill on the south coast of England were undertaken. In contrast the unit now finds itself working considerably further north along the littoral zone of the east coast of Scotland. This survey is in support of the government's commitments to modernising surveys in designated Marine Environment High Risk Areas as recommended after the *Braer* grounding in the Orkney Islands.

The Royal Navy has been tasked with the conduct of inshore shallow water surveys for many years now. For the last sixteen



NP1016 and MV Confidante crew



MV Proud Seahorse

this commitment has been satisfied by Naval Party 1016, latterly embarked in *Confidante* and prior to this in her predecessor *Proud Seahorse*. Before the use of contract vessels and Naval Parties, the Royal Navy operated it's own squadron of Inshore Survey Vessels such as the previous *HMS Echo*. *Echo* was bought on decommissioning by the Marine Society in 1985 and renamed *TS Earl of Romney*. Together, these three survey vessels have worked steadfastly to ensure the safety of the mariner in UK waters. When *Confidante* was based in Ramsgate earlier this year it was heartening during a visit by *Earl of Romney* to see all three vessels together, sound and continuing to serve the marine community well. All three were within a stone's throw of each other and this presented a striking impression of how the tools and practice of surveying have changed in recent years.



MV Confidante alongside at Eyemouth

When *Echo* and vessels like her first started the task of surveying, horizontal sextant angling and a great deal of skill, sweat and toil achieved positioning of the vessel. *Confidante* achieves positioning using Differential GPS (DGPS). These two systems, separated by centuries of technological advance achieve comparable precision! The real advance is in terms of distance from the shore that the new systems can be used and time. Horizontal sextant angling will give you a precise position, but it has a limited range, is very much subject to the weather, is skill dependant and is time consuming. DGPS gives the same precision but over a far greater area, is largely automated and very reliable, allowing the surveyor to achieve productivity undreamt of by the holder of the sextant. The Naval Party's measurement of depth is also due to take a quantum leap forward in capability at the start of the coming season, as the MCA are specifying that multibeam echo sounders are added to the Naval Party's armoury. When this happens the volume of data flooding into the ship will increase exponentially - our challenge then, is to ensure that standards of precision and reliability achieved by our forebears do not slide beneath this deluge of data.

So, in one harbour: a chronological history of shallow water surveying in UK waters - from Sextant to DGPS, and soon from primitive echo sounder to multibeam. With all this change, has anything remained constant? The answer to this is an unqualified yes. The people. After nearly two decades of operation Naval Party 1016 remains one of the Royal Navy's most efficient and productive platforms, an achievement due solely to the hard work and dedication of her crew both Royal Navy and civilian. Our working routines and practices are

both modern and efficient, and it comes as no surprise to see similar routines adopted by many of the Royal Navy's larger vessels to similar success.

Undoubtedly change will continue as a constant and welcome companion as surveying technology advances. As with our predecessors we certainly live in challenging and interesting times!

GEO PEOPLE



Captain Ian Turner OBE Royal Navy

**Assistant Director (Policy), Directorate of Naval Surveying,
Oceanography and Meteorology, MOD**

Born in Plymouth, I joined the Royal Navy as a Seaman Officer in 1973 at the age of 17. After a year of initial training I went on to Southampton University and left three years later with a degree in Geography and, more importantly, a very understanding wife, as the next 20 years were to be spent mostly in sea appointments with many lengthy overseas deployments. My first full appointment was as Navigation and Gunnery Officer in *HMS Sheraton*, based in Rosyth and operating mostly around the UK. I was always impressed with the construction of charts and the art of navigation and decided to test my interest in hydrographic surveying by arranging time onboard

HMS Endurance and *Hecla*. This fired my enthusiasm for the sub-specialisation and set the direction for my future career.

Early appointments were as Navigating Officer in *HMS Fox* and *Hecla* between 1981 and 1983, conducting surveys around the coast of UK and in the Atlantic from the Arctic to the Tropics. After more professional and staff training during 1984 I took command of the Royal Navy's smallest surveying vessel *HMS Gleaner*. This was followed by two years as Operations Officer in *HMS Hecate* conducting geophysical surveying in the Atlantic. In 1988 my first shore appointment came as Staff Operations Officer to the surveying squadron based in Devonport. This was followed by a year in command of Naval Party 1008, embarked onboard *MV British Enterprise IV*. After the RN Staff Course at the Royal Naval College Greenwich in 1991 I was promoted to Commander and appointed for 2 years in command of *HMS Roebuck*.

Moving ashore in 1994 I took command of the Royal Naval Hydrographic School until 1996, during which time I began to forge stronger links with the Geo community based at Hermitage. After a short academic study period I returned to sea in command of *HMS Herald* for a final two years of surveying operations at sea which included deployments to the Far East, Gulf and Mediterranean. After all that fun, the inevitable reward was a MOD desk job on the Commitments Staff in the Balkans Directorate. Not much surveying here, but plenty of exposure to joint and multi-national operations, particularly during the Kosovo Crisis. This was followed by an appointment to the International Military Staff at NATO HQ in Brussels as Staff Officer for Conventional Arms Control and Regional Security in Europe, prior to being promoted Captain and returning to MOD in my present post.

So now I am very much back into the business of hydrography, but with a much wider brief for policy matters concerning oceanography and meteorology as well. This will soon be further broadened with the formation of a Joint Directorate which will oversee the provision of seamless and coherent environmental information in support of future joint plans and operations. Hobbies include painting and music, but most of all I enjoy every moment of family life with my wife Sue and our three children, living at Kingston Upon Thames (yes, those quarters at The Keep are still there!).

INVOLVEMENT WITH D-DAY

The surveying, mapping and charting that was carried to plan and implement Operation OVERLORD is not well known and is not recorded in an easily-read form in one single publication. The summer 2004 issue will attempt in a small way to remedy this situation by publishing short articles covering many aspects of the hydrographic and geographic efforts. The edition would be greatly enhanced by first-hand accounts and to that end the editor is very interested in hearing from anyone who had an involvement with providing the hydrographic or geographic support to D-Day. Contact details are on page 2.



**Lieutenant Colonel James Prain RE MA MSc FRICS FRIN
FRGS MCMi**

**SO1 Exploitation, DEC ISTAR
Ministry of Defence**

Lieutenant Colonel James Prain was educated at Culford School in Suffolk and at Welbeck College. He entered the Royal Military Academy Sandhurst in 1974 and was commissioned into the Royal Engineers. Having completed his young officer training at the Royal School of Military Engineering, he was posted to 21 Engineer Regiment at Nienburg in Germany where he played his part in keeping the Warsaw Pact at bay.

In 1976 James went up to Cambridge University to read the Engineering Tripos. During his first summer vacation he was attached to 33 Field Squadron based in Northern Ireland and during his second he undertook a back-packing tour of Australia. From Cambridge he was posted to 36 Engineer Regiment at Maidstone. During this tour he was selected to join the UK contingent of the Commonwealth Ceasefire Monitoring Force sent to oversee peaceful and fair elections in Rhodesia.

In 1981 James joined the Army Survey Course at the School of Military Survey thereby following his father and great uncle into Military Survey. On completing the course, he undertook a six-month attachment to the Royal Australian Survey Corps before being posted to the Mapping and Charting Establishment at Feltham. (His grandfather had been adjutant of Feltham Vehicle Depot in the 1930s). Whilst there he was detached to undertake quality assurance work in Qatar and also became an Associate Member of the Royal Institution of Chartered Surveyors (RICS). During this tour James married Judith. In 1984 he was posted to 14 Topographic Squadron in Ratingen, Germany serving as Reproduction Troop Commander and then Second-in-Command. He returned to UK with two young children, Alexander and Catharine, to undertake an MSc Degree in Engineering Surveying and Space Geodesy at Nottingham University. In 1988 it was back to Feltham with the rank of Major to join the Systems and Techniques Unit to work with the PETROS project.

