

THE RANGER

Journal of the Defence Surveyors' Association
Summer 2003

Volume 2 Number 7



RFA Wave Ruler and HMS Echo Replenish at Sea (RAS): the first ever RAS of a hydrographic vessel.



Registered Charity No. 221816

Sponsored by **BAE SYSTEMS**

Contents - Summer 2003

<i>Item</i>	<i>Page</i>
Editorial	2
The Defence Surveyors' Association	3
Bereavements	3
Chairman's Column	4
New Members	5
The DSA Story	5
Station X Revisited	6
The Future of RA Survey	6
Bringing Solutions to Life	7
Support to Operations in the Gulf Region	8
Soundings from the Devonport Flotilla	10
Mapping the War in Iraq	12
Mapping Iraq: A Recurring 20th Century Story	16
Where next in Database Enabled Capability	19
HM Ships Echo and Enterprise	23
HMS Roebuck's War	26
Geographic Support to the ACE Rapid Reaction Corps	28
The OC's Car	30
Geo People	31
Bringing Map Management into the 21st Century	33
Presentation of 8 Map & Air Chart Depot RE Unit Sign	36
The 1st Independent Sound Ranging Battery RA	37
The REA Military Survey Branch - Major Reunion	38
A Reconnaissance and Intelligence Gathering Trip to Angola	39
Surveying - Can we afford to forget the basics?	42
New Military Mapping Group	43
Notes on Survey for Trench Mortars in World War I: part 2	44
Archiving for The Future	47
Obituary	48

This edition of Ranger...

not surprisingly has a feel of an 'Iraq' issue about it as yet again military hydrographers and geographers have been called upon to focus their attention on the region. It may surprise some readers to find that military surveyors, or geographers as they have now become, have mapped the land of the Tigris and Euphrates on no less than six occasions during the last ninety years. This edition of Ranger carries articles describing each of these mapping tasks as well as the usual spread across the full range of DSA interests.

Not only has the last six months been a very busy time operationally but at the same time there have been major changes in the personalities at the top of both the Royal Navy Hydrographic Service and the DGIA. We therefore include pen pictures of both Captain David Lye, recently appointed as Hydrographer to the Navy and Air Commodore Martin Hallam, the new Chief Executive Officer of the DGIA. We wish them every success in steering the two organisations through the next few years.

The advances in equipment and technology are never ending and Ranger tries to give readers the opportunity, where possible, of keeping up with the latest acquisitions and trends. To that end we report on the commissioning of the Navy's newest vessel, HMS Echo, and take a look at the very latest ideas in spatial database technology. Of course, as always, we attempt to cater for those with an eye to how things were done in the past and, to that end, we publish the first of two articles by Stan Tress telling the story of sound ranging in the early days of the Second World War.

In the last issue we promised that we would now update members on the future of Royal Artillery Survey but unfortunately the long awaited paper on the subject has yet to be published. However, we are assured that the final decision will be made in time to include details in the winter issue.

Finally, on behalf of the Association, Ranger offers its congratulations to all those in the defence geomatics community who played a part in the recent conflict in the Gulf. By all accounts you provided support of the highest professional standard which contributed to the swift and successful conclusion of the operation. Well done.

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.

- 1 To keep abreast of current issues in the geomatics arena.
- 1 To recognise the most significant contributions to geomatics by serving personnel through the award of annual prizes.

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

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

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

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

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 lithographic 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 deaths of Lieutenant Commander Alan Ingham, whose obituary is published elsewhere in this issue, and Tony Bomford. It is hoped to publish an obituary of Tony Bomford in the next issue of Ranger.

CHAIRMAN'S COLUMN



At the time of writing I shall have almost completed my first year as your Chairman. In my initial remarks to the AGM at the RE HQ Mess at Chatham last June and in the Chairman's Column of the last edition of *Ranger* I said that my aim was to see the Association progress and build upon its successes of recent years. I believe this is happening in several ways.

In the last year we have had three really excellent visits that were very well attended, there are more planned for this year and next. The colourful and informative tour of the Tower of London preceded by lunch during a cruise on a Thames river boat in September was followed by a most memorable visit to the Queen's Cartographic Collection in the Royal Library at Windsor. We were indeed indebted to Dr Yolande Hodson for kindly arranging a display of maps and illustrations, many going back to the reign of George III, that were produced by cartographers in support of field commanders, including the Duke of Marlborough, whilst campaigning. Yolande's eloquent description of these great works, as we viewed them, was fascinating and reflected her considerable knowledge of them through the research she has been conducting for some years. Our third visit, in March this year, was a return by popular demand to the much-enhanced World War II code-breaking museum at Bletchley Park. Our party of 76, the largest yet, sat down to an excellent lunch in the Drawing Room of the Mansion before a spell binding talk by Brigadier Tim Pulverman, a Sapper who many will remember when serving, and a tour of the museum. An account of this visit is published in this issue of *Ranger*.

As a change of venue from military messes, a Cotswold hotel was picked for the AGM in June so that members could visit nearby Blenheim Palace and its beautiful grounds in their summer glory. Those who saw the historic maps at Windsor could associate them with the great tapestries here depicting in panoramic scenes the same land, in many cases, over which the Duke of Marlborough fought his campaigns in Europe. Our plan is to complete our year of DSA visits with a tour around the Cabinet War Rooms in Whitehall in October. The area open to the public has recently been extended. There will of course be the usual opportunity to catch up with news from friends over lunch in a nearby hostelry.

In addition to our own meetings and visits, the Council has been looking at extending our contacts with other professional bodies that have mutual interests. We already have a liaison with the Medmenham Club, whose members have been on a number of our visits. Navigators, arguably the most discerning users of our products, would seem to have much in common with us. As a result of contacts with the Solent Branch of the Royal Institute of Navigation (RIN) we were invited to attend a joint meeting of the RIN and the RICS at the Ordnance Survey HQ in Southampton in February this year to hear about the latest developments and future plans for several Global Positioning/Navigation Systems including those of the USA, Russia and Europe. Colin Beatty FRIN gave an interesting and revealing talk that was certainly relevant and worthwhile for surveyors. Several of our members attended and enjoyed the evening. The Solent Branch of the RIN is very active and has generously offered us places at some of their future meetings.

We have all been almost overwhelmed with news and pictures of the recent war in Iraq and have heard about some of the impressively accurate shooting and bombing by the Coalition Forces. Many of us would like to know from our military surveyors and hydrographers, who were involved, about the contribution they made by providing geospatial information in its various forms. We shall be able to find out about this in due course from them and share the knowledge with our members through *Ranger* and by other means.

I hope that I have been able to indicate in this column that the DSA is very much alive. I conclude by encouraging you to be involved and to keep in touch with your Association whether you are retired or working in the profession, it is surprisingly satisfying to do so.

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.

Michael Gowlett started his survey career with Military Survey in 1954. He enjoyed operational tours in Cyprus and Singapore as well as in the UK where he served at RAF Brampton, Barton Stacey, Chepstow and Hermitage. He specialised in Air Survey and reached the rank of Warrant Officer Class 2 before he retired in 1978. He then went into the field of management training and development within the gas and electricity industries. He currently works as a freelance consultant.

John Tack is now completing a full career as a surveyor in the Royal Artillery serving as a Warrant Officer Class 2 and troop commander of the Survey Troop in 5 Regiment at Catterick. He saw operational service with the HALO Troop in Bosnia in 1996-97. He is now looking to continue his career as a surveyor in civilian life.

THE DSA STORY

As 'Defence Surveyors' has a relatively modern ring to it many people think that the Association is also relatively new. In truth, the DSA traces its roots back directly for 76 years making it much older than most survey-related professional societies. The Association was formed in 1927 as the Sound Ranging Association, its founders being for the most part officers who had served as Sound Rangers in the First World War. In 1928 it was reconstituted so as to include all officers and ex-officers associated with field survey work. The purpose was to retain the expertise that had been built up in the science of Flash Spotting and Sound Ranging by the Field Survey Battalions, Observation Groups and Sound Ranging Sections during the Great War. It was these survey techniques that enabled the British guns to achieve their biggest surprise and shock. It is arguable that this combination of survey and gunnery did as much as anything else, including tanks, to defeat the enemy. The work of these small units had an importance that was out of all proportion to the relatively small numbers so engaged.

An easy-to-read story of these early days can be found in "Flash Spotters and Sound Rangers" compiled by John R. Innes and published in 1935 and in 1961 the Association published a history of "Artillery Survey in the First World War". Both volumes are available by contacting the editor.



An illustration from 'Flash Spotters and Sound Rangers'.

The Association was officially recognised by the Admiralty, the War Office, the Air Ministry, the Colonial Office and the Ministry of Agriculture, Fisheries and Food, all of which appointed representatives to the Council of the Association. On the outbreak of the Second World War in 1939 the Association's register of members quickly provided qualified officers in all branches of field survey. In the post-war years the Association expanded its membership criteria to include the hydrographic surveyors of the Royal Navy and later embraced technically qualified warrant officers and also civilian staff employed in the Ministry of Defence. In 1997 the Association changed its title to the Defence Surveyors' Association in recognition of the wider applications of "geomatics" in the defence arena.

STATION X REVISITED

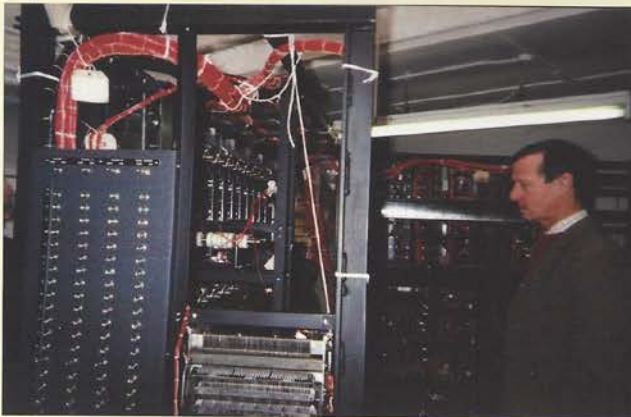
The DSA Visit to Bletchley Park

On the 29th of March a group of 73, comprising our members and members of the Medmenham Club with whom the DSA has a reciprocal arrangement in supporting each other's events, descended on the Second World War code-breaking centre at Bletchley Park in Bedfordshire.

The Bletchley Park Trust welcomed us in the dining room of the Mansion where, in true DSA style, we were treated to an excellent lunch served with copious amounts of wine, followed by coffee and mints.

It is seven years since the Association first visited Bletchley Park and those who had been on the first visit were amazed at the progress that had been made in extending the area open to visitors,

which is set up to represent each of the sections that operated at what was called "Station X".



Mike Wilson admiring "the innards" of Colossus the first programmable electronic computer

The Director of Operations, former Sapper Brigadier Tim Pulverman, welcomed us to Bletchley Park and gave us an overview of its history and stories about some of the personalities who were involved in the secret world of code breaking. We then split into two groups for a guided tour; the director taking one group whilst Jean Valentine, who had worked at Bletchley Park when it was operational, took the other. Jean was able to provide us with a very personal account of life in the top secret world which was Station X and tell us about the way of life at Bletchley Park and the personalities who had worked there during the War.

We were able to have a first-hand close up of the workings of Colossus, the very first programmable

electronic computer which was built by Post Office engineers to break the advanced Enigma code which had more than 150 million, million combinations.

Everyone was pleased with the visit, even the weather was kind, and most wanted to go back to Bletchley Park for another visit, as time is always the enemy when visiting such an interesting venue.

David A. Wallis

THE FUTURE OF RA SURVEY

Recent operations have delayed the publication of the much awaited paper on "Royal Artillery Pointing and Fixation" which will decide the future of Royal Artillery Survey. The paper is still out for comment but is now expected to be endorsed in the autumn. Ranger hopes to include an article and comments on the endorsed policy in the winter issue. Indications are that by 2005 the trade of Artillery Surveyor will be discontinued with the Royal Regiment retaining 14 soldiers holding a specialist qualification of 'Surveyor'.

However, all is not doom and gloom in the Gunner's world. HALO, the equipment produced by the Advanced Sound Ranging Programme (ASP) was deployed on operations in the Gulf and early reports show that it exceeded expectations and performed extremely well. Again, Ranger hopes to have an article describing sound ranging operations on Operation TELIC, formal operation name for what is being called the Second Gulf War, in the next edition.

BRINGING SOLUTIONS TO LIFE

BAE SYSTEMS' Battlespace management Evaluation Capability - Farnborough

Driven by the need for pragmatic representation of solutions within the battlespace, BAE SYSTEMS has invested in a special facility located in Farnborough, UK. The facility plays an integral role in solution development by enabling visualisation of operational capability in context. It is secured to Secret level and creates the ideal environment for the design and evaluation of network enabled solutions. It also has links to other facilities around the world. Using the facility, BAE SYSTEMS can perform:

- integration of engineering models with existing systems
- representation of communications infrastructures (real or modelled)
- multi-layer visualisation of complex issues
- rapid prototyping
- cost effective trials management

Design concepts can be explored and tested in a virtual battlespace context to an extent that could not otherwise be achieved due to safety, cost and environmental considerations.

Later this year, Kevin Porter - Capability Director ISR, BAE SYSTEMS, will be hosting a visit to the Battlespace Management Evaluation Capability for members of the Defence Surveyors' Association. This will give members a unique opportunity to see the vital role that geospatial information plays in the command and control systems of today and those envisaged for use in the future.



BAE SYSTEMS: Battlespace Management Evaluation Capability in use at Farnborough

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 Lt Col Morris Felton whose address appears in the Members List or e-mail him at mjfelton@hotmail.com

SUPPORT TO OPERATIONS IN THE GULF REGION BY STAFF FROM THE GEOGRAPHIC ENGINEER GROUP

By Captain Peter Richardson RE

The recognition of the development of potential operations in the Gulf region was the key to the commencement of detailed planning across all areas of the military. This included the geographic staff in the various headquarters and within the Geographic Engineer Group (GEG). The modelling of the Geographic Support Plan reflected the various options for deployment being considered at the early stages. The planning involved staff from all levels of headquarters and the deployable geographic units with the potential to be involved. These ranged from senior staff to the Brigade Geographic Sergeants that are stationed with the nominated Brigades.

The Geographic Support Plan ranged across the modern aspects of geographic support to the various elements deploying, from traditional map production, procurement and supply, across data production, manipulation, supply and releasability issues. The development of the plan became one of the key elements worked up during the major US/UK exercise conducted in Qatar in late 2002. This exercise was attended by geographic staff from PJHQ and 42 Engineer Regiment (Geographic). These staff included the Commanding Officer of the regiment, Lt Col John Kedar who took up the post of Chief Geographic Officer (CGO) within the UK element of the Headquarters. Inclusion of geographic staff in this exercise enabled the Geographic Support Plan development to keep a near pace with the development of the general plan for deployment into Iraq.

The initial assessments of the potential task and the Area of Operations, in combination with the data sets available, were quick to recognise the diversity and quantity of the data available to geographic staff deploying into theatre.

A Data Preparation Cell (DPC) was established within the regiment to compress and reproject much of the data available, therefore reducing the size of the datasets to be given to deploying staff and at the same time reduce the amount of time spent in the field in the production of tasks and specialist projects. It soon became evident that extra data holding capability would be required by any geographic staff deploying into this theatre of operations. The stand alone equipments deployed with

the small teams and singleton posts, the Digital Geographic System (Light), (DGS(L)), a PC-based system that can be deployed in support of light and mobile operations, required the procurement of an extra 800 GB of memory per system. This still called for continuous intelligent management of data by staff at all levels in the field.

The initial planning for UK Land Forces concentrated on a traditional deployment of 1 (UK) Armoured Division with its supporting brigades. This divisional HQ would be supported by 14 Geographic Squadron, which with the division, is based in Germany. As the New Year broke political events were to change the nature and many of the assumptions made at the initial stages of planning. Starting 2003 with a clean sheet proved to be most advantageous as the deployment, new in character, was to develop at a pace. The emplacement of geographic soldiers and the numbers involved reflected the pace of the deployment.