In 1990 James became Senior Instructor in the Field Survey Department at the School of Military Survey. The development of GPS, in particular the hand held receiver, together with the resurgent interest in desert navigation characterised the tour. He was elected a Fellow of the RICS in 1993. His next appointment was to Geographic Branch, HQ BAOR as it was in transition to HQ UKSC(G). In 1994 he received the Field Survey Association Prize for his contribution to land navigation. He moved to HQ Land Command in 1995 in time to be promoted to Lieutenant Colonel and was immediately sent to Zagreb, Croatia, as the UN Chief Geographic Officer for the Balkans. The tour saw the fall of the safe havens, the escalation of NATO air support and the formation of the more offensive UK/French Rapid Reaction Force, and the preparation for NATO involvement.

James returned to the School of Military Survey as Chief Instructor. His tour saw the School being granted the Royal Accolade and culminated in a visit by Her Majesty The Queen. In 1998 he returned to Feltham to become the SO1 Communication and Information Systems Strategy in the Directorate of Geographic Systems. On 1 April 2000 he became the head of corporate planning for newly launched Defence Geographic and Imagery Intelligence Agency (DGIA). In August 2002 he was posted into the Equipment Capability area within the central MOD staff.

James Prain has been active on the Council of the Geomatics Division of the RICS and on the Council of the Defence Surveyors Association. He is a liveryman of the Worshipful Company of Scientific Instrument Makers and in 2003 was elected Fellow of the Royal Institute of Navigation.



Jonathan Shears

**Senior Defence Consultant
Infoterra Defence**

Jonathan cut his mapping teeth in what was formerly known as the MOD Map Research & Library Group, based in Tolworth, Surrey. Working in a library wasn't exactly how he imagined starting his career after University, but with several million maps around him at least it fed his interest in geography. It was here that Jonathan first met Dave Fox, now CEO of Infoterra Ltd, when they both embarked on a pioneering remote sensing research project on the potential for using Landsat TM imagery to derive vegetation cover at 1:500,000 scale, for areas where source mapping was difficult - or illegal - to acquire. Although multi-spectral classification is

now performed at the touch of a single button, it was heady stuff in 1984 ... and so it bred a fledgling geomatic career.

When he had exhausted the career potential of the map card record system (PIR Section) at Tolworth, Jonathan graduated to the School of Military Survey in Hermitage in 1987 to do the Army Survey Course. As the only civilian, he was no stranger to short haircuts and BFT's and he even represented 42 Survey Engineer Group in the Corps hockey final. With an interest now firmly rooted in surveying and more than a passing knowledge of stereo restitution and the parallax equations, Jonathan was keen to pursue this on returning to duty at Feltham, where he joined the Military Survey Systems & Techniques Unit (STU) in 1988 on the PETROS team. To those of you familiar with acronyms, PETROS is ancient Greek for 'rock'. Dubbed Mk90 based on its delivery date of 1990, this new revolutionary digital mapping system did not achieve its intended Full Operating Capacity in 1990, but Jonathan had - and he handed in his resignation.

To pursue the green pastures of sales and marketing, he joined GEMS of Cambridge, but only briefly, because they went into receivership six months later. Not the Midas touch Jonathan was looking for, but fortune favours the brave and GEMS became GEMS/Ramtek and he was duly taken on as remote sensing specialist. Frankly Ramtek needed more than a specialist, they needed a software product too, so in 1993 after two years in the wilderness Jonathan saw the light and joined ERDAS (UK) Ltd in Cambridge with John Allan.

It was at ERDAS (UK) that Jonathan managed to flex some photogrammetric muscle, as ERDAS launched its first foray into Digital Photogrammetry, with IMAGINE OrthoMAX - it was manna from heaven, via Atlanta, Georgia. As employee #3, Jonathan resisted the opportunity to move to Georgia as most of his predecessors had done, opting instead for the spires of Cambridge. He progressed through the small, yet substantial, ranks of ERDAS to become General Manager and subsequently EAME Regional Manager before the hand of Leica Geosystems arrived. At a time when global economies were crashing, it was deemed from HQ in the Swiss Alps that ERDAS (UK) had to go too. This was an opportunity to at last become a practising 'geomatician' - so on the basis that DERA had recently become QinetiQ and got away with it, Jonathan became an independent geomatic consultant forming GeomatiQ in 2002. GeomatiQ still exists, but Jonathan can be found these days consulting for Infoterra Defence.

GIFT AID

A MEANS OF MAKING MORE OF YOUR DSA SUBSCRIPTION

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

Using Gift Aid enables the Association to keep down the cost of subscribing to the DSA because it increases the value of member's subscriptions from £10.00 to £12.80 a year.

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 the Treasurer whose address appears in the Members List or e-mail him at treasurer@defencesurveyorsassociation.org

ORDNANCE SURVEY APPRENTICE TRADESMEN BOYS RE

ROYAL ENGINEERS

Apprentice Survey Tradesmen.

Apprentices in survey trades of the Royal Engineers are enlisted as boys between the ages of 15½ and 17 for training in Surveying with a view to eventual employment in the Ordnance Survey. Boys may be registered for vacancies from 15½ years of age. They are clothed, accommodated and fed under the conditions laid down in Army Regulations and while under training they will receive pay at the prescribed Army rates, which are :—

On enlistment or transfer, 1s. 5d. per day; subsequent increases according to service and proficiency up to 2s. 1d. per day. Boys who qualify are paid at tradesmen's rates from 17½ years of age.

Boys must obtain the permission of their parents or guardians to enlist in the Army for 8 years with the Colours and 4 years with the Army Reserve—service to count from 18 years of age. They will be trained in survey work and drawing and thereby enabled to qualify for the trade of Surveyor (Ordnance), a "Group A" trade, carrying the highest rate of Army Trade Pay.

Education is continued to Matriculation standard and Courses are arranged at Universities for selected boys. Personnel of the Survey Branch of the Royal Engineers are eligible for promotion to Non-commissioned, Warrant and Commissioned Ranks.

It will be appreciated that it is not possible to guarantee what the situation will be at the end of the war period but the technical training and education given to the boys will place them in a favourable position to take advantage of available opportunities.

Before the outbreak of war personnel of the Survey Branches of the Royal Engineers normally served with the Ordnance Survey for the whole of their Army Service and on its completion were able to join the permanent civilian staff of that Department. There were frequent opportunities of volunteering for periods of service in the Colonies as surveyors.

The rates of pay of the Ordnance Survey permanent civilian staff rise to £230 per annum exclusive of any war bonus for Class II and, on promotion to Class I, to £340 per annum exclusive of any war bonus. There are also supervisory grades, receiving higher rates, ranging up to £600 per annum.

This civilian service is pensionable, so that on retirement at 60 years of age there would be, in addition to any military pension, a cash gratuity and a civil pension based on length of pensionable service as a civilian and the rate of pay on retirement.

Applications to :—
Officer Commanding,
Ordnance Survey R.E. Boys,
BRYN-HOWEL, near Trevor,
Wrexham, Denbighshire.