The first deployment of staff from Hermitage, the home of the GEG and regiment, was the placing of a SNCO and JNCO onto HMS Ark Royal. The concept of deploying staff on board had been practiced previously but is not written into any Standard Operating Procedures. It was therefore seen as a success to get the geographic staff on ship as she sailed off for

the planned exercise in the Far East and to potential operations closer to home. Of note, in embedding themselves into the workings of the ship, the pair managed to become well known to the senior members of the crew as, due to the requirement for 240 volt power, they established their working area within the Admiral's Day Cabin,

The headquarters in Qatar that had formed the basis of the exercise in the latter part of 2002 now became the major headquarters in theatre with Lieutenant Colonel John Kedar becoming the CGO of the UK National Component Command. Being a head taller than most of the staff Colonel John was often to be seen at the top of photo shots.



14 Squadron's base at Shaibah in Iraq



Accommodation Gulf style

As the Ark Royal sailed through the Mediterranean, other elements of the Royal Naval commitment to the developing operation prepared to deploy. In response to 40 and 42 Commando deploying with 3 Commando Brigade, the Brigade Geographic Sergeant was augmented with three extra staff and a second DGS(L) to allow for a split of resources. With 14 Squadron in Germany preparing to deploy with 1 (UK) Armoured Division, augmentation of individual units was undertaken by personnel from 13 Geographic Squadron based at Hermitage. Due to the requirement to man other commitments, many of the geographic soldiers detailed to deploy with units such as the commandos would do so from outside the usual trade groups. This entailed Data Technicians, normally used to the collection and management of data, deploying in the role of Terrain Analysts.



Examining captured Iraqi mapping

As much of the initial role of geographic support is in the enabling of forces, it was of the utmost importance to embed geographic staff with those conducting the RSOI of troops into theatre. It has long been an aspiration to have staff within the logistic brigades. Formal staffing of these posts has yet to mature, and so many levers were employed to get an SO3, SNCO and JNCO into the reception organisation, Joint Force Logistics Command. Much credit goes to the SO3 Capt Nathan Arnison for his natural skills in forcing his way into the organisation and most of all getting a seat on a plane into theatre, even if not his own! The instincts of a broker are in great demand as troops first arrive in theatre.

As the paratroopers of 16 Air Assault Brigade prepared for potential operations, two recently qualified Sappers were dispatched to augment the generic geographic staff at brigade, donning the all important red berets and DZ flashes on arrival. The deployment of light troops was reflected in the request by Capt Nicky Bell for minimal augmentation of the geographic staff within her headquarters.

The various geographic staff deployed into theatre with their respective formations. At one stage, the majority found themselves in close proximity in the Kuwaiti desert, awaiting the arrival of the greater mass of fighting troops. 14 Squadron, who were now forming the Geographic Support Group (GSG), joined these in their relatively small patch of sand. The process of augmentation continued with geographic troops being



14 Squadron Orders Group

deployed with commands such as the Joint Force Air Component, the Intelligence community and to work alongside the US forces within their Map Supply system. The latter entailed embedding SNCOs within US headquarters in three different states.

The array of tasks undertaken by geographic staff reflected the tri-service nature of their deployment. The GSG assumed a central role providing technical support, data processing, advice, resupply and surge capacity to the staff in theatre. The ability of the GSG to respond to tasks was exemplified by the production of products outside the normal geographic arena. This included the production of thousands of leaflets to be dropped over the theatre and the now ever present cards detailing items, such as Rules of Engagement, that the modern servicemen fill their pockets with.

At the height of the operation, 70% of the deployable geographic staff from the GEG were deployed on operations. This figure includes the continuing commitment to the Balkans and as far away as the Falkland Islands.

As an integral part of the regiment, 135 Independent Geographic Squadron (V) supplied a team consisting of an officer and ten personnel who deployed as part of the GSG. Other members of the squadron were called up to serve with other engineer units.

Following the successful completion of the initial stages of the operation in Iraq, units prepared to leave theatre and so reducing the UK commitment in personnel to the operation. By the middle of July the geographic staff that deployed on the initial stages of the operation will have been replaced by new staff with the handover of UK Divisions. The geographic staff from 3 (UK) Division will be supported by members of 13 Geographic Squadron, from Hermitage. The level of manning in theatre will be reduced but importantly the range of geographic capabilities will be maintained. As ever, the support given to the operation will remain flexible, matching the tempo of the operation. It is envisaged that future developments will see the geographic troops working along side other troops from within the coalition, many for the first time over the next few years.

SOUNDINGS FROM THE DEVONPORT FLOTILLA

By Commander Steve Malcolm RN

Commander Hydrography and Meteorology, Devonport Flotilla

Having taken up the post of Commander Hydrography and Meteorology (HM) within the RN's Devonport Flotilla in August 2002, I had expected to be busy helping to bring the new survey ships ECHO and ENTERPRISE into service from the waterfront perspective and to be dealing with the decommissioning of HMS ROEBUCK. These particular tasks would be in addition to the day to day running of the remainder of the survey assets and HM Teams. As with the remainder of the military, events in the Gulf rather changed the focus at the end of last year, resulting in missing the deadline for the last issue of Ranger - apologies to the

room available in the NAG in the build up to Operation TELIC and surveys in the approaches to Um Qsar allowed Humanitarian Aid to be delivered into this port.

The importance of survey information in areas of sparse data density became clear to the coalition forces to the extent that ROEBUCK worked on the front line almost continuously for four months in the lead up to the invasion. The value of her work was recognised by all the coalition commanders, land and sea, with many plaudits being received by the ship and back here in Devonport. Having expected to be back in March, the ship eventually returned to Plymouth on 9 June 2003 in need of a well-earned break for leave and maintenance before returning to more mundane work in the Irish Sea.



HMS Roebuck

Editor! Whilst the first part of my expected tasking with the new vessels proved correct, the involvement with ROEBUCK did not go to plan.

Under the command of Lieutenant Commander Andrew Swain, HMS ROEBUCK sailed in early November 2002 for routine surveys in the Gulf region as a part of the ship's final deployment before paying off. The ship's company expected to be in the Gulf until late January 2003 and to be home in time for an early Easter break. It soon became evident that the ship's tasking would significantly change and immediately prior to sailing for Devonport, the ship was warned to prepare for conflict and short notice change of tasking. In the event, by the time the ship reached Bahrain, there was a completely new set of survey priorities waiting for them and the clear indication that they would not be returning to the UK when expected. The new work in the Northern Arabian Gulf (NAG) involved a very large area of poorly charted water, which created problems for the coalition military commanders when it came to mission planning for a large number of ships, helicopters and troops required for the Iraqi landings. In the event, the data collected by the ship was quickly processed by the UK Hydrographic Office in Taunton and turned around in chart form to be used by all ships and landing craft in the Gulf. The ship's work trebled the amount of sea-

I mentioned that the decommissioning of ROEBUCK did not go as planned. In the midst of the conflict and with the ship deployed, it was decided by the MoD that we had insufficient surveying capability with just two new hulls. Given the success of ROEBUCK in the Gulf, it would be preferable to run the ship on to provide a third hull until 2014 and refit the ship under a ship life extension programme. The planning for the extension is now well underway and the ship is likely to go into refit in early 2004



HMS Scott

Other Devonport Flotilla survey assets have also been kept busy. HMS SCOTT has also been out in the Gulf and Indian Ocean conducting routine data gathering operations and has recently completed a maintenance period in Devonport for a generator change before sailing back to work on her world-wide operations. SCOTT's watch-rotation manning and operating cycle continues to provide excellent efficiency with the potential to achieve 307 days of each year at sea with a

ship's company of just 66 - with a displacement of 14500 tonnes, this is a large platform for a small number of individuals to look after. From the largest survey ship in the Fleet to the smallest: HMS GLEANER continues to work well in and around UK waters using Multibeam survey systems to produce a large number of surveys disproportionate to the size of the ship and her company. The two merchant ships with Naval Parties embarked, MVs MARINE EXPLORER and CONFIDENTE, have been engaged in UK Continental Shelf surveys on behalf of the Maritime Coastguard Agency.



MV Marine Explorer

A recent acquisition within the Devonport Flotilla have been the HM Teams which used to come under the old 'Frigate Squadron' organisations until April last year. There are six mobile teams comprising one officer and two Naval Airmen (Metoc) whose role is to provide meteorological and oceanographic support to frigates and destroyers engaged in anti-submarine warfare and complex air operations. All six together with a mobile survey team supporting ROEBUCK have been fully employed throughout the past year. Their role in providing comprehensive and coherent environmental data to commanders at sea is gaining in importance as the range of helicopters becomes greater, such as with the EH101 Merlin, and underwater detection systems become increasingly susceptible to changes in the environment in which they operate.



MV Confidante

In all, this has been an interesting and most definitely challenging period in the Royal Navy's history of surveying. Recent events have gone a long way to reaffirm the need for us all to understand the environment in which we all work, whether it is on the land, in the air, or at sea. In the coming months it will be fascinating to see how the new capability provided by the next generation of ships in the form of ECHO and ENTERPRISE can enhance our understanding of the maritime environment from a military perspective. I will keep you informed of progress.

Commander Malcolm featured as a 'Geo Person' in the Spring 2002 issue of Ranger.



see page 26 for the full story on HMS Roebuck's war.

“MAPPING THE WAR IN IRAQ”

(1914 - 1918)

By “Icky”

Having watched the battle for Baghdad City unfold on the TV screens, one conclusion is that the maps or graphics used by the media have not been overly impressive but there is no doubt that the Coalition Forces will have had the use of detailed maps based on modern technology.

There are few places in which present day conflict arises in which the British Army has not served before and Iraq is a case in point. During the First World War the British army spent three years overcoming the resistance of the Ottoman army in Iraq in a campaign which was initially undertaken to protect British interests in oil. The Desert Survey Party operated in Iraq throughout the 1930's and in the Second World War both British and Indian Field Survey Companies were active in support of PAIFORCE. In the 1950's field surveyors were again active in support of map production, and 14 Independent Topographic Squadron RE supported the 1991 Gulf War in the field. These surveys are briefly described in another article in this issue of Ranger but it is thought a few words on the First World War activities of Military Survey may not be amiss at this time.

From a Military Survey perspective, the various campaigns of the First World War posed different problems and different approaches or solutions were adopted. The Western Front may be summarised as a war of breadth but with little depth, with a framework of trigonometrical and existing map detail on which to superimpose new information from aerial photography. The Gallipoli Campaign was one of virtually no breadth or depth with no framework on which to base aerial survey and, in places, terrain so severe as to make the exploitation of aerial photography extremely difficult. The Egypt and Palestine Campaign, of much depth but little real width, was fortunate in having some planimetric framework on which to base mapping from aerial photography in the form of the Palestine Exploration Fund maps made by Conder and Kitchener in the 1870's. It was in this theatre that aerial photography came to the fore as a means of topographic mapping, and it was here that roll film was first used in order to achieve strip photography to assist mapping. The Iraq, or Mesopotamian Campaign, may be described as a linear campaign of much depth but very little breadth where control was virtually non-existent but



where the mainly flat riverine and desert terrain also proved particularly appropriate for the use of aerial photographs for topographic mapping.

Apart from the Campaign in East Africa, the Mesopotamian Campaign was probably the one most akin to the Burma Campaign of the Second World War in being accorded the least priority in terms of men and materiel and probably the least publicity, apart from the debacle of the Siege of Kut el Amara. However, from the Military Survey point of view, it is one of the best documented. In addition to the Official History of the War, the Corps History and more importantly, Records of the Survey of India Vol XX - The War Record, there are many sources of information on the Military Survey effort. Apart from the official accounts, the novelty of having to map a large country during a campaign and the imagery of numerous archaeological sites that was obtained during the mapping process were the subject of numerous accounts after the war in both the RE Journal and the Geographical Journal.

The Survey effort during the Mesopotamian Campaign of 1915 - 1918 was almost wholly provided by the Survey of India, described in the Corps History as "a civilian organisation officered by officers of the Royal Engineers." Almost wholly, for the Survey of Egypt also provided significant support. In addition 30 Squadron of the Royal Flying Corps provided essential support by taking the aerial photographs used in the map-making process.

The Indian Expeditionary Force "Force D" had landed in Iraq in November 1914 and quickly took Basra and secured the southern oilfield areas. In 1915 General Townshend's Division advanced rapidly up the Tigris as far as Kut which was occupied in September 1915. In November a further advance on Baghdad was halted at Ctesiphon and the Division was forced to retire to Kut where it eventually surrendered to the besieging Turkish army in May 1916.

Between February and June 1916 the compilation of sketch maps in this forward area was carried out under the direction of a GSOMI Maps at Tigris Corps H.Q., who had no technical experience or knowledge of surveying or map production.

In May 1916, TE Lawrence visited Mesopotamia in an attempt to arrange the lifting of the siege of Kut and, amongst other things, to give advice on the use of aerial photography for mapping purposes. Lawrence wrote a detailed and controversial report on his visit in which he described the Intelligence organisation, the Survey of India Party, and the RE Litho and Printing Section and made numerous appropriate suggestions amongst which were, *"That whenever serious photography is required, an aeroplane be sent up to do nothing else."* *"That the trig. Survey be extended as soon as possible to the firing line, and beyond, as in Gallipoli. It will not be hard to fix some points in the Turkish lines, for the country, though flat, has a lot of minor detail in it; and until these control points are in, it will be impossible to fit your photographs perfectly."* *"That some form of correcting*

apparatus like our "Bahel" be installed." It is believed that the Bahel was a form of enlarging lantern used by the Survey of Egypt to correct distorted cadastral plans. If any reader can throw more light on this the author of this note would be pleased to hear about it. Lawrence's report is reproduced in full as an appendix in the authorised biography of TE Lawrence by J Wilson.

The Map Compilation Section was formed during the attempt to relieve General Townshend's force, besieged by the Turks at Kut. In June 1916 Captain K Mason RE was appointed to the Corps HQ post but within a few days he was replaced by Major CP Gunter RE. Major Gunter had taken part in the Tirah Campaign in 1898 but shortly afterwards, in 1899, he was posted to the Survey of India and the remainder of his career was spent in Survey notably serving in the Mishmi Mission in NE India in 1911-1912. The Map Compilation Section thus came into being in June 1916 as part of Tigris Corps.

Its work was primarily the compilation and printing of all maps in the operational areas for the use of the troops. The suite of maps decided upon was :-

- a. 1:253,440 or smaller for strategic and general use.
- b. 1:63,360 or 1:126,720 for areas of military operations.
- c. 1:21,120 or 3-inch for areas in which attack or defence was in progress or expected.
- d. Trench maps at 6-inch and 12-inch scales.

Throughout the summer of 1916 position maps were compiled using maps already produced by the Basrah Survey Party supplemented by aerial photography. Beyond Kut, where there was no control, simultaneous observations from four fixed points to identical howitzer-shell bursts provided some forward control, the positions being simultaneously registered on an aerial photograph by an airborne observer; and this control was used to control photo strips.

By the end of October 1916 the Tigris front had been wholly mapped at 3-inch scale to a width of five miles from the Tigris River and the Sannaiyat and Suwadah positions had been mapped at 6-inch scale. These maps were kept up to date by the use of Correction Slips, notifying changes to detail, and Appliqué Slips, the latter being small portions of the map with updated detail which were cut out and pasted on to the existing map.

In early 1917 General Maude launched an offensive which broke the Turkish position before Kut and the pursuit to Baghdad commenced. Baghdad was occupied on the 11 March 1917 after an advance of 120 miles. This advance was so rapid that as the Turks were being chased off one map an aeroplane was used to drop the new adjacent sheets to Corps Headquarters.

The Compilation Section moved to Baghdad a few days after the occupation and occupied buildings with relatively cool underground rooms suitable for the presses.

At that time, the personnel comprised :-

Major CP Gunter RE
Captain A.H. Gwynn IA (from Aug 1917).
Captain GC Lewis RE
Captain JH Cole RE (from Survey of Egypt).
One Subaltern under instruction.
One Warrant Officer.
27 British other ranks.
19 Indian other ranks.
12 Khalasis.
1 Carpenter.

The present Battle for Baghdad must have been a "City Map" battle. The aftermath, may well present peacekeeping and administrative problems for which a city map will continue to be an absolute necessity. The same situation probably prevailed after the occupation of Baghdad in 1917 and in the years immediately following the world war. Baghdad in 1917 was much smaller than the present city but it was still considered necessary to have a reasonable City Map.

The Baghdad City Map.

The following notes are taken from a report made by Major CP Gunter of the Map Compilation Section to Colonel Hedley, the head of the GSGS in September 1917. In addition to the map, Major Gunter forwarded a sample part mosaic and a reduction of the whole mosaic at 1:253,440 scale. These survive in PRO Kew Class WO 302 piece 551.

The Baghdad City Plan was based on a triangulation of some 26 stations executed by the Survey of India Party with the Mesopotamian Expeditionary Force. Aerial photography of Baghdad was flown by 30 Squadron RFC, commencing on 9 May 1917, the average scale being 9 inches to a mile, about 1:7,000. It was completed by 16 May 1917.

On receipt of the aerial photographs, a further 36 points were fixed by plane table interpolation to obtain three fixed points on each photograph. These points were projected (gridded) onto a base-board on which the photographs were to be pasted. For each photograph, a trace was made of the fixed points and this was placed on the ground glass screen in an enlarging lantern capable of being tilted in any direction. The negative was then placed in the lantern and the lantern adjusted to achieve the necessary scaling so that the fixed points on the negative coincided with those on the ground glass. An enlargement was then made of this "rectified" frame and it was this which was fixed on the board. After a "mosaic" of all the photographs was completed, the board was re-photographed and six negatives were made for field completion.

The field work involved marking on the blue prints all the main buildings, streets, alleyways, covered bazaars, gardens, quarters and so on and naming them. Similar blue prints on drawing paper were then inked up in waterproof ink with all the detail and names to appear on the final map. The prints were then bleached out leaving the line work only. A combined fair trace was then made from the bleached out prints with the scale and all the marginalia etc. Black-line prints were supplied to those who needed the map urgently. The map was then drawn on zinc and printed in a hand press in two colours, black and buff.

Enlarging and fitting of photographs took place from 10 to 19 May. Field work took place between 16 May and 1 June. The fair trace was completed and sun prints issued by 6 June. The drawing on zinc and production of first proof was completed by 14 July and the first issues of the final map made on 21 July.

The map was compiled by Captain CG Lewis RE of the Survey of India and Captain JH Cole of the Survey of Egypt. The map was drawn on zinc by Corporals R Watt and AT Harrow RE and printed by Sergeant F Pharo. Field work was undertaken by Corporals E Evans, A Morrison RE and Surveyor Iltifat Hussein of the Survey of India. Major Gunter considered that production of the map by traditional plane table and chain survey would have taken at least six months due to the tortuous nature of the alleyways in the old city.

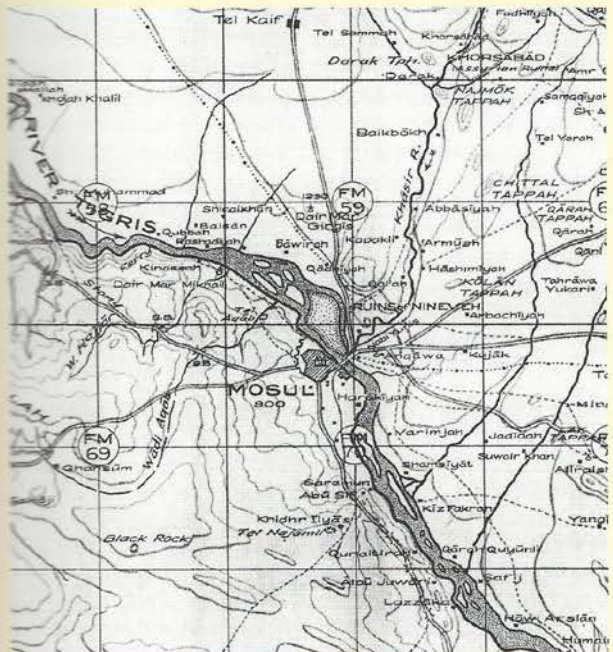
The above description will make familiar reading to many in the DSA, the methods evolved so soon after the availability of reasonable vertical aerial photographs, having been developed and refined and used in many later campaigns. The subject of map-making by aerial survey versus traditional field survey methods was hotly debated in the immediate post-war years, one of the advocates being Lieutenant Colonel SF Newcombe R.E. However, useful as the Baghdad City Map might have been, Lieutenant Colonel Gunter, responding to an article published in the Geographical Journal by Newcombe, drew attention to the problems of extracting areas from photo-mosaics caused by roof areas and the shadows thrown by them. He also stated that even at 1:10,000 scale, experience proved that even amongst trained map-readers, very few officers could interpret a mosaic correctly.

In addition to the Baghdad map this article includes two small representative extracts of Compilation Section maps of areas that have been frequently in the news, the Kirkuk one-inch map and the Mosul quarter-inch map.

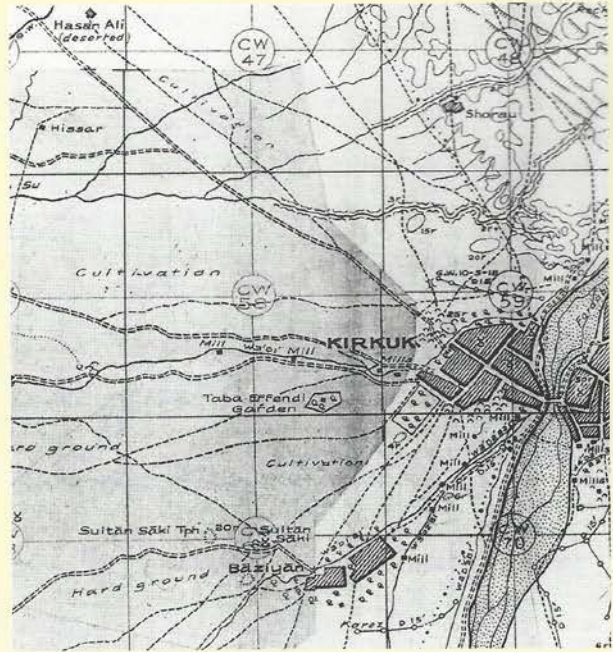
Notes on the mapping mentioned in this article and a reference list are available through the Editor.



Photomosaic of Baghdad: PRO WO 302/551



Compilation Section map showing area of Mosul quarter-inch map. PRO WO 302/533



Compilation Section map showing area of Kirkuk quarter-inch map. PRO WO302/523

The discoloured area to the west of Kirkuk is actually an example of an appliqué correction slip.

MAPPING IRAQ: A RECURRING 20TH CENTURY STORY

By Alan Gordon

This issue of *Ranger* has articles describing the surveying and mapping of Iraq for two wars separated by some nine decades. It may come as a surprise to many to learn that military surveyors were involved in survey work in that benighted land on four other occasions during the intervening years.

The part played by Military Survey and the Survey of India during the Mesopotamian Campaign is detailed in the previously mentioned article. The Map Compilation Section, along with virtually all of the units formed for the Great War, was disbanded in 1919 and Military Survey involvement in the area ceased. An Iraq Survey Directorate was formed in that year but its efforts were restricted to mapping for land settlement and irrigation purposes. The vast tracts of desert and the rugged mountainous area in the north of the country remained unmapped for the next decade.

The Desert Survey Party 1929 - 1939

In the early Twenties it was found that using the newly-formed RAF rather than large and costly garrisons of soldiers was the most cost effective way to police the more remote areas of the British Empire. This policy was proved successful in 1921 when a rebellion by several tribes in Iraq, then a mandated protectorate,



The Desert Survey Party was resupplied by air.

Prain collection

collapsed the moment their villages were bombed, albeit after prior warning had given. In 1929, to assist with its policing role, the RAF asked for a series of 'flying maps' to be produced at a scale of 1:500,000 covering the desert areas of Iraq and to that end the Desert Survey Party was formed. Its composition varied in the early years but eventually it comprised two sections. The section responsible for providing the survey control was headed by a Sapper subaltern with two RAF other ranks, a fitter and a wireless operator, plus four local Iraqis as drivers, cook and labourer. The other section, charged with plotting the detail, had a Royal Engineers lance

corporal surveyor who was seconded from the Ordnance Survey and granted the local rank of sergeant. Both sections had the same level of support. Arab guides were hired locally to interpret and guide the sections in their local area. Transport for each section was two 16-horse power Morris cars and a 6-wheel Crossley truck. One of the earliest surveyors to lead the Desert Survey Party was Captain (later Brigadier) Sandy Prain, uncle of James Prain the DGIA representative on the DSA Council. During his time in Iraq there were further tribal disturbances and Sandy became one of only two soldiers to be awarded the 'Southern Desert, Iraq' clasp to the GSM. Sandy's photograph album indicates that he not only worked in the Tigris and Euphrates valley but also near the Syrian border and in the mountains of Kurdistan.

The survey techniques employed were fairly basic. The officer's section carried out astronomical traverses fixing control stations some 25 miles apart whilst the NCO-led section plotted the detail by compass and speedometer, and latterly, plane table traverses between control stations. Heights were provided by aneroid barometers. The sections worked in the field for eight months of each year, being re-supplied in the main by air. They spent the four summer months at Air HQ, initially Baghdad but later Habbaniya, where they compiled their field work and prepared for the next season. It is of note that apparently little use was made of air photography although there is mention of one officer using mosaiced prints to compile detail in areas inaccessible to the cars.

The Party operated in this remote and rather lonely manner for ten years during which time they produced six sheets of the series, a remarkable achievement for such a small number of surveyors.

The Persia and Iraq Force - PAIFORCE 1941 - 1943

Iraq was of little significance for the first two years of the Second World War although plans were being implemented to update the First World War mapping and survey the areas not yet mapped. However, in 1941 Iraq moved towards centre stage when Britain's already bleak military situation worsened as the Iraqi Prime Minister, Rashid Ali, led a pro-Nazi uprising in Baghdad and it looked as though a similar event might take place in Persia (modern Iran). So urgent was the situation that an Indian Brigade en route for Malaya was diverted to Basra where it landed on the 18th of April 1941. The revolt was over by the end of May but then in June the German invasion of Russia made the entire area, with its essential oil reserves, a serious concern and so defence planning was immediately instigated and the Persia and Iraq Force - PAIFORCE - formed.

The initial survey support was provided by the Headquarters of 1 Indian Survey Company who arrived three weeks after the Brigade had landed and set up a

map depot. The remainder of the Company did not arrive in theatre until August due to an outbreak of cholera but they were then joined by two other Indian Survey Companies. The area of survey interest expanded rapidly as operations were first planned for Syria and then troops moved into Persia to thwart the efforts of Nazi agents based there. The Indian companies surveyed and printed vast areas through the end of 1942 and the early months of 1942 but with the very real threat of a German offensive through the Caucasus in the spring of 1942 it became apparent that reinforcement was necessary. This was provided from Egypt in the form the Mobile Echelon of 512 Field Survey Company comprising a Headquarters and three



Plane Tabling with PAIFORCE

Topographic Sections and the Headquarters, Reproduction Section and three Drawing Sections of 19 Field Survey Company. They were accompanied by a detachment of Basutos, employed as guards but later to work on the presses, and an Egyptian officer as for liaison with the Iraqis and Persians.

The field surveyors quickly deployed across the two countries putting in control and carrying out plane table surveys. The Drawing and Reproduction Sections' technical facilities were accommodated in a grain silo in Alrwaz whilst the troops lived under canvas. Conditions were harsh with temperatures raising to 132 degrees in the shade during the summer whereas winter brought such bitter cold and severe flooding that four members of 19 Company died, three from pneumonia and one from hypothermia. The output from the presses was prodigious and the work rate of the topographic surveyors was astounding; each surveyor averaging 150 square miles of plane table survey at 1:100,000 each month. The plotting was of such a high standard that these sheets were mosaiced together, photographed and printed as the final product. The rate of mapping increased as more use was made of air survey and at the same time the pressure reduced as the expected German offensive failed to materialise.

In October 1942 the Mobile Echelon of 512 Company was relieved by two Topographic Sections of 19 Company and returned to Egypt. The 19 Company field surveyors were employed on joining the Persian

network to the Iraq system, a task they completed in February 1943. The relief of Stalingrad and the subsequent Russian push westwards, together with the defeat of the Afrika Corps in Libya, altered the whole political and strategic situation to such an extent that PAIFORCE was scaled down and in April 1943 19 Company returned to Egypt and the survey effort was reduced to a maintenance level.

During their time with PAIFORCE the Indian and British Field Survey Companies carried out control surveys over thousands of miles of desert and mountain and produced topographical and 'goings' mapping using both field and air survey methods of more than 220,000 square miles.

19 Topographic Squadron RE 1953 - 1958

Ten years after leaving Iraq 19 Topographic Squadron returned with a peacetime tasking to map the western desert areas at 1:100,000 and parts of Kurdistan at 1:20,000. The Squadron was based at RAF Habbaniya, a staging post centred on a man-made oasis in the desert about 30 miles west of Baghdad with a lake that had been used as the overnight stop for flying boats. It was a large and comfortable post with a perimeter of seven miles and all the facilities expected of a well-established RAF station. However, the surveyors spent the majority of their time in the field with each of the three Troops working from tented camps in their operational area. From the Troop camp the survey parties, generally a junior rank survey soldier and a driver, would deploy into the desert for anything up to fourteen days. In Kurdistan mules replaced the ubiquitous Land Rover. It is of note that these junior rank surveyors were mainly in their late teens as they had either recently passed out from the Apprentice School or were National Servicemen.

The Squadron was required by the Iraqi Government to work in the field in civilian dress and to use vehicles painted and numbered so as to appear civilian. In the early days the Ordnance Corps' response to the request for civilian cloths was to issue each surveyor with an identical 3-piece pinstripe 'demob' suit plus a shirt with a detachable collar, a tie and a trilby hat. The Squadron Commander's response was to parade his men, dressed



19 Squadron's memorable mountain "demob suit" parade

in their issued 'mufti', at a mountain survey camp for a visit by the GOC. Time had been spent ensuring that the troops could raise their trilbys with Guards-like precision when they were dismissed from the parade. The result was that the visiting senior officer quickly arranged for the Squadron to be paid an allowance for wearing their own cloths.

The survey work covered all field stages from primary triangulation to names collation. Although most of the detail was plotted at 42 Survey Engineer Regiment in Cyprus, the contours were plotted in the field from barometer traverses. Life in 19 Squadron carried on in this pleasant manner until the 14th of July 1958 when, with no prior indication or warning, Brigadier Kassem of the Iraqi Army staged a swift and successful coup, killing the Iraqi Royal Family and leading government figures in the process.

Immediately the Iraqi Army sealed off RAF Habbaniya from the outside world and took control of the armouries within the station. Iraqi soldiers were posted throughout the station with several positioned inside 19 Squadron's headquarters building. By chance one of the Field Troops returned to Habbaniya later that day and was allowed to enter 19 Squadron lines. Wireless contact, difficult for much of the time, could not initially be made with the two other Troops still in the desert but both returned to the oasis within the week. So began the so-called "Siege of Habbaniya" which, for 19 Squadron personnel, lasted until 21st of October 1958 when they were withdrawn to Cyprus. The station was evacuated by the RAF shortly afterwards thus ending British presence in Iraq...for some time!

Operation GRANBY: The Gulf War 1990 - 1991

On the 2nd of August 1990 Iraqi troops invaded Kuwait and all eyes were turned once more towards Iraq. Military Survey's initial response was the production of briefing maps but the first air chart production tasks followed within the week as the decision was taken to move aircraft to the Gulf as part of the moves made to deter Saddam Hussain from moving into Saudi Arabia.