S.T.C.-R.E. P9 45 8/43



Grand Marine Hotel Barton on Sea 1941. Well known military surveyor Bob Eade is second on the left.

On the night of the 30th of November 1940 incendiary and high explosive bombs showered down onto the buildings in Southampton that housed the Ordnance Survey, an event repeated the following night. The destruction was massive and among the precious items lost was the original Ramsden 3-foot theodolite which was said to have melted in the intense heat. Lieutenant Jack Keleher and Boy NS Thompson were awarded the George Medal for conspicuous bravery and devotion to duty during that awful night. However, this action by the Luftwaffe indirectly led to the formation of a unique training establishment, the Ordnance Survey Apprentice Tradesmen Boys RE, also known colloquially as the RE Apprentice Tradesmen (Survey) or 'RATS'.

It had long been mooted that there should be a military version of the Ordnance Survey's "Scheme A" apprenticeship which trained 16-year old boys in basic 'map construction'. The 'diaspora' caused by the comprehensive destruction of the Southampton offices provided the impetus to set up such a unit. The now Acting-Captain Keleher GM RE was tasked with the formation of the unit and remained as its Commanding Officer until mid-1945 when Captain George Whally RE took over.

The first dozen or so students were mainly buglers and were housed in the White House Hotel at Milford-on-Sea on the south coast near Bournemouth. Active recruitment, principally in the Southampton area and from the Duke of York's Military School at Dover, rapidly increased numbers and so larger premises were needed. These were found at The Grand Marine Hotel at nearby Barton-on-Sea where the school stayed until April 1943 when it moved to the small stately home of Bryn Howell near Ruabon in north Wales. This was an eminently sensible location as not only was it deep in peaceful rural Wales but it was also very near to the Survey Training Centre RE (STC RE) that was based in Wynnstay Hall in Ruabon itself.

In December 1945 the STC moved into the grounds of Longleat House and the OS Boys followed in May 1946 to be absorbed into the STC as "A/T Company". However, this arrangement was not to last for long as in 1948 the boy soldiers moved to Taunton to become part of the Army Apprentice School although within a short space of time Survey training of apprentices was moved to the Army Apprentice School at Harrogate.

In retrospect ex-RATS, as they fondly refer to themselves, consider that it was not a bad life. The boys were issued with two sets of service dress, one 'working' and the other for 'best'. These were of the old pattern which buttoned uncomfortably high up in the neck and were made of thick 'itchy' serge. Denims were the attire for a multitude of tasks, including 'jankers' the usual punishment for minor misdemeanours, and were also worn when off-duty but not going out of camp. PT kit doubled up as nightwear - pyjamas, let alone sheets and pillow cases, were unheard of luxuries for ORs in those days and only two blankets could be a bit cool in the north Welsh winter. Discipline was fairly strict, to be scruffy was a major sin, but was fairly applied by people such as Company Sergeant Major (later Lieutenant Colonel) Jock Robertson who devised his own system of 'punishments to fit the crime'.

The first three months were spent on a 'Drawing and Lettering Course' where they learned how to write in Sloping Egyptian - the font deemed suitable for mapping purposes. Upon completion of that course the boys graduated to a cadastral survey course to master the use of chains, tapes and other contemporary surveying tools. Then came either a Surveyor Topographical Course, which was plane tabling, or a Surveyor Trigonometrical Course each of which lasted about 9-12 months. Draughtsman Topographical, which included graphical air survey methods, and print trades were included latterly as trade options. In addition to the technical syllabus there was a full programme of academic, military and physical training such that most of the waking hours from Monday to Saturday were 'usefully' filled. Sundays were taken up largely by church parade which included marching off up a mini-mountain to the church itself. The young men were encouraged to play a lot of sport and the unit produced a gymnastics display team of such a high standard that it performed at local fairs that were held to raise funds for the war effort.

Academic training was considered to be of such importance that the unit had its own 'schoolmaster', a former public school teacher Sergeant, later WO2, Stone. He was a much respected tutor who was tasked with getting the boys through their Army Certificate of Education 1st Class and, for those deemed capable, chosen subjects for the 'Special Certificate'.

RATS only existed for seven years and never catered for large numbers but from its ranks emerged many who enjoyed very successful careers either in Military Survey or in commercial life. The bonds of friendship born in the austere environment of a 1940s military institution have survived into the 21st Century with bi-annual reunions held at Bryn Howell itself. Some 70 or so former OS apprentice tradesmen boys are still in contact with each other and at least 20 manage to attend the dinners. Among the diners is Ian Keleher, son of the founding CO and a proud ex-RAT.

This article was written by the Editor based upon the reminiscences of Ian Keleher and other ex-RATS, supported by facts from the 'History of the School of Military Survey' published in 1980 and 'Ordnance Survey' by Owen and Pilbeam.



Bryn Howell home of the Survey Boys.



OS RE Boys Feb 44 Gymnastics Team February 1944.

HYDRO'S FIRST REPLENISHMENT AT SEA

By Captain RJ Campbell OBE Royal Navy

The cover picture of the summer issue of *Ranger* showed what purported to be the first ever Replenishment at Sea (RAS) of a hydrographic ship when the newly commissioned *HMS Echo* took on board supplies from *RFA Wave Ruler*. This elicited a swift response from DSA member Captain Richard Campbell. The following is the text of Captain Campbell's letter detailing what may well be the first RAS of a hydrographic ship - unless, of course, you know otherwise!

My reason for writing to you concerns the photograph of *RFA Wave Ruler* and *HMS Echo* on the cover which shows what is far from being the "first ever RAS of a Hydrographic Vessel".

Replenishment at Sea (RAS) is divided into Solids and Liquids and the latter used to be divided again into Abeam and Astern. Your photograph shows RAS, (I presume) liquids, abeam. This was carried out by *HMS Hydra* and *RFA Olmeda* in the South Atlantic, during the Falkland Islands War, 2 June 1982. The Hospital Ship *Uganda* also refuelled at the same time. I was in

command of *Hydra* and we had to go alongside to receive the hoses (fuel and fresh water) in the dark, with *Uganda* joining at first light. We had problems with the speed as we could not do more than 14 knots and the operation was carried out at 12. The result was that we had considerable difficulty keeping station and, since *Olmeda* had *Uganda* on her port side, she was unable to help us. In the end, just before we were due to slip, the hoses were parted. I enclose a photograph which does not do justice to the swell but otherwise it was calm with only a light wind.

I also remember *HMS Dabrymple* embarked 52 depth charges from (I think) *HMS Forth*, on the way to the landings at Port Said in November 1956 - RAS, solids, abeam. In the Far East *HMS Dampier* took fuel from an RFA by the stern method in the late 1960s.

I have no doubt RAS, in most of its forms, has been carried out frequently during work-up and very probably in earnest by other hydrographic vessels. I expect you will receive letters from other retired members!



HYDRO REPLENISHMENT AT SEA

Response from Commander Steve Malcolm RN

Following my article in the last edition of *Ranger*, Captain Campbell has pointed out above that *Echo* and *Wave Ruler* was not the first Replenishment at Sea (RAS) for a survey vessel and, as can be seen from his letter, this occurred in the Falklands in 1982. To be more specific, this was the first RAS for the *Echo* Class survey ships and the new *Wave* Class Royal Fleet Auxiliaries and it is the first time survey ships have been designed with the ability to RAS alongside each other from build rather than over-the-stern RAS or by makeshift arrangement. This provides a common system designed to operate with auxiliaries, frigates, destroyers and capital ships from across NATO and many other nations.