A Coalition was formed and force levels in the area rapidly grew. UK sent 7 Armoured Brigade to Saudi Arabia with 14 Independent Topographic Squadron as the in-theatre Survey unit. The Squadron brought the old print semi-trailer out of mothballs thus re-establishing the mobile role of the unit. As the force was increased to divisional strength so 14 Squadron was reinforced by personnel drawn from all other Survey units and Military Survey specialists were added to all headquarters. It was soon recognised that troops trained and based in the familiar, feature-rich and well sign-posted North German Plain needed all the geographic help that they could get. This led to the creation of specialist teams to provide training for ground forces in desert navigation and the use of the newly acquired GPS systems which proved to be 'war-winning' technology.

By this time the Coalition's aim was the liberation of Kuwait and the UK and USA had agreed to a joint geographic production programme to support the campaign. Unlike the previous operations in Iraq, air

power was to be of prime importance and the so-called 'smart' weapons were used for the first time. The result was the designation of a very large operational area of interest and the need for digital data as well as mapping and terrain analysis products suitable to support land forces deployed in a strange and hostile environment.

Soon, all of Military Survey's resources were involved in producing, printing and distributing a wealth of paper and digital products. All this map production was achieved without surveyors setting foot in Iraq. Much use was made of the surveys mentioned previously and imagery from satellite-borne sensors was not only used in the production on new and revised mapping but, for the first time, the imagery itself was issued a product.

By the time Iraqi forces had been driven from Kuwait and the ceasefire signed on the 11th of April 1991, Military Survey had mapped over 9,000 km² at 1:10,000 and a further 170,000 km² at 1:100,000, produced over 300 specialist products for the RAF, printed 20 million maps and air charts and issued 13.6 million of these to the forces in the Gulf. Work did not stop with the cessation of hostilities as the Geographic Sections that remained in the Gulf then provided essential local products such as minefield maps.

Prologue and the Future

And so we come to the Second Gulf War when once again mapping Iraq fully occupied the minds of military geographers. Suffice to say, 42 Engineer Regiment (Geographic) was again fully engaged with 14 Geographic Squadron deploying to Kuwait and then to



8 Map & Air Chart Depot - last resting place for millions of returned Granby maps

Iraq. It is hoped to include a detailed report on the geographic support provided by the DGIA as a whole in a future issue. However, given the volatile nature of the politics of the Middle East and the importance of the oil reserves under the Iraqi desert, it is by no means unlikely that future generations of uniformed geographic specialists will have to focus their attention to the land of the Tigris and Euphrates just as their predecessors have done in decades gone by.

Details of the reference material used for this article can be provided by the author on request.

WHERE NEXT IN DATABASE ENABLED CAPABILITY

By Cameron Japp

Head of Information Capability Concepts

BAE SYSTEMS Future Systems - Head Office

Introduction

Satisfying the "who needs what information, where and when?" question is an ever present and increasingly complex challenge in achieving information superiority. The delivery of operational effects is highly dependent on the "effect deliverer's" ability to gain timely access to the right information. In many cases the requirement will be for a simple answer - yes, no, location, time - rather than a substantial ream of contextual data within which an answer is embedded. Irrespective of the data delivery method - supply pushed to or, demand pulled by the effect deliverer - methods for storing, accessing, querying and retrieving data are key to maximising information value and to minimising network latency.

Ever since Hermann Hollerith introduced machine-readable data processing cards in 1890, the main database design objective has remained fundamentally unchanged - to provide an information storage and retrieval system which provides answers quickly and concisely to a range of user requests. Arguably, amid the complexity of the emerging "info-structure" of today's battle-space, this simple objective deserves a closer look. Greater understanding of associated human factors and information management challenges in the problem domain is vital if emerging technologies are to be of optimal value in the solution. Generally, the network topology and reach receives a high degree of emphasis. However, it is equally important that the information management nodes storing and serving the information within the network are confirmed for rapid definition of what needs to be sent where and to whom.

Changing Information Management Context

An effective "info-structure" requires a flexible yet robust means of sensor netting, data fusion and information exchange. As the demand for maintaining a near real time Joint Operational Picture (JOP) grows, so the "mission capability package" must provide the means to rapidly collect, filter and deliver mission critical information (Alberts et al). With the growing challenge of serving all source derived information at various levels of fidelity, thematic content and security classification, the design of the database element within the information management node is of increasing importance.

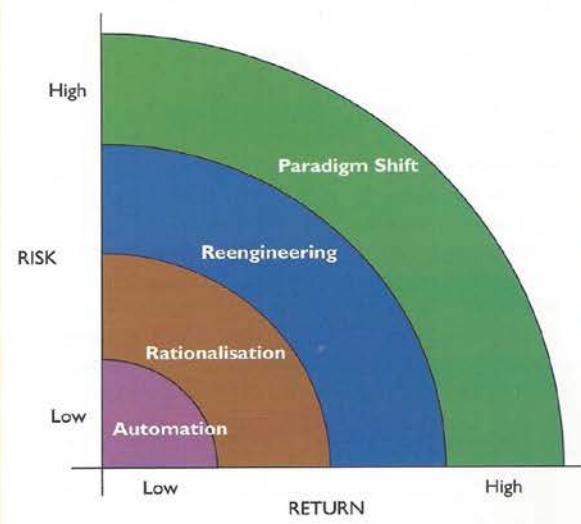
The last 10-15 years has seen increased emphasis on expeditionary operations. The resulting increase in operational tempo and mobility demands flexible and agile data exchange for time sensitive information logistics. Arguably, automation of military information processes in the early 1990s has given way to phased

rationalisation of these processes, largely driven by an increasing need for collaborative information sharing in both the national and coalition domains. This continued evolution is increasingly characterised by a *paradigm shift* in organisational, doctrinal and technological practices as the move from platform centric to network centric operations gathers pace (Alberts et al).

However, there is a long way to go. As the information process is re-engineered, designing, integrating and successfully deploying information technology (IT) and communications components within the info-structure is a major undertaking - technically and financially. Maximising return on this continuous investment needs careful planning and de-risking at every stage of the evolution. Figure 1 (Laudon & Laudon) shows the risk-return relationship over time evidenced in such an evolution within an organisation. The four stages are:

- 1. **Automation** Information technology speeds up the performance of existing tasks
- 2. **Rationalisation** Operating procedures are streamlined to eliminate bottlenecks
- 3. **Re-engineering** Business processes are radically re-designed
- 4. **Paradigm shifts** Nature of operations & organisation are re-conceptualised

Figure 1 - Systems Development and Organisational Change: Risks and Returns (after laudon & Laudon)



Challenges Ahead

To optimise information management effectiveness across a complex info-structure, a number of key factors need to be addressed. Information exchange requirements must be captured in a structured way to promote network enabled transactions that are "relevant, digestible, secure and timely" (TOGAF, UK JSPs 329/602). With the dramatic up-turn in the volume of raw data being collected (thousands of terabytes daily), the prospect of managing millions of daily message transactions derived from the raw source data is quite conceivable.

In this scenario, there is a significant challenge in storing data to allow querying of both the daily detail and strategic patterns and messages evident in the high level JOP. Increasingly, large volumes of data shall be supply-pushed to a range of end users via sophisticated parsers and routers using semi-automated message management. The content of such transactions will account for thematic attributes, geographically defined areas of interest, security classification and access permissions. In this scenario, risk management of such transactions will be required to ensure that data do not arrive too late, too thin or excessively aggregated (Mintzberg et al).

An equally important transaction type is the demand-pull, ad hoc remote user query. The growing uptake of web enabled, wide area transactions provides greater scope for conceptual database design to overcome the constraints of physical data location and increase the opportunity to query several distributed databases as a single virtual repository. This allows the information demander to query a range of distributed databases from a single point in the network and demand-pull the answer. Again, the understanding of human factor aspects of this process is critical in what can easily become *technology lead design*. The opportunity to shape such a process now during an organisational paradigm shift is clearly significant.

The Database

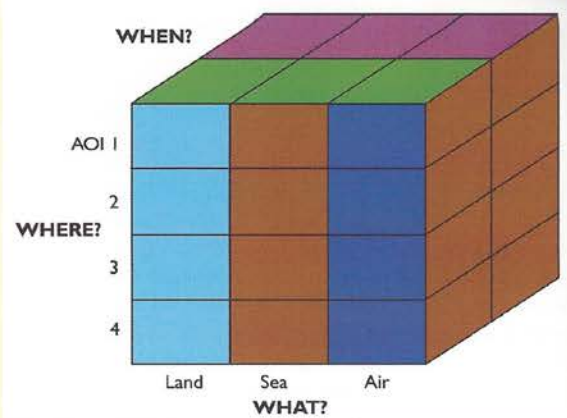
The database - an information repository - can be either structured or unstructured. The structured database is organised to service many applications concurrently, whilst storing and managing data so they appear to be in one location. Database design requires two related but distinct design considerations: conceptual (business centred) and physical (the actual data arrangement). The creation of the database environment has to account for data relationships, data types to be used, and those changes to be adopted by the organisation to achieve a high value return in terms of transaction efficiency. The database must respond to specific organisational needs if this efficiency is to be realised.

In the military context, this underlines the need to address and substantively respond to the softer issues, or human factors. These include: doctrine, concepts of operations, command behaviours, organisational structure, and operational expertise or training.

Three principal types of database management system (DBMS) are commonly used by all types of organisation: hierarchical, relational and object oriented. The hierarchical DBMS is an older generation database structure, based on one to many and many to many relationships, configured in tree-like structures. The relational DBMS (RDBMS) offers greater flexibility than the hierarchical approach. The RDBMS is more suited to multi-user ad hoc queries, combining information from various sources, and providing the capability to add new data and records without disturbing existing programs and applications (Laudon & Laudon). RDBMS data are represented in two-dimensional tables called relations or files. However, in the Object Oriented (OO) DBMS, information is managed by storing data - and the procedures acting on the data - as objects. These objects may be called and retrieved automatically, including multi-media and graphical files. In some instances, OO and RDBMS can work together through using tools that offer OO access to the RDBMS, using OO extensions, or using a hybrid object-relational DBMS.

In reality, data management will need to take account of all three types of database given that legacy data holdings often continue to hold value for several years in a given organisation. DBMS software enables organisations to manage de-centralised data, providing simultaneous data access for application programs. Emerging database capabilities provide: efficient real time data access; flexibility in organising data; the ability to store, arrange and access multiple data types and formats, plus alignment with organisational information management models, and operating systems.

Figure 2 - The "Database Cube" & Multidimensional Querying of the Land, Sea, Air picture over time (after Laudon & Laudon)



In Figure 2, "what, where, when" data relationships are shown schematically as a database cube. With the advent of object oriented databases, web browser architecture, and write once run anywhere programming languages - such as Java (SUN Microsystems) - promising opportunities for data storage and retrieval are emerging. Java allows the creation of mini programs called applets

which enable the user to download only the software or data that is required to satisfy a particular query. A central database can be queried remotely using a remote browser together with application software resident with the database. This minimises the need to have application software on the client PC and enables users to view the answer to a data query remotely - without necessarily requiring the user to download all the relevant data. Transmission capacity is, therefore, conserved since little or no data requires to be pulled to the client. This may also promote good security practice since the majority of information remains on the central server.

Transaction Efficiency

Given the increasing pressure placed on finite transmission capacity, there is a growing uptake of simple standards such as binary text and extensible mark-up language (XML) for intelligence dissemination. Currently, one of the main languages for data manipulation, querying, reading and updating a DBMS is Structured Query Language (SQL). Versions of SQL run on almost any operating system, enabling computers to pass and exchange data by passing SQL commands. Additionally, SQL and Java can work well together where, for instance, SQL statements may be executed by entities called SQL Enterprise Java Beans (EJBs). These manage user queries made from a Java applet which are then executed by EJBs within the application, which in turn send the request to the database engine for execution.

Allied to such novel ways of querying databases is the use of multi-dimensional data analysis to rapidly analyse large repositories (online analytical processing (OLAP)). Through analysis of large pools of data, patterns and rules emerge which enhance the ability to manipulate and analyse data from multiple perspectives. Battle-space information needs to be accessible to various levels of command, and at multiple levels of information fidelity. Given the importance of efficient and timely access to the JOP - for both strategic and tactical decision making - such techniques are potentially of immense benefit. When tailored to specific organisational needs, such techniques promote timely data sharing, offer ways of accessing data independently held in stove piped systems. This helps reduce: network latency or friction; data redundancy and inconsistency; program and data dependence; inflexibility, and data security risks.

Cameron Japp. A former Officer in the Royal Air Force Operations Support Branch, Cameron is Head of Information Capability Concepts in BAE SYSTEMS' Future Systems at Head Office. In this strategic role, he works closely with customers, internal business units and industrial partners to identify, explore and test innovative concepts which assist in the problem solving quest for optimal "information superiority". He is a Research Associate at the University of Nottingham, where he gained an MSc in GIS in 1992, and is a Freeman and Liveryman in the City of London.

Towards the Future

One version of the ideal information superiority goal would read as "knowing everything about everything, everywhere in real time so that every eventuality could be predicted, and prepared for to achieve ultimate effect". Whilst this ideal may prove allusive for some years to come, existing and emerging capabilities in information management have much to offer the incremental move forward towards such an ideal. This is especially true of emerging database techniques which offer flexibility and speed of access on an unprecedented scale. Equally, there is as urgent opportunity to re-visit information management - both from technology leverage and human factors points of view.

Conclusions

Design and delivery of network infrastructure and topology rightly receives a high degree of emphasis and investment. However, it is equally important that information management nodes - which store and serve information across the network - allow timely definition of what needs to be sent where and to whom. Serving all source derived information at various levels of fidelity, thematic content and security classification, is a major challenge - the design of the database element within the information management node is of increasing importance in meeting this challenge.

Automation of military information processes in the early 1990s gave way to phased re-engineering and rationalisation of these processes - largely driven by an increasing need for collaborative information sharing at national and coalition level. This evolution is continuing with a paradigm shift in organisational, doctrinal and technological practices as the move from platform centric to network centric operations gathers pace. The associated continuing investment needs careful planning and de-risking at every stage of the evolution.

Whilst information exchange practice must promote transactions that are relevant, digestible, secure and timely, the challenge of achieving this increases as the volume of raw data collected, analysed and disseminated reaches unprecedented levels. In meeting this challenge, well-designed databases are of critical importance and opportunities for leveraging database technology abound. Advancements in web accessible object oriented databases allow remote browsing using novel applications on the central server, thus reducing need for application software on the remote client PC. Through the ability to view the answer to an on-line query remotely, without downloading potentially large

amounts of contextual data, transmission capacity is conserved as little or no data is sent to the client.

Although leveraging this emerging technology is of potentially immense value in data management, the need to make human factors a central consideration to ensure that capabilities are fully tailored to the needs of the information manager cannot be overstated.

Selected Bibliography:

- Alberts, DS (et al) (1999) Network Centric Warfare (CCRP US DoD)*
Alberts, DS (et al) (2001) Understanding Information Age Warfare (CCRP US DoD)
Laudon KC & JP Laudon (2002) Information Management Systems (Prentice Hall)
Mintzberg H (et al) (1998) (Strategy Safari) (FT Prentice Hall)
TOGAF The Open Group Architecture Forum (www.opengroup.org)
UK MoD JSP 329 Information Management & 602 Information Exchange
Various papers and articles

eSpatial  www.espatial.com
Spatially Enabling Business

“Integrated Spatial Intelligence... ..Any device...Anywhere...”

eSpatial's unique network-centric architecture allows you to quickly and easily consolidate spatial information from multiple sources, integrate that information with other data sources and distribute it to any device anywhere...

eSpatial's iSMART technology leverages and extends Oracle Spatial to provide high performance spatial capability with enterprise-class security, reliability and availability. Supported by a range of industry standard development tools including eSpatial's Rapid Application Development environment, iSMART STUDIO, the technology allows you to:

- integrate multiple heterogeneous spatial and operational data sources
- access data from any device in any environment...over low bandwidth
- Shorten development and deployment times
- lower the cost of development, deployment and ongoing maintenance
- reduce the complexity and risk in deploying advanced spatial functionality.

eSpatial's server-based model also extends to pricing giving you low cost access for large numbers of users.....a true enterprise solution.