ROMMEL FOXED BY FAKED MAP

By Brigadier RE Fryer OBE

This article was first published in Sapper Magazine in January 1961.

When Rommel made his first attack on the El Alamein line at Alam Halfa on the night of 30th-31st August 1942, he had a captured British "going" map in his possession. Rommel was known to have captured several of this type of map before and had placed great faith in them. Little did he realise that the use of this map would contribute to the first of a series of defeats that would end in the rout of his Afrika Korps.

The fuller story, which I will now tell, is one of the best strategic ruse stories to come out of the war, and the part the Royal Engineers took in the preparation of this phoney map is not generally known.

A "going" map is one that shows by the use of colours and symbols where movement of all vehicles, and especially armoured vehicles, is possible and where it is impossible. In a vast area like the Western Desert such maps, mostly on the quarter-inch scale, were made from information received from the Long Range Desert Group patrols, from air photographs, and every other possible source. They were usually prepared by the Intelligence branch of the Staff, but were printed by the Survey units of the Royal Engineers.

Perhaps some of you have never heard that the Royal Engineers produce maps. You will not be alone as quite a number of the General Staff seem never to have heard of the Survey Service either. I well remember in September 1939, when the British 1st Corps mobilised at Aldershot I was appointed as its first Assistant Director of Survey. My allotted place for mobilisation was in the lavatory of the Prince Consort Library at Aldershot. I am sure Survey was looked upon then as one of the odds and sods of the Army and classified with Graves, Postal, NAAFI, Provost, and such like. Useful, perhaps, but a damned nuisance, and anyway, what was there to survey?

However, to return to the false "going" map. I must now put you into the picture about the military situation before the battle of Alam Halfa.

The Afrika Korps with Rommel as its leader had just pushed the British back to the El Alamein position. This was only about 60 miles from Alexandria, and

Rommel had told his Korps that with one more push they would be through into Egypt and the Nile Delta.

British morale was at a low ebb. Secret papers had been burnt in Cairo, on what came to be known as Ash Wednesday, and our enemies within the city were getting ready to welcome the Germans and Italians.

But - and it is a very big but - great changes were taking place in the higher command. General Alexander became Commander-in-Chief and on 13th August 1942,



The camp at Tura and the entrances to the caves where 512 Field Survey Company produced the faked map.

General Montgomery took over command of the Eighth Army in the Western Desert. Within a day or two General Horrocks, whom you all know from seeing on TV, was transferred from his command of the 9th Armoured Division in Northumberland to join General Montgomery in the desert to command 13th Corps.

The effect was really electrifying. I was Deputy Director of Survey at GHQ at this time and I sensed at once a change of outlook. When a little later on I visited our Directorate and RE Survey units in Eighth Army in the desert I felt immediately the upsurge of morale. Most people had only vaguely heard of General Montgomery and then only through stories - especially the one about making old Colonels and Generals go out for run.

This increase of morale at this moment could not possibly have been more valuable. It was known that Rommel was at the top of his form and that he was about to attack us with the avowed object of rolling up the Eighth Army and driving into Egypt and the Nile Delta.

Our line at El Alamein was admittedly a strong one. It was 35 miles long with the two ends firmly based, the right flank on the sea and the left on the Quattara Depression. This depression was impassable to tanks and vehicles. Every indication from Intelligence sources pointed to the fact that Rommel would attack us in the south and try to roll up the left flank of the Eighth Army.

Then it was that General de Guingand, General Montgomery's Chief of Staff of Eighth Army, had the cunning idea of making a "going" map which would link up with the maps already in German hands and then to falsify a particular area to suit Eighth Army plans.

The area he selected was south of the Alam Halfa ridge. Due south of the highest point (132ft) of this ridge was an area of very soft sand. Eighth Army were certain that Rommel must make for this ridge and if the map showed this known bad area as good going for vehicles, Rommel might be tempted to send his tanks round that way.

This was what was done. The actual tracings for the false map were prepared in the Intelligence branch of the Staff. The RE unit that carried out the work as the 512 Field Survey Coy located with all its printing machines at Tura Caves, about 6 miles south of Cairo.

The plan was naturally a very hush hush one, and "officer only" if possible, and as few as possible at that. 512 Coy RE at that time had an Intelligence officer by the name of Gentil attached to them. He is a New Zealander and is now working in the AA office in Auckland, New Zealand. It was he who brought the finished traces of the false "going" to Tura Caves.

Here plates were made and the colours were printed on the quarter-inch base map by Captain Murdoch RE, a printer by trade who now runs his own firm in Glasgow. He remembers the job because he had trouble with the machine, but he eventually finished in the early hours of the morning. I was with him at the time and I remember putting the serial numbers on the maps as is always done with "secret" copies. The finished map looked like any other "going" map, but in the southern area it was completely phoney. Having selected 5 or 6 copies at random I took them to Cairo and gave them to the General Staff.

What became of them is recorded in many books, including Sir Winston Churchill's "The Hinge of Fate". A copy was "planted" on the Germans. A fake blowing

up of one of our scout cars was staged in the minefield in the southern area. It is now known that the Germans found the map. They record the fact in considerable detail in a book called "Foxes of the Desert", by Paul Carell, translated by Mervyn Savill. They say "it was well printed by the first-class British map-making studios". I'm sure that Jock Muroch will be pleased with that compliment! Further, the Germans say "it bore serial and code numbers and it seemed genuine enough, in fact it was just what Rommel wanted as he did not know the "going" in this part of the British front. The open sesame to the key point of the British position, the Alam Halfa height, was as good as in our hands".

What actually happened in the battle has been told many times, but perhaps most vividly by General Horrocks in his article in the Sunday Times of 20th October 1957. The German attack went very much as General Montgomery said it would. Rommel's tanks were bogged down in the soft sand we had shown as good going on the map and they were shot up and heavily bombed by the RAF. Rommel's petrol consumption was increased threefold in trying to get out of the sand, and he was known to be very short of fuel. In six days the battle was over and Rommel withdrew beaten. After General Horrocks' article in the Sunday Times in 1957, I wrote to him and asked him if he had any fresh evidence that our map had really been captured and used by the Germans. This is what he says: "When General von Thoma was captured during Alamein (two months later) he spent the first night at General Montgomery's Camp. Over dinner he said that before Alam Halfa they had captured a map 'which proved very helpful' (sic). I think this must be so because no one in his senses would choose a centre line through the Rajil Depression" shown falsely on our map as good going).

The Germans in their latest book say that our map was the basis for the plans of attack and the prototype for the German route maps and that the faked map had an important influence on the course of the Alam Halfa battle.

And what did General Montgomery have to say after the battle? In his book "El Alamein to the River Sangro" he says: "It was a vital action, because had we lost it, we might well have lost Egypt. The victory had a profound effect on the Eighth Army. The morale of the soldiers became outstanding, their confidence in the higher command was re-established, and they entered into the preparations for the decisive battle that was to come with tremendous enthusiasm".

The importance of the RE work at the time was certainly not realised. It was not particularly spectacular, but to use the words of General Horrocks, "it bore wonderful fruit".

SURVEY LEADERS WITH THE BRITISH SCHOOLS EXPLORING SOCIETY

By Roy Wood - Chairman BSES



The obituary to Tony Bomford in this issue of Ranger mentions his involvement as a leader on expeditions run by the British Schools Exploring Society (BSES) in the 1950s. Our Editor knew that Tony was by no means the only Military Surveyor

to have been a BSES leader and, as he doesn't miss a trick on these things, he tasked me, as the current Chairman of BSES, with a some research which may stir a few memories.