Contact: eSpatial UK Ltd., Arle Court, Hatherley Lane, Cheltenham, GL51 6PN or call 01264 359 700 or email: agordon@espatial.com

HM Ships ECHO and ENTERPRISE The next generation of Survey Ships By Commander Steve Malcolm RN



HMS Enterprise leaving Appledore

Following the decommissioning of the Royal Navy's Coastal Survey Vessels FOX, FAWN, BULLDOG and BEAGLE over the past few years, the delivery of their replacement has been awaited with anticipation. The decision to build the Survey Vessels, Hydrographic and Oceanographic (SVHO), under the new government 'Smart Procurement' initiative was made in June 2000 and the contract awarded to Vosper Thornycroft (VT), with the actual build sub-contracted to Appledore Shipbuilders Limited (ASL) in North Devon.

The contract is unlike any previous shipbuilding programme in that VT have agreed to maintain the ship under a 25 year Contractor Logistic Support (CLS) arrangement. This transfers responsibility to VT to ensure the ships are available to operate at sea in a surveying or contingent tasking roles for 334 days per year. In order to achieve maximum efficiency and utility from the Royal Navy's perspective, ECHO and ENTERPRISE will be adopting the Watch Rotation system pioneered by HMS SCOTT in 1997. This allows one third of the ship's company to be ashore at any one time for leave and training with the remaining two thirds at sea running the ship. Clearly, this requires 1½ times the number of people to run than a single watch vessel, however, the benefits far outweigh the additional manpower.

The number of sailors onboard each ship is not large. ECHO and ENTERPRISE sail with 48 onboard and 24 ashore, bearing in mind they are over twice the displacement of the Coastal Survey Vessels they replace,



HMS Echo launched March 2002

which had 52 onboard but only spent an average of 180 rather than 334 days at sea. This represents very lean manning and exceptional efficiency, which coupled with CLS and leading edge technology across the board provides the Royal Navy with an exciting step change in surveying capability. In addition to the survey role, the ships are fitted out as Mine Countermeasure (MCM) command platforms with the capability of supplying MCM Squadrons with their daily needs and support



HMS Echo in Portsmouth Harbour

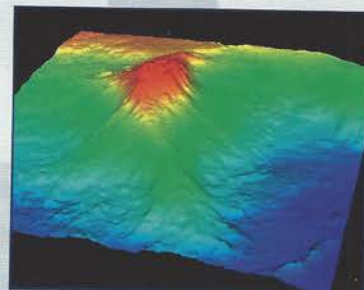
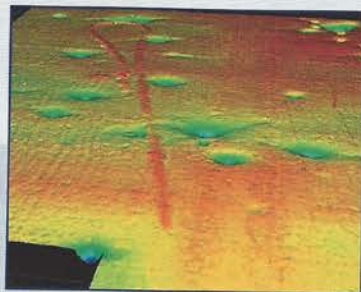
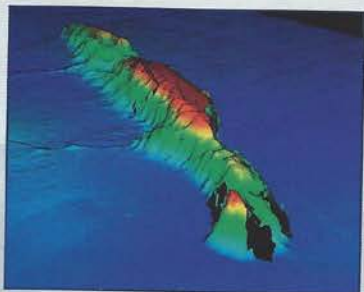
world-wide. This is the first time survey ships have been fitted with this bespoke facility on build further enhancing the utility of these new vessels.

Following the contract award, an Integrated Project Team (IPT) was established to co-ordinate final design and to act as the Navy's link with the prime contractor. Smart Procurement has allowed a more flexible and pragmatic approach to shipbuilding, the result being a very swift build with both ships currently planned to be in service by February 2004, just three and a half years from contract award. Although there have been many challenges for the IPT, prime contractor, shipbuilder and ship's companies alike, this project has been highly successful to date.



KONGSBERG

HMS Echo & HMS Enterprise utilise Kongsberg Simrad's Multibeam Echo sounders, renowned for their superior sounding accuracy, high reliability and durability.



Kongsberg Simrad congratulate Vosper Thornycroft and the Royal Navy on the successful commissioning of HMS Echo and HMS Enterprise

KONGSBERG SIMRAD Ltd
Telephone +44 1224 226500 E-mail: info@kongsberg-simrad.com
www.kongsberg-simrad.com

WORLD CLASS - *through people, technology and dedication*

HMS ECHO has an in-service date of September this year and is set fair to meet this target. The ship has been conducting sea trials and defect rectification since April this year, the results of which have been most encouraging. The new Integrated Surveying System has been supplied and fitted by Kongsberg Simrad Ltd, a Norwegian equipment manufacturer specialising in Multibeam Echo Sounding (MBES) systems. Sea trials have shown the ship's EM1002 and boat's EM3000 MBES systems to be very impressive, state-of-the-art, effective survey tools. These systems represent a significant change in the way hydrographic surveys will be conducted by the RN in the future and much effort is being put into establishing how to use the sonars to maximum effect. No doubt experience gained in this area will be shared with readers of Ranger Magazine in future editions.



HMS Echo

vessel is the ability to Replenish at Sea (RAS) and whilst on sea trials ECHO had the opportunity to RAS with one of newest Royal Fleet Auxiliary supply vessel RFA Wave Ruler in the English Channel. Given the fact that both vessels were new and ECHO was still coming to terms with a new propulsion system, thankfully everything went well.



RFA Wave Ruler and HMS Echo carrying out the first RAS of a hydrographic ship

The previous generation of survey vessels were built in 1968 and served the RN admirably. HM Ships ECHO and ENTERPRISE look set to continue this tradition and to take the Royal Navy's hydrographic capability to a new level through innovative procurement, support, manning, operational routines and equipment. Exciting times lie ahead as we all learn how to extract the most from these capable hulls.

At sea, the ships have proven 'interesting' to control for Commanders Martin Jones and Vaughan Nail of HM Ships ECHO and ENTERPRISE respectively. Under initial guidance of the Trials Master, Captain Jake Backus, they have been coming to terms with the "Azipod" thrusters at the stern, which replace the traditional propeller shaft and rudder design of conventional ships. The Azipods are effectively two electric motors with a propeller at the forward end designed to pull rather than push the ship through the water. Each pod, one port, one starboard, can be rotated through 360 degrees to change the direction of thrust and, therefore, act as rudders. Confused? Apparently it takes some time to become adapted, however once the art has been mastered, the ship becomes highly manoeuvrable and relatively easy to bring alongside. Another new capability in a survey



HMS Echo entering Portsmouth

HMS ROEBUCK'S WAR

Devonport based coastal survey ship HMS Roebuck returned to Devonport on Monday the 9th of June after an extended deployment to the Gulf during which the ship played a pivotal role before and during operations against Iraq. Hydrographic charts of the seabed compiled by HMS Roebuck were used to plan the recent military operation and by the coalition ships during the conflict. The ship surveyed the main amphibious operating area, which was larger than the county of Hampshire, in less than six weeks, plotting any contacts on the seabed larger than a coffee table.

HMS Roebuck and her ship's company of 53, sailed from Plymouth in November 2002 originally for a 3fi month deployment to conduct surveys in the Southern Arabian Gulf. In early December, with the possibility of conflict increasing, the ship was re-tasked to the Northern Arabian Gulf and the deployment extended.



HMS Roebuck on the Az Zubayr river near Umm Qasr

The ship continued her work in this new area of operation until the day before hostilities commenced. With the ability to print her own charts, as each area was fully surveyed a new set of charts were printed onboard and distributed to coalition ships by boat transfer as soon as the ink was dry. HMS Roebuck's work proved that there was more water available than was detailed on existing charts. This allowed the aircraft carriers to move further north, speeding up the initial landings by reducing helicopter flight times from sea to Iraq by 10 minutes.

Further survey work in the Khawr Abd Allah waterway and the port of Umm Qasr prepared the way for the delivery of humanitarian aid with RFA Sir Galahad becoming the first ship to bring in supplies. HMS Roebuck also went alongside at Umm Qasr and the ship's survey motor boat, callsign Sierra One, was launched to begin a detailed survey of the port. Three days later HMS Roebuck produced the first new chart of the port for over 40 years. As the river further

north was cleared by the Mine Counter Measure vessels, Sierra One began surveying again and proceeded along the Khawr Az Zubayr to 50 miles inside Iraq.

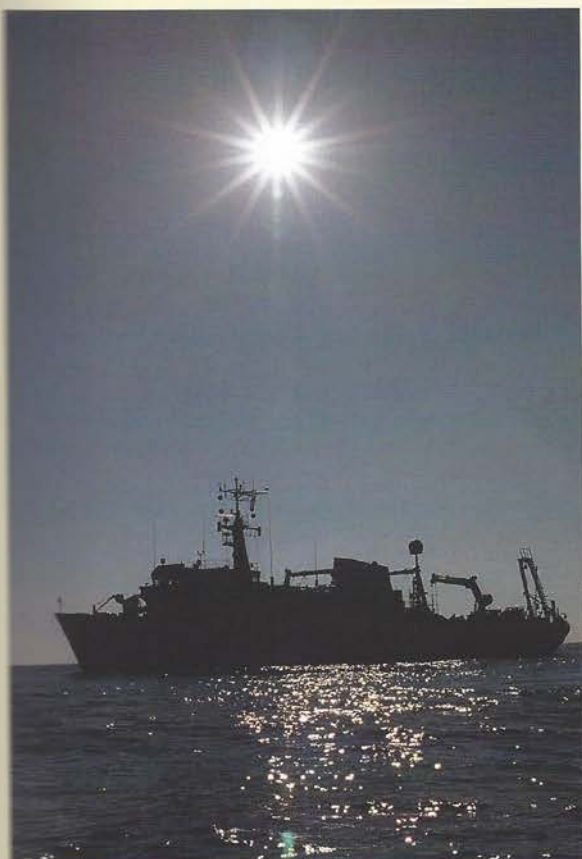


RFA Sir Galahad and HMS Roebuck at Umm Qasr

Lieutenant Commander Andrew Swain, HMS Roebuck's Commanding Officer, said: "The charts produced by HMS Roebuck were used by all types of warships during the conflict. I am immensely proud of every single member of the ship's company. They have shown exceptional courage and worked extremely hard under uncertain and arduous conditions during the many long months that HMS Roebuck has been surveying the waters off Iraq. The ship has been at the front of the maritime force since mid December; often working alone and the crew have faced new challenges every day. I would also like to pay tribute to the families and friends of the crew. The ship has had many short notice changes to her programme over the last six months and due to security requirements attached to our survey mission it has not been possible to tell our families back home where the ship was working or which port we would visit next. I know that this type of uncertainty makes separation even harder, particularly for those families with young children. Throughout the deployment letters, cards and e-mails from our families and friends have kept our spirits up and helped us to get the job done."

Vice Admiral Mark Stanhope, Deputy Commander in Chief Fleet, joined HMS Roebuck in Plymouth Sound on the 9th of June to welcome the ship's company home and congratulate them on a job well done. The ship was escorted to the jetty by boats from HMS Raleigh, where around 150 family members and friends waited to be reunited with their loved ones. The Band of Her Majesty's Royal Marines Plymouth and a Guard of Honour made up of trainees from HMS Raleigh were also on the jetty to meet the ship. HMS Raleigh has a long association with the ship, as Roebuck was the name of one of Sir Walter Raleigh's boats.

HMS Roebuck is the Royal Navy's only remaining coastal survey vessel, and was built as one of a class. The ship was launched in November 1985 and commissioned on 3 October 1986. She is the 17th ship to bear the name giving her the longest battle honours of any other ship starting with the Armada.



HMS Roebuck Silhouette



HMS Roebuck proceeds up the Az Zubayr



The Devonport fireboat welcomes Roebuck home



HMS Roebuck returns to Devonport

GEOGRAPHIC SUPPORT TO THE ACE RAPID REACTION CORPS

By Major Hamish McCarthy BSc MSc RE - SO2 TERA/Plans

**Allied Command Europe
Rapid
Reaction
Corps**



**Forged on Operations
Honed in Peace
Ready for the Future**



NATO's Spearhead

The aim of this article is to outline the structure and role of Geographic Section and Engineer Intelligence, who we work in conjunction with, in Headquarters Allied Command Europe Rapid Reaction Corps (HQ ARRC) and, to describe how the organisation supports the staff and Commander ARRC's mission.

The Geographic and Engineer Intelligence Sections are part of the HQ ARRC Group (Engineers). HQ ARRC Group (Engineers) consists of three key elements: the Corps Engineer Brigade (29 (MN) Engr Bde), a Geographic Support Group (GSG) and an Engineer Works Group (EWG). In addition there will be linkage with Host Nation (HN) resources and Engineer units and, whilst they will remain outside the HQ ARRC Group (Engineers), their inter-dependencies are shown in **Figure 1**. Note that there are close working links between each of the HQ ARRC Group (Engineers) elements and HQ ARRC Engineer Sub-Branche. In the case of Geographic this is directed through the Chief Geographic Officer, currently Lieutenant Colonel Mark Burrows.

ENGINEER GEOGRAPHIC

HQ ARRC Engineer (Geo) is primarily responsible for:

- 1 Acquisition and provision of Geographic Information such as mapping, digital elevation data, imagery, etc for HQ ARRC and assigned forces;
- 1 Geographic advice, including terrain analysis, to HQ ARRC staff.
- 1 Support to officer education in the form of historical battlefield studies, vignettes and TEWTS.

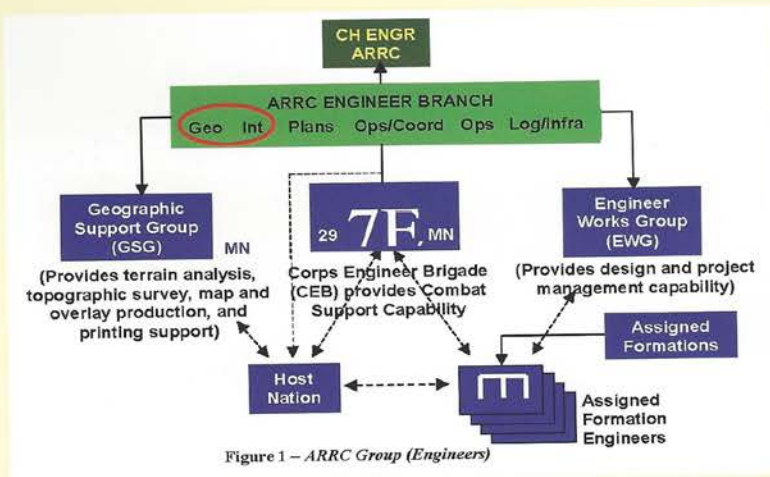
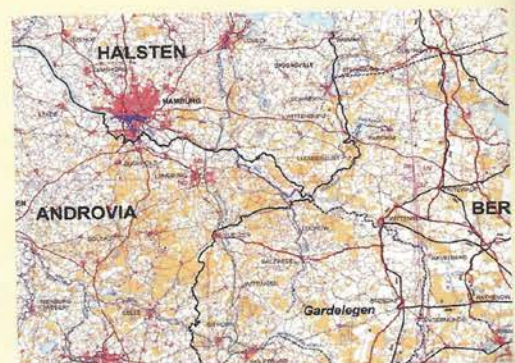
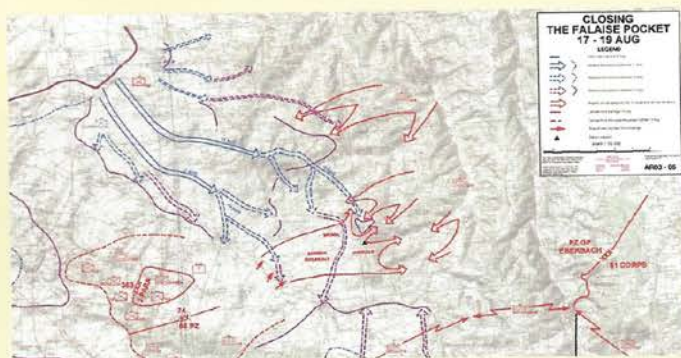


Figure 1 – ARRC Group (Engineers)



A Battlefield Tour Map and a Terrain Map

In order to achieve this, the sub-branch consists of a peace establishment and augmentees who reinforce us for major exercises and on operations. These are divided between the main headquarters and Rear Support Command.