For those who have not come across the organisation before, BSES was founded in 1932 by the late Surgeon Commander G Murray Levick who had been a member of Scott's 1910 Antarctic Expedition. In that first year Murray-Levick took eight boys to Finland and, since then, the Society has achieved charitable status and has developed into a major provider of challenging expeditions for 16 to 20 year olds. Until the 1980s this meant six weeks in arctic conditions in the more remote parts of Iceland, Greenland, Scandinavia, Alaska, Canada etc. However, recent expeditions have ranged as far as Australia, Africa, South America, the Himalayas and the Tien Shan Mountains in Kyrgyzstan. Having put just one group into the field each year until the mid 1980s the annual total is now up to 200 sixth formers who are usually divided between three summer expeditions and a longer one aimed at those taking gap years.

As well as the physical challenges of mountains, glaciers and the like, BSES has a strong tradition of scientific field work involving geology, glaciology, ornithology or whatever is appropriate for the area. A large scale map of the area is, of course, essential as a base for such studies and, as even a reasonable 1:50,000 of the remote areas chosen tends to be quite a luxury, survey work and mapping have been an important part of the expeditions. Until recently the fieldwork tended to depend on the trusty plane table which provided a robust and easily understood tool for the purpose. However as with most field survey tasks, GPS has now taken centre stage.

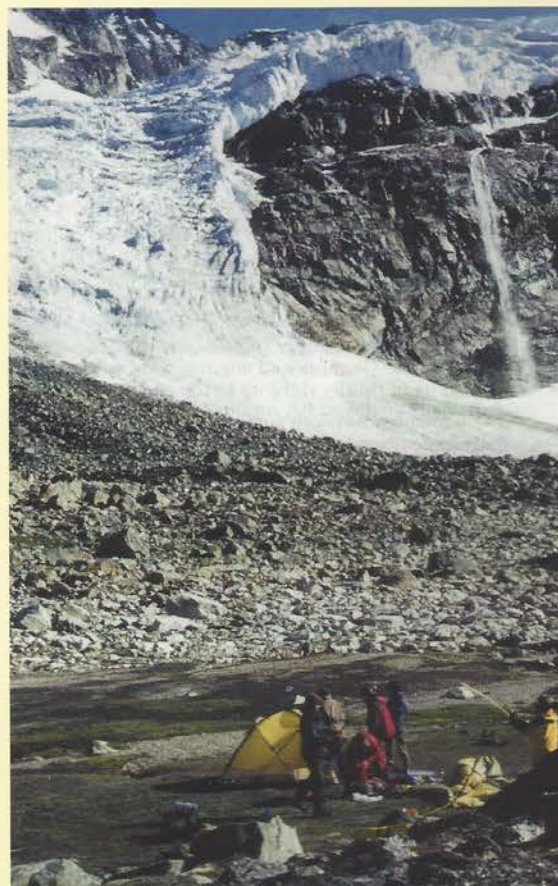
The need for competent survey leaders to oversee this work was appreciated early on and where better to look for suitable candidates than the Armed Forces. I would have liked to put Military Survey there but I have to record that the first survey leader in 1933 and then in 1937 was a Gunner, Captain C A Carkeet-James. However, for whatever reason (we do not have a copy of his map) our records indicate that almost all subsequent survey leaders from the Forces have come from Military Survey.

Lieutenant A G Bomford went to Northern Quebec in 1948 followed by Captain George Hardy in Northern Norway the following year.

Captain Bomford was back again running the survey in '51 before promotion - in BSES if not the Army - to Chief Leader of the '57 expedition to Finnish Lapland. However, he did not enjoy a monopoly and other names from those early years include Denis Rushworth in '53, Peter Whitestone in '60 and Sam Sowton in '61 while Peter Savage managed some pre-Army Survey Course training in Sweden in '62. Starting with Simon Fraser and Mike Batterham in '64 and '65 respectively, it then became fairly standard practice for an officer finishing the Army Survey Course at Hermitage to join the BSES expedition and this happy state of affairs continued until the mid 1970s.



Camp at dusk



Camp near the head of Tasermuit Fjord during the 1997 expedition to Greenland



Towing pulks across the snow

However, when it came to the 1977 expedition there was a problem. No officer was available and I happened to be the Major at the Survey la posting desk with the task of passing this message to BSES. Then

pressure was brought to bear to ensure that a survey leader was found and lateral thinking - or was it desperation - led me to suggest an experienced Field Survey Technician NCO. This caused something of an explosion from BSES. Did I realise, I was asked, what I was suggesting; the survey leader was always a commissioned officer. Well to cut a long story short, Corporal Phil Maye was a survey leader in Iceland that year and he received a glowing report on his efforts.

Thereafter there was rather more flexibility in the choice of survey leaders and the list runs through to the late 1980s with a mix of officers and NCOs. Since then, however, the demands of operations and a rather more hectic pace of life have clearly made it difficult to meet requests from BSES. The list of military leaders in our records ends in 1990 with Major Glyn Jones who we believe was a Gunner thus bringing us through a full circle back to that Royal Artillery beginning. There have also been civilian survey leaders, particularly in recent years, and one of these deserves a special mention. Alastair Macdonald, previously of Overseas Surveys, Military Survey at Feltham and Ordnance Survey, was tempted out of retirement as survey leader on the 2001 expedition in Svalbard.

As well as providing leaders in the field, Military Survey played a major part in completing the various expedition maps. The Army Apprentices College at Chepstow, the School of Military Survey at Hermitage and, I think, 42 Regiment at Barton Stacey were all involved at this stage over the years and their efforts were much appreciated by BSES.



1997 India expedition moving below the Kao Rong Range

Back to those leaders in the field. Some, although by no means all, were volunteers but all seem to have enjoyed the experience and to have made an excellent contribution to their expeditions. Most seemed to relish the rare opportunity to start with a blank sheet and create a map in those few short weeks. Starting with a dozen or so raw sixth formers who had little idea of how to read a map let alone what went into making one, training them in survey techniques and in how to live in a fairly harsh environment and then managing



Trekking to Chadra Tal (4270m) in 1997

the fieldwork proved an interesting and worthwhile task.

So why am I still involved in the Society? Both of my sons went on BSES expeditions (Alaska '85, Kashmir & Ladakh '88) and I was so impressed by the experience it gave them and the ethos of the organisation that I wanted to help ensure that future generations could also enjoy the benefits. An ex-officio seat on the BSES Council while I was Director General Military Survey provided the link and I then continued as a Member of the Council, serving as Treasurer for several years and now as Chairman. Having visited an expedition in the snow covered Drakensberg mountains in Lesotho this summer (where the survey work involved field checking a 30 year old DOS 1:50,000 map), I remain convinced that the Society provides an excellent mix of adventure and challenge for youngsters and leaders alike. I just wish I could join the gap year expedition which is currently in the field - a month each in Patagonia, The Falklands and South Georgia. There will be some tales to tell from that one.

The ex-officio seat on the BSES Council is now held by Commander Geographic Engineer Group and we hope that the links will remain as strong as ever in the future.