GEOGRAPHIC AND ENGINEER INTELLIGENCE FUNCTIONS

There are three Geographic staff officers and an Engineer Intelligence staff officer within HQ ARRC. A further 12 personnel, comprising British, Americans and an Italian, support the staff officers in the Geographic Engineer Intelligence Section.



The multi-national staff of the Branch

SO2 Geo Ops/Coord, currently Major Mark Huish, is responsible for acquiring, accounting and distributing mapping and other forms of Geographic Information. He is also responsible for manning and liaison with subordinate Geo units and cells within subordinate HQs. In summary, he and his staff are focussed externally to sub formations and the wider Geographic community.

SO2 TERA/Plans, currently Major Hamish McCarthy, is responsible for providing advice and support to HQ ARRC staff, notably to the Intelligence and Preparation of the Battlespace (IPB) process lead by the G2 military intelligence community (G2) and the Corps Planing Group (CPG) process. He and his staff are focussed internally.

The main focus for Geographic support to the HQ is in the form of Terrain Analysis (TERA). This is the process of collecting, analysing and evaluating geographic information on natural and man-made features. The interpretation of this information, in combination with other relevant factors, provides predictive information and advice about the effects of terrain on military operations. SO2 TERA/Plans and the TERA Section are responsible for TERA support to all HQ staff branches. SO2 TERA/Plans inputs TERA advice during the G2 All Sources Cell (G2 ASC) planning process and, either directly or in conjunction with SO2 Engr Plans, to the CPG. TERA is an integral part of IPB and is used to examine how enemy and friendly forces may move and operate over and above the terrain (Land and Air IPB). As such, close liaison with G2 is essential.

There are a number of additional areas where geographic support may be provided to HQ staff such as: mapping with vector overlays, provision of historical mapping and position reference. Where large tasking and bulk supply are required to ARRC assigned

formations the Geographic Support Group (GSG) is used. The GSG, currently focussed around 14 Geographic Squadron (UK), is a multinational group of Geographic specialists grouped together to form a unit. The size and shape of the GSG is task-dependent but would normally be based on a UK Geographic Squadron and controlled by 1 Signal Brigade with which it is often co-located.



TACISYS: the field deployable geographic system

ENGINEER INTELLIGENCE

Engineer Intelligence is responsible for all enemy engineer related input to the Corps IPB process, as well as the Corps targeting process through the Corps Targeting Group (CTG). As such they are now grouped with Geographic. The Engineer Intelligence Section provides engineer advice to the Deep Operations Cell (DOG) as required. Engineer Intelligence, along with Geographic, remains closely linked to Corps G2.

The Chief Geographic Officer routinely controls the Engineer Intelligence cell in barracks and on deployment it collocates with the G2 All Sources Cell (G2 ASC) in the ARRC MAIN command post. The Cell is responsible for:

- 1 Providing expertise on enemy Engineer doctrine, capabilities, operations, and potential courses of action to the Engineer Branch and the G2 ASC;
- 1 Providing expertise on theatre infrastructure, in conjunction with Geographic and Engineer Logistics and infrastructure personnel (primarily road, rail, bridges, APODs (Airports of Disembarkation) and SPODs (Seaports of Disembarkation) and how it affects enemy and friendly movement and manoeuvre;
- 1 Serving as the engineer representative on the Corps Targeting Group, bringing the mobility/counter-mobility perspective to the Corps target nomination process and assisting in shaping the battlespace in accordance with the Commander's intent;

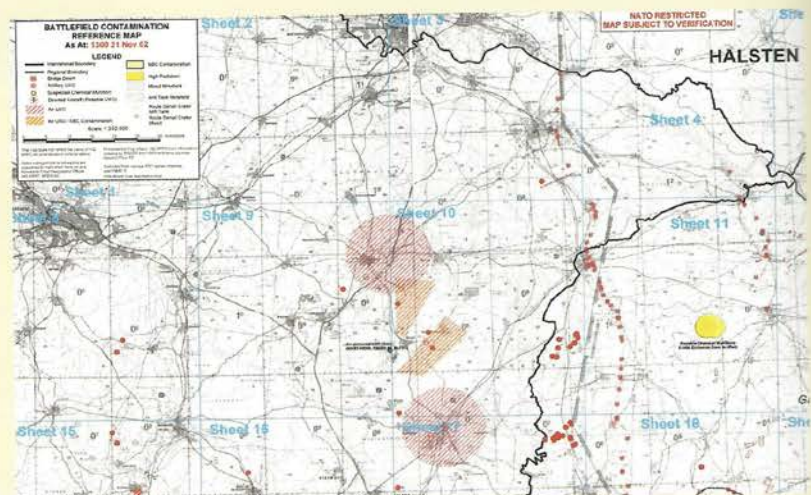
- 1 Providing assistance to G9 Civil Military co-operation (CIMIC) as they develop country studies and information databases;
- 1 Providing input into the Corps Battlefield Contamination Database.

Obstacles, especially minefields, constitute the most critical part of Engineer Intelligence in terms of information flow. As such all formations must be informed immediately of changes to the obstacle trace. The internal and external distribution of obstacle information is achieved by a number of methods, including the entering of data into GP3, ARRC's bespoke situational software, and inputs into G2 Intelligence Summaries (INTSUMS). The Engineer Intelligence cell has sole responsibility at Corps level for the recording and numbering of all enemy obstacles including minefields. Obstacles are to be recorded on an Excel spreadsheet and converted into ARCVIEW Shape files that can be exploited on C2 systems using normal web browsers. This, and other contaminations such as Nuclear Biological and Chemical (NBC) and Toxic Industrial Hazards (TIH), burials, vehicle casualties and air/artillery delivered unexploded ordnance, are then collated in a Battlefield Contamination Database which is published at intervals to the HQ in the form of a Battlefield Contamination Map. Subsequent declassified mapping at 1:100,000 scale is available for Non Government and International Organisations (NGOs/IOs) use.

SUMMARY

The Engineer Branch and crucially the Geographic/Intelligence section allow Commander ARRC to make meaningful deductions about the geographical conditions and the enemy's capabilities, in a given time and space, which shape his battlefield. In the planning process we allow a more responsive approach to the IPB Process giving greater flexibility, accuracy and therefore tempo to this crucial and ongoing process

The Duke of Wellington stated "All the business of war, and indeed all the business of life, is to endeavor to find out what you don't know by what you do; that's what I called 'guessing what was at the other side of the hill.'" The Geographic/Engineer Intelligence Section within HQ ARRC ensure that the Commander's guess is based on superior, more accurate information than that which was available to Wellington!



An extract from a Battlefield Contamination Map

THE SAGA OF THE OC'S CAR AND THE IRAQI TAXI DRIVER

The order for 19 Topographic Squadron to withdraw from RAF Habbaniya after more than three months under siege (see the article elsewhere in Ranger) presented Major DV Hutchinson, the Officer Commanding, with a problem. The only way to backload stores to Cyprus was by air and so only the most valuable equipment and essential personal kit was granted space on the aircraft. The OC was the proud owner of a car - not the universal possession in 1958 that it is now! What was he to do with this prize possession? With little choice, at the last moment Major Hutchinson left the vehicle in the care of an Iraqi taxi driver who had served in the Iraq Levies. He gave him the car keys, £50 and instructions to drive the car to Beirut and there to instruct Thomas Cooks Travel Agency to ship the car to Cyprus. With that the Iraqi drove off and the OC, who because of the coup had been unable to insure the car, thought that he would see neither his car nor the £50 again.

However, some long time later, an overjoyed Major Hutchinson received a telephone call from a shipping agent in Famagusta asking him to collect his car from the docks. It transpired that the taxi driver had at last received permission to drive the car to Syria. He left Habbaniya on the Ramadi to Rutbah road and there turned north on the "Nairn" route to Damascus, so called because it was an unpaved route straight across the desert used by the Nairn Bus Company. Unfortunately whilst on that route he got a puncture but was unaware that there was a spare wheel in a tray under the boot and so he hitch hiked back to Ramadi with the punctured wheel for repair. Eventually he arrived in Beirut and handed the car over to Thomas Cooks - and disappeared - presumably back to Iraq. The OC was never able to contact and thank him but retained a long belief in the good nature of the average Iraqi.

GEO PEOPLE



Air Commodore Martin R Hallam RAF

Chief Executive

Defence Geographic & Imagery Intelligence Agency

Air Commodore Hallam was commissioned in 1973 and, after initial professional training as a photographic interpreter, served at the Joint Air Reconnaissance Intelligence Centre (JARIC), at Brampton. During this first tour, he undertook detachments in Northern Ireland on the Reconnaissance Intelligence Centre (RIC) at RAF Aldergrove and as Officer Commanding the RIC in Belize. In 1977, he moved to RAF Wyton to serve with 39(PR) Squadron (Canberra PR9s), which was followed by tours at RAF Laarbruch (Jaguars and Buccaneers) and RAF Waddington (Vulcan B2s), as Wing and then Station Intelligence Officer. He went on to serve at RAF College Cranwell as a flight commander in the Department of Initial Officer Training, and then as ADC to the Governor and Commander-in-Chief Gibraltar.

On promotion to squadron leader in 1987, he filled command appointments as OC IV(AC) Squadron RIC at RAF Gutersloh in support of Harrier GR3s, and then at JARIC as OC 4(Aerospace) Squadron. He was selected to attend the RAF Staff College at Bracknell in 1991. There then followed four years duty in the UK MOD on the Defence Intelligence Staff, firstly as Staff Officer to Director Intelligence Rest of the World, and then, on promotion to wing commander in 1993, as the policy lead for Imagery Intelligence (IMINT) training and RAF Intelligence personnel. He moved to command Operations Wing at JARIC as it became a Defence Agency in 1995.

In 1998 Air Commodore Hallam was promoted to group captain to take up a NATO post as DACOS Intelligence at HQ AIRCENT, Ramstein. A year later he returned to the UK as Chief of Staff of the Defence Intelligence and Security Centre, Chicksands, and in July 2000 he took command of JARIC. He held this appointment until December 2002, and then attended the Royal College of Defence Studies before moving, on promotion, to DGIA in April 2003.

Air Commodore Hallam and his wife, Margaret, live at Brampton and number walking, country field sports, horse racing and opera among their interests. He has also been known to play golf and tennis.



Captain David Lye OBE RN

Captain Hydrography and Meteorology and Hydrographer of the Navy

David was born in 1950 and joined the Royal Navy in 1973, keen to pursue a career in Hydrography. He conducted his sea training in HM Ships HAMPSHIRE and LOWESTOFT, and qualified as a Naval Hydrographic Surveyor in 1976. Thereafter, having served in HMS HERALD off the Shetlands, and completing a detached ten-week survey of Takoradi and Sekondi Bay in Ghana, he served in the Storm Tide Warning Service at the Meteorological Office. David also served as First Lieutenant of HMS ENTERPRISE; Navigating Officer in HMS BULLDOG; and Senior Watchkeeper in HMS HERALD, which saw service in the Middle East, Arctic and Falkland Islands during the Falklands Campaign.

In 1983 he was appointed to HMSML GLEANER, building, and brought her into service as Commanding Officer of the first commission. Following the completion of a large detached survey in Western Scotland, he was appointed to HMS ROEBUCK in 1985, building, and brought her into service as First Lieutenant. In 1987, David was appointed to the Staff of Commander Sea Training in Rosyth as Staff Navigating Officer (Hydrographic) where, in addition to his operational sea training task, he was responsible to the then Commodore Minor War Vessels and Minewarfare for precise navigation in the Minor War Vessel Flotilla.

Having served for two years as 2SL/1SL in HM Y BRITANNIA, David completed the Royal Naval Staff Course at Greenwich in 1992 and was promoted to Commander in December of the same year. He then joined the Ministry of Defence, in the Hydrographic Department, where he was involved with work associated with the study of the 'Future Strategy for the RN Hydrographic Service', and the initial procurement of Multibeam and Differential GPS systems. He assumed Command of HMS HECLA in 1995, where he was responsible for a nine-month deployment to the

Western Atlantic and surveys in the Indian Ocean, before paying the ship off in December 1996. A three year tour as Commander (H) followed and on leaving, and prior to assuming the post of Commander of the Royal Naval Hydrographic School in March 2000, David was awarded the OBE for Services to the Hydrographic Branch. Selected for Captain in June 2000, he subsequently joined DNSOM as ADI on 28 August 2000 where he worked to promote digital products and charting nationally, multi-nationally and with NATO.

From 15th January 2003, David assumed the title and role of Hydrographer of the Navy. He said, "I am thrilled and highly privileged for my last job in the Navy to be that of 'The Hydrographer' - particularly when you think of the tradition, and those who have filled the position before." He also said that having worked at, for and with the UKHO as a surveyor for many years; he has many friends there and feels enormously committed to the Office and proud to be a non-executive Director.

David married his wife Jane in 1976 and they live in Plymstock, South Devon. They have three children, their eldest son aiming to follow in his father's footsteps when he joins the Navy as a Survey Recorder in June.



Lieutenant Colonel MRH Burrows RE

Chief Geographic Officer - HQ ARRC

Lieutenant Colonel Mark Burrows is currently the Chief Geographic Officer at NATO's ACE Rapid Reaction Corps (ARRC) headquarters in Rheindahlen. Although he is a qualified surveyor, completing the Army Survey Course in 1987, he has spent much of his time working in both military operations and intelligence.

Mark had half a mind to join the army (which was deemed sufficient at the time) on hearing about sponsorship for undergraduates. He was then sponsored by the Royal Engineers at Exeter University to read chemical engineering and after a number of military training courses was posted to 26 Engineer Regiment in Germany, the Falkland Islands and 1 Training Regiment at Minley. He was then seconded to the Defence Mapping Agency, as part of 512 Specialist Team Royal Engineers, working on various satellite tracking programmes in the US, Cyprus, Ascension Island and Diego Garcia; this subsequently led onto joining Military Survey. On completing the Army Survey Course, he carried out a number of survey tasks in the Caribbean, East Africa and Indian Ocean, working with the DMA and the US Oceano/Hydro ship USS Harkness.

On returning to the UK, he was posted to HQ UK Land Forces in an SO3 operations appointment and was deployed to Turkey post the Gulf War. Then on promotion to Major, he was sent to the Production Planning and Control Unit at Military Survey Feltham for a year before moving to a newly established post in the Directorate of Military Operations. This was followed by a course at the RN Staff College at Greenwich, where he gained an MA in Defence Studies. After the course, he was posted as Officer Commanding 13 Topographic Squadron and then deployed to Bosnia twice. The first tour was to support a newly formed Anglo-French headquarters to provide geographic support and to assist with construction projects and the second time, with the Squadron plus US and Canadian attachments, providing geographic support to NATO's Peace Implementation Force.

London then called with his next appointment as Military Assistant to the Deputy Chief of Defence Staff and then, on promotion to Lieutenant Colonel, to the newly formed Directorate of Equipment Capability ISTAR, with responsibilities for geographic and imagery intelligence acquisition programmes. After a five-year spell in London Mark was pleased to return to soldiering as the Chief Geographic Officer at HQ ARRC.