THE SHOCKING TALE OF A TOPOGRAPHER

By 'MapMaker'

In the mid 1960s I was fortunate to be posted to a Survey Squadron based in Singapore. One of this unit's primary tasks, besides drinking for Great Britain, was to produce a series of maps at a scale of 1:50,000 covering the local area, including the Malay Peninsular and the country of Borneo. In common with much of the Far East, most of Borneo was wall-to-wall steaming jungle containing vast, densely forested areas with trees up to 70 metres high. You can imagine the nightmare faced by the mapmakers when trying to survey points prior to the flying of the area by the RAF. However, the problem was often overcome by literally cutting the tops of four or five closely-growing trees, building a platform on the stumps, and then setting up a temporary station on the platform to establish position and markings.

The survey work was carried by sweating Army topographers from our Squadron whom not only had to overcome the very uncomfortable humid conditions, and vertigo to boot, but had to produce the necessary accurate observations both night and day. One of these gallant few was a likeable but gregarious character by the name of...(let's call him) Ollie. Corporal Ollie was a sharp cookie when it came to mathematics and surveying but had one unfortunate impediment - he had a terrible stutter. To get round hesitations in his conversation he got into habit of making a clicking sound before the offending word. For instance his evening greeting went something like..."Your round for next, (click) (click) (click), beer".

And so it was that the day came when it was Ollie's turn to occupy one of these platform stations and he was 'helicoptered' in complete with kit, food and a Malay soldier. (Oh dear - although it has nothing to do with this tale, to the more liberal-minded, the latter's job was to carry out the necessary everyday chores of cooking, etc). Having successfully completed the work, which on average took about three days, Ollie packed up the kit and radioed in to be taken off. Whilst waiting for the helicopter, which took about an hour, our hero lay down for a quick snooze when there was a short, but almighty, tropical thunderstorm.

Now the Gods were not pleased that Ollie had taken rest without obtaining permission from his Sergeant, resulting in a bolt of lightning striking the platform with great force. It destroyed the radio, the surveying equipment, most of Ollie's personal kit and then passed through his knee on its way to the ground 70 metres below. Luckily the helicopter arrived within minutes only to see a rather bemused soldier kneeling beside the prostrate form of his Corporal. Realising the gravity of the situation, the Pilot flew Ollie directly to the main hospital in Singapore where our topographer made a miraculous recovery over the ensuing weeks.

The only apparent after-effect was a large scar on the knee in question.

His recovery went down in the annals of medical history and was considered as one of those fine examples of the unique robustness of the human body. But like all these things in the Army, he had to go before a board of senior medical officers to be cleared before further duty. The great day was set for the interview and Ollie, in his best uniform, went before those revered gentlemen. On entering the room he was greeted by the Brigadier who said "Corporal, we are very, very glad to see that you have made a full and complete recovery" and then asked "Have you experienced any after-effects since the accident?" to which Ollie replied, "(click) (click) (click), No sir".



Winching a surveyor into the jungle.



RAF PR Pilot's view of Borneo.

A NEW PAINTING FOR THE GEOGRAPHIC ENGINEER GROUP

By Major Julian Brammer RE

The unveiling by the Commandant of the Royal School of Military Engineering, Brigadier Chris Sexton, at the inaugural Khyber Survey Party Dinner on 5 June 2001 of the new Mess Painting was the very satisfying conclusion to what had started as a series of coincidences. I was the incoming PMC of the Geographic Engineer Group Officers' Mess and by chance met Captain Hamish McCarthy who was about to deploy on operations in Afghanistan. He had been reading about the Corps' involvement in the Second Afghan War in the History of the Corps of Royal Engineers and had come across a story about a member of the Khyber Survey Party, a Captain Edward Leach RE, who had been awarded the Victoria Cross for an action during that campaign.

At the same time, one of the items discussed at the General Mess Committee Meeting was the possible commissioning of a new piece of mess silver. I wasn't particularly keen on this and thought that a painting might be a little different, particularly if it could double

up as a presentation piece for people leaving the service. A new Commander, Colonel Angus Cross, was taking over and I hoped that he might be keen on the idea.

I visited the Royal Engineers Museum, and discovered much more about Captain Leach, whom I learned, rose to the rank of General. The museum had a fund of information about General Leach, including correspondence from the Surveyor General of India recommending him for the Victoria Cross. They also had some of the maps he had drawn and I also discovered the Victoria Cross he had been awarded is the only one actually owned by the Corps, all the others on display being on loan.

Probably the most important thing now was to find the right artist. I was quite struck by a print which I saw in the Assistant Curator's office. The painting was by the military artist Peter Archer and showed a scene which looked to be of the same period as the Second Afghan



War. Peter, it turned out, had painted eight scenes depicting some of the Victoria Crosses won by members of the Royal Engineers. Having previously served in the Parachute Signals Squadron, I already knew the name Peter Archer as he had painted one of my favourite paintings, 'Go to it', which shows a Parachute Signaller during the battle at Pegasus Bridge.

After contacting the Imperial War Museum and the National Army Museum I eventually managed to get in touch with the artist. I borrowed a print of his work from the Corps Museum to show the mess an example of his style and then got the 'go ahead' from the mess members to ask him to do some sketches. I also had an application approved by the Royal Engineers Corps Fund for a grant to assist in paying for the painting. The mess members voted overwhelmingly for one of the sketches and four months later the painting was unveiled.

The aim now is to obtain replicas of General Leach's medals, commission a small portrait of him and, together with his citation, hang them adjacent to the painting to tell the story of his bravery. His citation is as follows:

" Captain Edward Pemberton Leach. For having in action with the Shinwarris near Maidanak, Afghanistan, on March 17th, 1879, when covering the retirement of the Survey Escort, who were carrying Lieut. Barclay, 45th Sikhs, mortally wounded, behaved with the utmost gallantry in charging, with some men of the 45th Sikhs, a very much larger number of the enemy. In this encounter Captain Leach killed two or three of the enemy himself, and he received a severe wound from an Afghan knife in the left arm. Capt. Leach's determination and gallantry in this affair, in attacking and driving back the enemy from the last position, saved the whole party from annihilation."

CAPTAIN EDWARD PEMBERTON LEACH

Extract from 'The Sapper VCs' by Gerald Napier

Edward Leach was the second son of Lieutenant Colonel Sir George Leach, KCB, who was himself a sapper officer for 23 years before joining the Civil Service for a distinguished second career, eventually as Secretary to the Board of Agriculture; his mother was the former Emily Leigh Pemberton of Sittingbourne. Edward was born in Londonderry, presumably his father's station at the time, and educated at Highgate School. After his courses at Woolwich and Chatham he was commissioned in April 1866 and left for India two years later. He served with the Bengal Engineers at Rawalpindi but quite soon joined the Public Works Department until being appointed to the Indian Survey in October 1871. It was in this capacity that he joined the 1871 Lushai expedition although in that he accompanied one of the companies of his own corps, the Bengal Sappers and Miners. This rather minor campaign was but slight preparation for the dramatic events in which he was to become involved in Afghanistan although the experience of working in a remote mountainous region must have been useful and earned him the thanks of the Secretary of State for India and also of the Government of India, together with the Frontier Medal and Clasp. In fact he was much closer to death in an incident on his next posting when he was surveying in central India under Thomas Holdich.* Leach, an indefatigable sportsman but a novice to tiger shooting, shot two during a hunt organised by Holdich. The first was a clean kill but the second went to ground in a bush where Leach discovered it by crawling in on his stomach. 'Just one extension of his great paw and he could have smashed Leach's head in like a nutshell.' There was nothing for it but to inch his rifle forward to the tiger's head and fire and he then 'literally blew his brains out whilst they were still staring into each other's eyes.'

When he arrived in Afghanistan in 1878, as a member of the Khyber Survey Party, he had only just returned from leave in England and started a new job as private Secretary to Sir James Caird, Famine Commissioner.

By March 1879 General Sir Sam Browne's column in the Khyber had reached Jalalabad but behind him lay his line of communication, still under harassment by the tribes bordering the route, the Afridis, whom we have already met in Reginald Hart's affair, and further west the Khugianis and the Shinwaris. An expedition was mounted against the latter in their area round Maidanak, about 14 miles to the south of the route between Jalalabad and Basawal. Leach was undertaking some survey of the area with the protection of an escort from the Guides Cavalry under Lieutenant Walter Hamilton and the 45th Sikhs and Lieutenant Barclay when they were attacked and decided to withdraw. '... for 2 miles everything went well, but when they got close to the plain the tribesmen closed round and a rush was made by a party of them. This Leach was able to check - emptying his revolver in their faces; but then Barclay was wounded, mortally as it turned out, and the enemy, seeing this, again closed up and prepared for another rush.' Taking up the story in Leach's own account:

"There was nothing for it now but the bayonet, and calling to the men nearest I went back to meet them, and held a little knoll which we had just left, hoping to give the men who were carrying Barclay time to push on. Three only closed with us, one was immediately bayoneted by a Sepoy, the other made a rush at me but missed and I floored him with the butt end of the rifle, and the third was either shot or bolted, the remainder, about 50 strong, kept up a shower of stones from 15 to 20 yards off, crouching behind the rocks and assisted by the men with guns from the ridges, who, I am thankful to say, made precious bad shooting though only from 60 to 80 yards from us.

For three or four minutes I simply stood there dodging the stones with an empty rifle in my hand, - of course you will say where was your revolver, but to re-load is a matter of a minute or so, and with these scoundrels so close up I had to keep my eyes open. However, one of the Sepoys realised the situation and brought me a handful of cartridges, I now had my turn and polished off three one after the other, the Sepoys behind me backed me up, and in two or three minutes the whole of this motley crew took to their heels and left us to get down in safety ..."

*Holdich became one of the leading surveyors in the Second Afghan War, operating largely in the southern sector. He made his name later participating in boundary commissions around the borders of Afghanistan in the 1880s and 1890s, retiring as Colonel Sir Thomas Holdich, KCMG, KCIE, CB in 1900.

The book 'The Sapper VCs' is available from RE Corps Enterprises, Brompton Barracks, Chatham, ME4 4UG

RECENT DSA VISITS

The Atlantic Wall and Fortress Europe

On the 18th October twelve members including partners left by coach to spend five days visiting Second World War sites along the Belgium and French coast which were constructed by the German Todt organisation as defence against possible allied invasion.

The group also visited the launch sites for the V1 and V2 weapons located in and around the Pas de Calais area as well as the little known V3 complex at Mimoyecques. This was concealed below ground and consisted of 25 "Super Guns" housed in five 127metre-long chambers that were built on the incline and aligned to direct 150mm missiles onto London. The intention was to destroy London by firing V3 missiles at the rate of 600 an hour around the clock. Just in the nick of time the RAF bombed the hell out of the site using Tallboy blockbusting bombs.

The party also visited a number of military cemeteries and memorials, in particular the site of the Nazi massacre of British troops at La Paradis and Wormont. They also visited part of the Atlantic Wall, which had been preserved just south of the town centre of Ostend, which date from the 1914/18 period but extended, improved and re equipped in 1941.

On the last day an interesting three hours was spent at La Coupole near St. Omer, which has the most wonderful display covering the history and development of rocket powered flight from its early days to putting men into space.

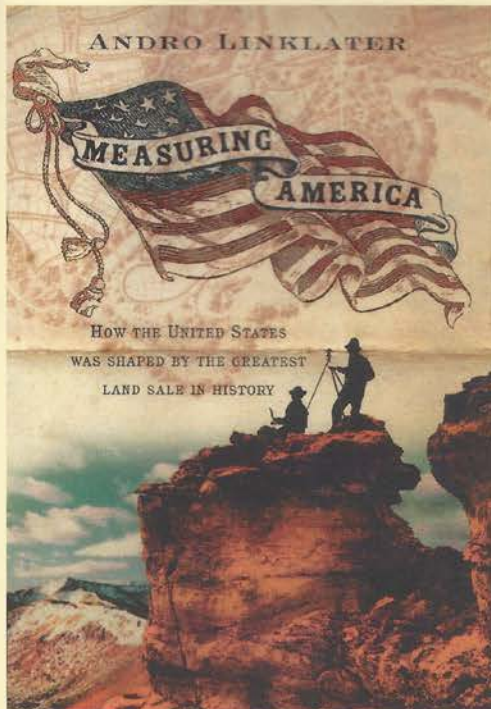
War Cabinet Room in London

On the 4th October 42 members, their partners and friends visited the newly extended War Cabinet Room located under the Treasury in Whitehall. Before the visit lunch was taken at the Albert Restaurant in Victoria Street where an excellent two course meal was provided in comfortable surrounding, with a parliamentary division bell to signal those who may have to dash off before the coffee.

The War Cabinet Rooms provided a talking guide, which went into great detail on all the important events of the Second World War, particularly those monumental decisions that turned the balance in favour of an allied victory. Most of our party took over two hours to complete the visit and probably could have taken longer if time had permitted.

David Wallis

BOOK REVIEWS



We are publishing two reviews in this issue and although neither is a newly published work as they both fall into that rare category - an easy read on a subject that is core to the interests of those in the geomatics profession - it is felt that it would be doing Ranger readers a favour if we brought them to their attention.

Measuring America - the Science, History, Politics and Geography that shaped the United States of America

By Andro Linklater

Every so often there comes along a book which explains a complex technical subject with such lucid insight that it deserves to go straight to the top of the best sellers' list. Such a book was Dava Sobell's *Longitude*. The next one should be Andro Linklater's *Measuring America*.

This book has been awhile coming but it has been worth waiting for. Andro Linklater's research and scholarship shines through in almost every page and readers will undoubtedly find this one of the year's most rewarding reads.

So what's it all about? *Measuring America* is to some extent a bit of a misnomer for this is the history of many things, all of which are intertwined. It is about weights and measures since Elizabethan times and their affect on the course of world economic history; the division and measurement of land and the

role of Gunter's Chain; the dispossession of the Indians and the very building of free enterprise America. Along the way Linklater gives us a revealing and perhaps unique insight into the fundamental role of land ownership in the US and how it has moulded and shaped the country and American people into what they are today. You will also discover how America, following its friendly relations with post-revolutionary France, almost went metric 200 years ago yet today still remains teetering (sometimes even regressing) on the brink of full change. They keep company on this issue of course with Britain and several other English-speaking countries. And how, even in today's new Europe, vestiges of the old human-based measurement units remain. Throughout the narrative Linklater vividly tells the story through the extraordinary deeds and egos of the characters involved.