Lieutenant Colonel Burrows is married to Felicity and they have two young boys. He is a keen fly fisherman and deerstalker and maintains a healthy interest in a number of country pursuits.

August 2001 saw me leave for Brussels and a tour with the European Union Military Staff, the embryo of the European Army. This was great fun and very rewarding but alas was to last for only eleven months as I was pulled back to Hermitage to fill my current post of Commander Geographic Engineer Group, an honour and opportunity for which I am very grateful.

Myra, my wife, is happy to be back as we see more of the three children, the youngest of which is currently partying her way through university. I can pick up on my golf and sailing and hopefully still afford to get a bit of skiing in during the winter.

BRINGING MAP MANAGEMENT INTO THE 21ST CENTURY

“Making life easier through modern technology”

By Andrew Blenkinsopp

Information Systems Manager, Ultra Electronics



The new home of the Map Library

Bringing Map Management into the 21st century - a mighty large statement. However, this was the charge placed on Ultra Electronics by the Defence Geographic Centre (DGC) of the Defence Geographic and Imagery Intelligence Agency (DGIA) with the award of two major contracts: the Open Systems Database Migration project (OSDBM) and the Defence Geographic Requirements Management System (DGRMS).

The problem...

The work of surveyors over the last one hundred years has enabled DGC to assemble a collection well in excess of one million maps, one of the largest if not the largest, in Europe. This collection, fundamental to the success of any UK military operation, must be rigorously and stringently managed.

Towards the end of the Nineties it became apparent to DGC that its map management processes were unwieldy and the supporting IT infrastructure was fast becoming obsolescent. A decision was taken to modernise the management tools.

OSDBM

The first and largest concern was that the majority of DGC's systems used VAX main frame computers with dumb terminals which were becoming difficult to support. Therefore the OSDBM project was conceived and put out to competition. The innovative approach proposed by Ultra was accepted and in late 1998 work began.

One of the main proposals was for the DGC to be an integral part of the Project Team, something that we all know now under the principles of SMART procurement. To this end strong and open relationships were forged so that any unexpected events were readily resolved with mutually agreeable actions. Before the migration of any software systems could be undertaken a completely new IT architecture needed to be implemented which would support future expansion. The chosen route was Microsoft Windows NT4 with Intel processors.

The infrastructure requirement was further complicated by the need for Users to be able to work at both Restricted and Secret levels on the same machines connected to one physical network. This was solved by some simple hardware changes to give standard PCs removable Hard Disk Drives and supported by a not-so-simple network configuration. Hence, over 200 DGC Users in Feltham, Tolworth, Guildford, Hermitage and the Old War Office Building in London ended up with a single Dual Mode Workstation, DMW, on their desks.



A Dual Mode Workstation

Once the IT infrastructure was in place work began on the migration of the databases, most of which were small and straightforward. These were completed, installed and tested allowing the old systems to be turned off before the dawn of January 2000.

There remained two more complicated databases. ModMap, DGC's electronic catalogue of its physical map products and Repaut, a similar electronic catalogue of the corresponding reproduction materials. The data from these two databases was to be merged and a totally new application to access this new super database written. This is ModMap2.

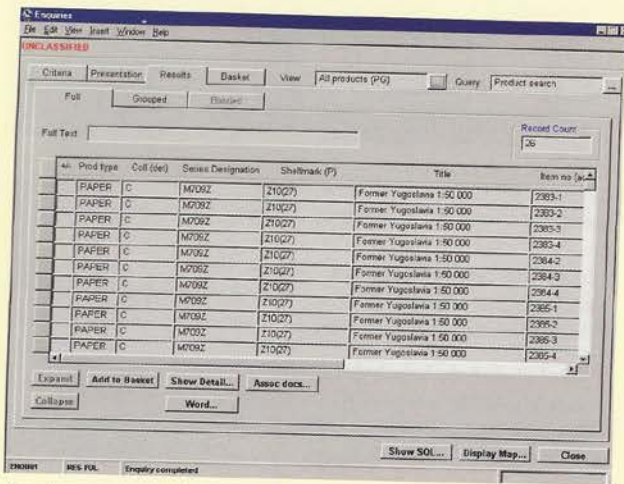
To ensure the success of the ModMap2 programme careful and detailed process and data capture workshops were held. From these workshops new streamlined working practices were developed and the graphical front-end of the system prototyped. The main shortcomings of the incumbent systems were their very limited graphical capability and the inflexibility of the enquiry mechanism.



Part of the Map Library

Map Metadata: data about a map as opposed to data on the map, ie scale, geographic coverage, publisher, etc.

ModMap2 is the tool used by DGC to facilitate all of its day-to-day tasks such as loaning and superseding mapping products, as well as becoming the prime cataloguing and enquiry tool. The metadata stored within the database is comprehensive and due to the structures now in place, every piece of metadata can form part of the enquiry.



Sample query output from ModMap2

Once an enquiry has been completed the results can be displayed graphically, with the option of various

overlays such as political boundaries, airports etc. The User community sees this as the major improvement, as now they can instantly have a visual check against some meaningful backdrop.

Due to the operational nature of ModMap2 it was decided to train the Users before the system was fully accepted. This allowed them to 'hit the ground running' with the live system. The feedback from almost all the courses was "When can I get my hands on it for real?"

When ModMap2 was accepted at the DGC all of the legacy data to the new system was migrated onto the system.

DGRMS

One of DGC's main activities continues to be the processing of requests for maps for different classes of operation, from detailed troop manoeuvres to flight planning - a 'Geographic Requirement'. Previously they have done this by providing an informed opinion on the availability of mapping information suitable to meet that requirement or by a provision solution to meet it in the future.

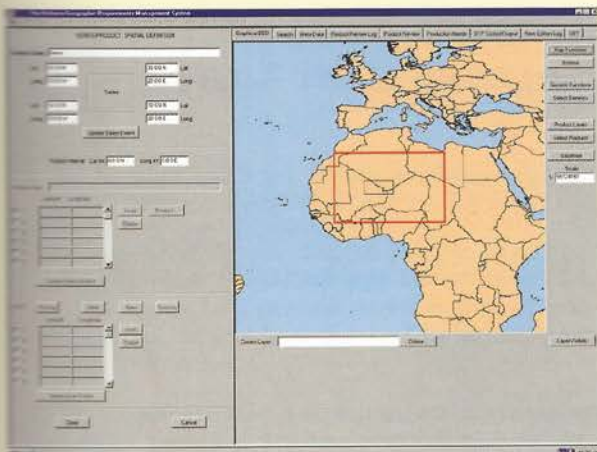
Once again the DGC identified that its process could be improved. Data was stored on a number of disparate sources ranging from paper through Microsoft Access to Oracle databases. The lack of integrated metadata meant that producing the most complex reports could take up to six months as everything had to be done and then manually checked.

The DGC tendered for a bespoke application that would capture, shape and then mould its working practices into an efficient streamlined business model, the Defence Geographic Requirements Management System, DGRMS.

Once again Ultra was successful in winning the contract in May 1999. Five months were spent in Requirements Capture, three more than were originally planned, to ensure that everything possible was included. What became evident was that everyone had underestimated the complexity of providing a system to fulfil this need. Once application development was underway close liaison was maintained to guarantee that the eventual Users were satisfied with the look and feel of the system.

During the system integration phase it became apparent that there were conflicting processes within different DGRMS stakeholder groups. Ultra took the role of facilitator and through design workshops developed suitable processes to meet all needs.

One of the prime discriminators between DGRMS and the systems it replaced was its graphical capability, both for displaying results and for defining the Requirements that the systems holds. With this enhanced graphical capability production of the most complex of reports is now possible in days.



A sample DGRMS graphical query

As development approached its conclusion it was time to migrate the data from the legacy systems to DGRMS. A nerve-racking time, and many late nights were spent in developing a process to minimise the time the DGC would be non-operational. However, on the 19th December 2000, DGRMS Phase 1 was fully accepted by the DGC and went operational.

For the technocrats...

The minimum specification of a DMW is an Intel Pentium II, 200MHz machine with 128 Mbytes of RAM running Microsoft Windows NT4 with CESG accredited Security Extension add-on. The machines are modified to have removable 8GB HDDs, and connect using a fibre optic network running at 10 Mbit/s.

ModMap2 is a web-deployed application; using any browser such as Netscape or Internet Explorer to interrogate the data. A database server with 1GB of RAM hosts the Oracle 8 database and is connected to a twin Pentium server that acts as the web-server and application download machine.

The DGRMS application is a web-enabled, thick client-server application. The DGRMS database is also Oracle 8 and resides on a twin Pentium II server. The data requests and transformations are managed through the Formida Enterprise Spatial Manager to ensure maximum efficiency of enquiries. As the DGC network is upgraded, the speedier dataflow will allow the system to be also web deployed with a thin client browser.

The Way Ahead, possibly...

One of the requirements of OSDBM was to be capable of future expansion. Microsoft's statement back in 1999 that they would be phasing out support of Alpha variants of their software means the current infrastructure has a dramatically reduced operational life. Therefore to sustain the supportability of ModMap2 these have been replaced with an Intel based server.

Another logical step to increase the efficiency of the DGC's Map Management process could be to extend ModMap2's capability to cover digital mapping products.

One could foresee that, as both the ModMap2 and DGRMS databases store gigabytes of data with a large degree of overlap, it would be sensible to merge the databases. This would allow two separate GUI applications to have access to a common data store, removing the current need to separately update data that resides in the both databases, ensuring consistency of data.

In Summary

Not everything on OSDBM or DGRMS has been straightforward, but as a Team we have come through all the difficulties.

The final acceptance activities are complete for ModMap2 of the OSDBM project and DGRMS application is now in full operational use. I think we can say that Ultra have made Map Management easier for DGC to undertake and given them some of the 21st century tools. However, human nature will always ask, "Now I can do this, surely it would not be too difficult to add...?" That is for tomorrow.

Andrew Blenkinsopp is an experienced project manager with a background in aerospace and defence. He joined Ultra Electronics in early 1999 where his role has been that of Information Systems Manager responsible for some of Ultra's 'New Direction' projects.

BOOK REVIEWS

Members knowing of newly published books that might be of interest to readers are asked to let the editor the details so that a review can be published in Ranger.

PRESENTATION OF 8 MAP & AIR CHART DEPOT RE UNIT SIGN

Just before his recent retirement after 33 years service to Military Survey, Mr Colin Price presented a restored version of the old 8 Map & Chart Depot RE unit sign to Rod Siggs, current Head of MOD Map & Air Chart Depot.

Before his retirement Colin felt sufficiently moved to try and record a part of Military Survey history relating to the unit responsible for a large part of the UK's supply of mapping. Indeed, so much has already been lost and so little recorded, that Colin had a hard job finding out anything about 8 Map & Air Chart Depot RE.

What he did find he has recorded within a frame that is fixed to the wall of the new MOD Map and Air Chart facility at Feltham alongside the old unit sign and above a plaque that reads:

*"To Those Who Served"
1941 - 2000*

Colin has written - "This Unit Sign was saved from destruction when the Depot was moved on relocation to Feltham in September 2000. This was the last of 29 numbered Royal Engineers Map Depots that were formed during the Second World War, serving British and Allied Forces, both from within the United Kingdom and throughout the British Operational Theatres of that period. The Unit performed a vital, key role in support of other Map Depots, Operations, Exercises and Training for all three Services and Government activities throughout its life.

No 8 Field Survey (War Office) Map Depot, RE was formed in January 1941 and was located at 75 Winchcombe Street, Cheltenham, Gloucestershire. Additional storage space was taken in Old Bath Road, Cheltenham, in May of that year. It moved to Southall, Middlesex in July 1942, where it operated for 2 years.

In June 1944, the Unit was moved into the "Hygrade" factory at Hanwell, London, W7. This incorporated production elements that were forerunners of a Survey Production Centre, which later moved to Feltham.

In 1947, it moved to Ascot, Berkshire, next door to the winter quarters of Bertram Mills Circus and in 1952 it moved to its last home at Grange Road, Guildford, Surrey. It was during the 1970's that the Unit changed its title to that of 8 Map & Air Chart Depot, RE.

The Unit was disbanded on 11 September 2000, when it lost its status as a military unit and was renamed MOD Map & Air Chart Depot upon moving to Feltham during August/September. The official opening took place on 22 September 2000."

The photograph shows Colin Price, having presented the restored version of the old 8 Map & Air Chart Depot unit sign to Rod Siggs. Also present were WO2 Paul Hargreaves, current 2 i/c and Geographic Co-ordinator and SSgt "Pops" Prior, Customer Services and Freight Co-ordinator.

SUEZ MEDAL ANNOUNCEMENT

Readers who served in Egypt between 1951 and 1954 will be pleased to learn that a recommendation has been formally put to Her Majesty for the award of a 'Suez' clasp to the General Service Medal 1918-1962. Details regarding the precise dates and area to be covered by the award have yet to be defined but almost certainly service with 42 Survey Engineer Regiment during its time in Fayid Camp in the Canal Zone will count.

Younger readers may not be aware of the turbulent times during the 1950s when Egyptian nationalism was directed against the British Forces stationed under treaty conditions in what was called The Suez Canal Zone. Housed mainly under canvass in the desolate desert fringe, troops, many of whom were National Service conscripts, were subjected to terrorist attacks which led to a greater number of British deaths than either of the recent Gulf Wars or the various operations in the Balkans.

THE 1st INDEPENDENT SOUND RANGING BATTERY

By Stan Tress

In the Spring 2002 issue of the *Ranger*, Geoff Woodhead recalled his days as a Met Officer with the 1st Independent Sound Ranging Battery RA. He mentioned that there appeared to be little or no official record of the unit. As one who served with the Battery throughout its existence, perhaps it falls to me to put something on record.

Upon returning from Dunkirk, the Sound Ranging Battery of 1st Survey Regiment was given the task of locating any hostile guns which might be ranged across the channel at targets in SE Kent. Sound Rangers in the 1914-1918 War had experienced the difficulty of fixing a hostile gun at a range of more than about 6 miles in front of the base. Whilst a plot was reliable as to bearing, it was inaccurate in range. They had solved the problem by setting up three adjoining bases, thus giving three good bearings which could be plotted on a composite plotting board to give a reliable intersection. In 1940 1st Survey adopted this pattern of deployment.

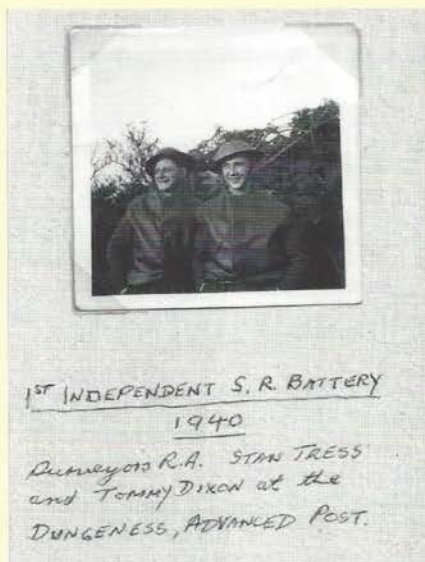
The Sound Ranging Battery was enlarged to three troops (Able, Baker and Charlie). The Battery and A troop had HQ's at Eythorne, with a base behind the South Foreland and an Advanced Post (AP) at St Margaret's Bay. B troop was at Sellindge (where Geoff Woodhead and his Met Section were stationed), with a base behind Hythe-Sandgate and an AP in the Hythe area. C Troop was at Appledore, with a base straddling Romney Marsh and an AP at Dungeness. Each of these bases deployed six microphones. The Battery was in operation for some weeks before it became detached from the 1st Survey Regiment and adopted its new title.

A hostile gun firing from the extreme east or west might not have been heard by an AP until the sound had passed some of the mikes on its own base. Consequently, the four HQ's were linked by one permanently manned telephone line. Each telephonist wore a headset by which he was linked to his AP through one ear and the battery line through the other. Instantly the recorder at his base started up, the telephonist would shout down the battery line (e.g. Shot Baker, Shot Baker ...), and the other troops would switch on their recorders (assuming their own AP had

not already done so). Plots were reported back to Eythorne, where the final assessment was made and by whom the RAF was notified.