The book was widely reviewed in the broadsheet press when it was first published last year. The Guardian said "... *Andro Linklater is too restless and intelligent a writer to take a predictable route through the subject for long. He begins not with America, but with the pioneering land surveys in England and Holland during the early 16th century.*" And: "*After learning all this, it is hard to see 'the greatest land sale in history', as Linklater's subtitle . . . calls it, as the essentially benign project presented in the book's earlier chapters. But over the last 50 pages, Measuring America shifts tone once more, into a celebration of the modern landscape the surveyors helped to create, and Linklater's writing is lyrical enough to make you forget the coercion and dispossession that made it all possible.*"

One cannot do better than endorse the text from the book's flysheet:

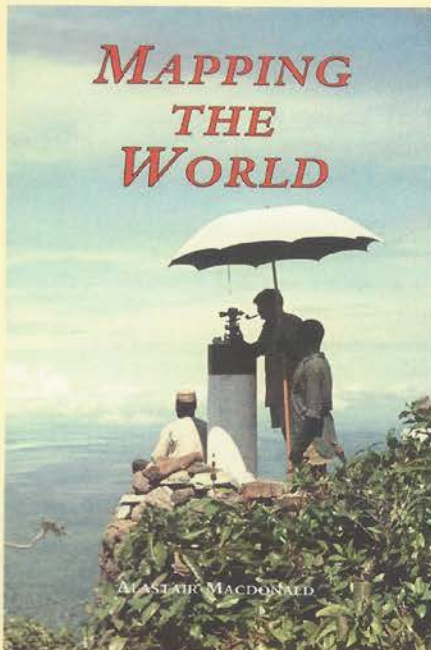
"Like most visitors to the United States," writes Andro Linklater, "it was the shape of the place that I first fell in love with - the spectacular grid of city blocks, the squared-off American Gothic farms, and the long straight section roads that caught the imagination of Jack Kerouac and every drive-movie director you can think of. It has always struck me as utterly astonishing that such a coherent pattern could have occurred across a three-thousand mile continent. How did it happen? Who shaped the gigantic land?"

Measuring America sets out the answer to these questions in lucid and graphic terms. In May 1785 Congress authorised the survey and sale of the land west of the Ohio River. In what proved to be the greatest property deal of all time, the US government eventually measured out and sold over a billion acres stretching out from Canada to Mexico. The grid it imposed upon the unmapped land determined the configuration of states, counties, farms and towns. Not only was the American landscape shaped forever - so was the American psyche.

The hero of this mighty enterprise was the wayward seventeenth-century British genius Edmund Gunter, whose twenty-two-yard chain imprinted its dimensions on every parcel of land in the United States. It was the means by which wilderness was turned into private property. *Measuring America* is a brilliant exploration of the colossal power of measurement.

Stephen Booth, Editor GW

Measuring America by Andro Linklater is published by Harper Collins in 310pp with hardback covers. ISBN 0 00 710887 7



Mapping the World

By Alastair Macdonald

'Macdonald' he said, pointing slightly below and to the left of Kilimanjaro, 'you will be joining our survey party somewhere about here. You will be helping to run a chain of triangulation down here' - a sweeping motion down to his right as far as the Indian Ocean - 'and then' - another sweeping motion up the coast - 'up towards Mombasa and Malindi.'

With these words Brigadier Martin Hotine, the inspirational and farsighted Director of Colonial Surveys, despatched the author on a near 40-year career in surveying and mapping. Throughout that time he was able to see at first hand how not only technology but events changed forever the way we survey and map the modern world.

Honed and conditioned by the hardships of the Second World War, a generation of young surveyors went in search of adventure in foreign lands. Times were tough. Some surveyors were away 'up country' for three years. The resolute leadership of survey party chiefs like Chris Bere: 'My policy has always been to get on with the job with as little delay as possible. . . to accept hardships cheerfully when they are necessary. If it is necessary to go without a tent or a comfortable bed I am quite ready to do so. . .'

Mapping the World is an insider's account of the contribution which Britain made through the Directorate of Overseas Surveys (DOS), and subsequently Ordnance Survey International, in assisting the development and transition from colonies to Commonwealth. Relying not only on his and others personal recollections, the author tells the story through contemporary documents such as field diaries and reports. The abundant human interest in the many anecdotes of a way of life that will not be seen again makes this a book as much for the general public as for the surveying fraternity.

This is a vivid and lucid account too of DOS's pioneering work in mapping from aerial photography, the first use of EDM, photo-mapping and four-colour printing. Neither is the politics forgotten as politicians and civil servants repeatedly tried to scale down DOS's activities.

Mapping the World was published in 1996 by HMSO in hardback, 226pp with 8 full colour maps and 32 black and white photographs. Limited stocks only.

To order these books

Both volumes are available at £14.95 + £2.95 p&p UK (£4.95 rest of the world) each from:

PV Publications, Suite L 17 Park Place, Stevenage, Herts SG1 1DU.

Credit card orders (Visa & Mastercard only) to: 01438 352617

OBITUARIES

JOHN WILLIAM (BILL) HUNTER 514 FIELD SURVEY COMPANY

On the morning of the 3rd May Bill's son Philip rang me to say that his father had had a fall in which he hit his head and from which he did not recover. This was very sad news for me as we had a great friendship of 63 years, starting when we met at the formation of 514 Field Survey Company at Aldershot in the spring of 1940.

Bill was born on his father's farm in Kirkby Thore near Penrith and after finishing his education at Appleby Grammar School was appointed as an assistant to the surveyor of the Gypsum Mines in the Cumbria area. In due course Bill progressed to become a Managing Director of British Gypsum.



Bill Hunter (on the right) at Sidi Barrani in the Western Desert July 1941

Bill and I joined the DSA on the occasion of the celebrations to mark the 250th Anniversary of Military Survey at Hermitage. However, with Bill living so far north it was really difficult for him to participate in our activities but he was constantly in touch with me asking all about our events.

Bill's wartime travels took him to France in 1940 and, after moving up into Belgium, he very soon returned to this country via the Mole at Dunkirk. The summer months were engaged in ranging coastal guns from Skegness to the Shetlands. In October that year he was on his way to the Middle East where he participated in the Ethiopian Campaign. The following two and a half years were spent in the Western Desert until November 1943 when he boarded a destroyer in Alexandria bound for Italy.

That winter, a bitterly cold one at that, was spent on the banks of the Sangro river held up by the Germans. In May the Company moved to the West Coast, camping near Cassino. Whilst here Vesuvius erupted. After the fall of Cassino the next encampment was at Assisi where in August Bill, and quite a number of the Company, were repatriated to England.

Bill was a lively and sociable person, a staunch patriot who will be remembered by all those who knew him.

Bill was buried in St Cuthbert Church on the 9th May in Carlisle.

Tom Phillips

ANTHONY GERALD BOMFORD



Tony Bomford, a former director of National Mapping Australia passed away in Canberra on 10 May 2003 aged 76. Tony was a surveyor, mapmaker and mathematician. He was well known for his love of travel, kayaking, stamp collecting, poetry, music, making woollen rugs to mathematical and geometric designs and carving polyhedrons from red box timber.

Born in India of English parents on 17 January 1927, Tony's early years were spent there before being sent to England for his education at Shrewsbury School. The challenge of little-known landscapes was kindled early in his career when he undertook several mapping projects for the British Schools Exploring Society on expeditions to northern Quebec, Iceland and Lapland.

The systems company innovating for a safer world

We are an international company operating across five continents with customers in 130 countries. We have the capability to develop, deliver and support advanced defence and aerospace systems in air, land, sea and space. Our 90,000 people generate annual sales of £12 billion through wholly owned and joint venture operations. We design, manufacture and support military aircraft, surface ships, submarines, radar, avionics, communications, electronics and guided weapon systems. Our technological heritage and range of key skills fuel our ability to develop the next generation of intelligent defence systems. It's all part of our total commitment to innovating for a safer world.

www.baesystems.com

BAE SYSTEMS