The enemy guns were, in due time, positioned in fixed, fortified positions along the French coast; particularly in the areas of Wimeroux and Cap Gris Nez. Because of their static locations, we were eventually able to identify them and give them labels e.g. Cap Gris Nez B and Calais A.

In the early days, when there was the possibility of invasion, the Dungeness AP was inland at Boulderwall Farm. The first shelter was a sandbag structure with a corrugated iron roof but later the Royal Engineers built us a concrete pillbox. A stint at the AP lasted three days and nights. Some of the lads took the opportunity to snare a few rabbits to sell to the Appledore butcher. If you were lucky enough to be on AP duty a few days before leave was due, the butcher would keep your rabbit in his cold room until you were able to take it home. When the threat of invasion had subsided, the AP was moved forward to the most westerly house on the Greatstone Shore Road.



There was always considerable air activity. In September 1940, there were days when the sky above Appledore was completely filled by formations of enemy bombers. All we could do was to lie back in the sunshine and watch them continue on their way towards London. Later, fighters were more common and there were times when Me 109's strafed the area around Dungeness as they returned to base. There was a period when the Hermann Goering Squadron

was active over Kent. Our name for these was "yellow-nosed bastards".

On one occasion, I was detailed for Air Sentry in the yard behind the Appledore Operations Room. I had charge of a Bren mounted on an anti-aircraft frame and loaded with 1-in-7 tracer. There was a heavy mist and I did not expect to have much to do. However, after an hour or so I heard a lot of small-arms fire and then the drone of an aircraft engine and it became clear that a plane was approaching, and that neighbouring units were shooting at it. As I manned my Bren, a Dornier 17 came out of the mist, and, in the second or two that it was visible, I got off a few rounds in the right direction. The plane flew on accompanied by more

small-arms fire. Later in the day, I was told that it had crashed about five miles further on.

In the early days we had to make use of some requisitioned civilian vehicles. These had to be painted olive drab and black but, as we were operational, there was some delay in completing this chore. Some amusement was generated locally by our use of a Tizer truck (Tizer being a popular soft drink of the period) whilst out on the marsh maintaining our lines.

By the time the Battery was disbanded in 1942 it had been operating non-stop for some two years. I am not aware that any analysis of its performance was ever made and, sadly, it never occurred to me to make any notes. After all, this was a time when we were forbidden to keep diaries which might disclose information to the enemy, were we to be taken prisoner.

Editors Note: An article by Stan Tress describing the sound ranging technology used during the Second World War will appear in the next issue of Ranger.

Captain (Retd) SB Tress was training as a valuation surveyor when World War 2 intervened. From 1940-1943 he was a Surveyor RA involved mostly with Sound Ranging. He attended OCTU from 1943-1944 and completed the RA Long Survey Course and then served in Holland, Persia and Iraq. After the war Stan served in the UK and Germany before retiring and taking up a career with the Inland Revenue for the next 28 years.

THE ROYAL ENGINEERS ASSOCIATION MILITARY SURVEY BRANCH - MAJOR REUNION

One of the most successful events that marked the 250th anniversary of Military Survey in 1997 was the major reunion of military and civilian staff. As a result the Military Survey Branch of the REA was formed in 1999 with the aim of providing a focus for anyone, military or civilian, who has served or is currently serving in a Geographic (Military Survey) unit in either a technical or support role. The current Branch committee includes the following posts:

President: Brigadier (Retd) A E H Matthews
Chairman: Chris Nash
Secretary: Peter Wood
Treasurer: Chris Cleeton

The prime functions of the branch include an annual general meeting/reunion (with a major function every third year), identifying any welfare cases to the appropriate authority and publishing a quarterly newsletter. The latter has been extremely successful in acting as a focal point for old friendships to be re-kindled.

This year is just such a year for that major function. Reunion 2003 will take place over Friday 5th and Saturday 6th of September at Hermitage, Berkshire, the home of the Geographic Engineer Group (GEG) that includes The Royal School of Military Survey and 42 Engineer Regiment (Geo). The programme includes a dinner at Newbury Racecourse on Friday evening followed next day by joining in with GEG's Families Day, the AGM later in the afternoon and rounding off the Reunion with a buffet and music in the evening.

Existing branch members will have received this Reunion information already but it is the non-members that the Branch would like to welcome to this major event. In order to spread the news the Branch is carrying out a mail shot to all known non-members. However, in common with other similar organisations many will, no doubt, fall through 'the net'. Some readers may fall into this category so now is the opportunity to catch up with old Military Survey chums and perhaps even to join the Branch. For more information why not contact the Branch Secretary and DSA member, Peter Wood on 01962 760497 or e-mail peterwood@gordonwood2.demon.co.uk. As they say - go for it! - the Branch would love to see you.

A RECONNAISSANCE AND INTELLIGENCE GATHERING TRIP TO ANGOLA

By Donald Mills BSc LS MURP

After the collapse of French forces in 1940, the German High Command agreed with the French "Vichy" government to occupy only the northern half of France. Early in 1941, British Intelligence sources learned that the occupation of southern France would take place probably before the end of 1941. There was a distinct possibility that Spain and Portugal would be occupied at the same time as they were being used as escape routes. Should this happen, it was arranged that South African troops should occupy Angola and Mozambique.

Prior to such an operation, more information would be required about roads, railway rolling stock, petrol storage facilities, etc., particularly in the case of Angola. I was chosen, as a lowly lieutenant, to do the Angola trip and another officer, not from the SA Survey Company, was selected for the Mozambique venture, because no survey work would be required there.

One of my tasks was to map the road from Windhoek to Benguela, via Nova Lisboa (now Huambo) and Lobito. This was to be done using car mileage and compass bearings, controlling both by sun observations for latitude and longitude. This was to be a secret trip and a theodolite and tripod would be too difficult to conceal, so a sextant and artificial (mercury) horizon were to be used instead.

Captain Frank le Roex, who was well-versed in astronomy, coached me in this operation. We practised on various roads in the Transvaal. A chronometer was used for timing the sun observations and an aneroid barometer for height control. We prepared foolscap-sized sheets, each with a length of road marked off at about 5 miles to the inch, on which we built up a strip map showing road condition, strength of bridges, nature of the terrain, branch roads etc. Bearings were also taken to outstanding physical features such as mountain peaks for eventual plotting on the strip map.

Captain Frank le Roex was unfortunately killed while on an LRDG patrol in North Africa, late in 1942, when his jeep struck an unmarked teller mine - a great loss to his family and to our survey establishment.

The British Vice Consul in Lobito, Mr Billy Williams, was due for leave and planned to spend it in Cape Town, with his wife. He was requested to take his leave early in June, so that he could take me back by road in a new car, which he intended buying in Cape Town. Our departure was scheduled for the last week on June in 1941, because I was to travel on a passport showing that I was a student at that time. I was to pose as Billy's cousin, spending a holiday with him in Lobito.

The three of us duly left Cape Town in Billy's new Ford sedan and after a day in Windhoek, I started my survey

on 29th June. We soon got into the routine of stopping at major bends in the road for compass bearings. Two sets of sun observations were made, one at midday and one late in the afternoon. In using a sextant at sea, one sight is set on the horizon, but on land, there is no horizon at the level of the observer, so an artificial horizon has to be used. I used a metal container with a glass top filled with mercury. One sextant telescope is then pointed at the reflection of the sun off the mercury surface and the other at the edge of the sun itself. The angle thus measured is double the altitude of the sun, when corrected for the semi-diameter. The first night of this survey operation was spent at Otjiwarongo. Next day we passed through Outjo and called at the police post at Okakueyo, to show our permits for travelling through Ovamboland. Later in the day, we passed the western edge of the Etosha Pan, where we were treated to the amazing sight of an astonishing variety and number of wild game. We stopped briefly to watch the game, but we had to press on because we had arranged to spend the night with the SWA Regional Officer at Ondangua. For the last 100 miles the road comprised two-wheel strips with long grass in between, with the result that at Ondangua we had to remove compacted grass from under the engine of the Ford, as it was a fire hazard.

After a most hospitable overnight stay with the Regional Officer and his wife, we left Ondangua and passed through the SWA Border Post at Oshikango. Although the Angolan border is about 300 metres north of Oshikango, the Portuguese customs house was at Namukunde, about 8 miles further north. We had already hidden the sextant in Billy's luggage and my papers were hidden under the car seat. The mercury pool and chronometer were concealed in my pockets. Nevertheless, we had some anxious moments at the customs post because, if the Portuguese Officials searched the car and found my survey equipment, I would have been interned for the duration of the war, possible at Fort Rozades prison, which was not a very salubrious place. Fortunately, they were only interested in the customs duty to be paid on Bill Williams' new car.

Our next stop was at Ngiva, or Vila Pereire d'Eza to give its Portuguese name. There I had my first experience of an Angolan toilet - just a round hole in a concrete floor.

On 2nd July, we carried on through Mupa and 40 miles further on we got stuck in the heavy sand of a dry riverbed. This part of Angola was very flat and subject to flooding during the rainy season. Our efforts to get the car out of the sand were unsuccessful, so we had to sleep in the car. Next morning I strode off to a mission station we had passed about four miles back. I knew this was lion country, so I eyed each tree I passed with a view of using it as a refuge should a lion appear. I was

only armed with a hunting knife in a sheath on my belt. At the mission station I was told that two missionaries had been attacked and killed by lions a couple of years before. We returned to the marooned Ford in a rickety old van with six black workers and the Ford was soon manhandled onto firm ground with our grateful thanks and tips to all concerned.

We spent the next night at Vila da Ponte after passing through Kassinga. I was able to take my observations almost undisturbed as very little road traffic was encountered. If a car did appear when I was busy, I pretended I was going to relieve myself in the roadside bush.

On 4th July we arrived at Nova Lisboa (now Huambo). We spent the next day there because the car needed some repairs. This gave me the opportunity to gather intelligence information as Nava Lisboa was an important city as well as being a rail centre and a military base with roads branching off to all parts of Angola.

There were many bends and river-crossings in the road from Nova Lisboa to Lobito, as it descended from the escarpment to the coast. Most of the bridges were of rickety timber construction and would definitely not support heavy tanks.

We duly arrived at Lobito on 6th July, where I stayed with Billy and Betty Williams, at the British Vice Consulate. The road survey between Lobito and Benguela was completed while ostensibly on a sight-seeing trip. During my very enjoyable stay at Lobito, I did all the things that a student on holiday would do - sea bathing, tennis, lunch and drinks parties etc. This included taking snapshots of scenic views, often including port installations and petrol storage tanks etc. On one scenic view of the part, I marked the locations of gun positions and military buildings on the ridge behind the harbour. Altogether, quite a lot of information of an "intelligence" nature was collected.

At one social function I met an attractive Portuguese girl and arranged to take her out to lunch. When I went to pick her up in Billy's car, her mother came out with her, to see her off, as I thought. But no, she climbed into the car with her daughter! We could not speak each other's language, so we conversed in fractured French. I ended up having to pay for three lunches instead of two and the relationship made no further progress.

I flew back to Cape Town in a Lockheed Lodestar, on one of the last flights to leave Lobito. The service was discontinued shortly afterwards. My survey equipment was later taken to Cape Town on a Royal Navy vessel. Although Lobito was a neutral port, the Portuguese Government allowed British vessels the courtesy of using facilities there.

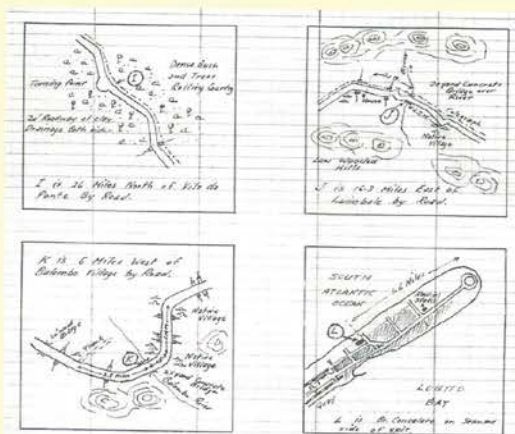
After some home leave, I spent three weeks at Defence HQ Pretoria, calculating the latitudes and longitudes of the sun fixes, converting these geographical co-ordinates to rectangular co-ordinates on a military grid system. Then a series of traverses were calculated using the car mileages and compass directions and adjusting each traverse to fit in with the sun fix points. The whole route was plotted on a map and booklets were also made of 50-mile sections with details added.

Two reports were prepared: a technical report, a copy of which is appended hereto, and an intelligence report, which was sent to the director of Military Intelligence. Before leaving Lobito, I had asked Billy Williams to try and get additional information about roads to other centres, such as Luanda and roads from Nova Lisboa to Luanda, the alternative route from Nova Lisboa to Lobito. While I was busy at DHQ Pretoria, his report on these matters as well as information about other towns arrived by diplomatic pouch. I was able to include this new information in my "intelligence" report.

When the German army eventually occupied Vichy, France in November 1942, they stopped short of Portugal and Spain, so my work was never used. Such is life!

The secret file on this project was handed to me by Major Phil Thomas, when he retired from the Department of Surveys and Mapping in the 1980's. However, I maintained the 50-year silence rule and did not mention a word about this project until 1992.

Donald Mills qualified as a land surveyor in Cape Town in 1938 and joined the South African Survey Company in June 1940 as 2nd Lieutenant. He served in North Africa from 1941 until January 1944 when he moved to Italy, first attached to the US 5th Army and later to the 8th Army. Demobbed as a War Service Captain in October 1945, Donald then spent 37 very successful years in private practice as a Land Surveyor and Town Planner before taking up a desk job at the Surveyor-General's office in 1983. He retired from full-time work in May 1990.



Diagrams made during the clandestine journey

REPRINTS OF HISTORIC MAPS

The following maps, acquired by the Association, are offered for sale:

LIMITED EDITION MAPS (LE) - PRICE £ 12 + P&P

Each map is individually numbered, eg 7 of 850. A short history and other technical details are printed on the reverse or on a separate sheet. The maps are approximately A3 size.

Description

LE1 THE MILITARY SURVEY OF SCOTLAND, 1747 - 1755. An extract from sheet 16, the Crieff area. Pencil, pen and water-colour on paper. Drawn and painted by Paul Sandby, William Roy, Charles Tarrant, Hugh Debbeig and David Dundas.

A map never before printed. Reproduced by courtesy of the British Library Board.

LE2 BATTLE OF CORUNNA 1809 (Peninsular War 1807-1814). The Plan of the Battle of Corunna, 16th January 1809. British forces under command of Lt General Sir J. Moore KB. Pencil, pen, ink and water-colour by H. B. Harris.

LE3 PICTURE OF SURVEYING IN THE HIGHLANDS 1749. A survey party near Loch Rannoch. Pen, ink and water-colour by Paul Sandby.

LE4 BOSTON, ITS ENVIRONS AND HARBOUR, WITH THE REBEL WORKS AGAINST THE TOWN, 1775 "From the observations of Lieut Page of His Majesty's Corps of Engineers and from those of other Gentlemen."

QUALITY REPRINTS (R) - PRICE £ 5 + P&P

Reproduced on fine grade map paper. All approximately A3 size unless otherwise stated.

Description

R1 CUIDAD RODRIGO, January 1812 A fine example of a Peninsular War Map.

R3 SHAKIYEH CATARACTS, February 1885 Map from the ill-fated expedition to relieve Gordon in Khartoum.

R4 AVIATION MAP OF THE WESTERN FRONT 1917 Rare example of an early air chart constructed on a perspective grid to simulate the aviator's view. 76 X 76 cm.

R5 SPION KOP, January 1900 Two small maps of battle situation on different days.

R6 LAKE RUDOLPH TO NAKORO November 1901. Fine example of the 19th century maps produced during the exploration of Africa. Size 21 X 50 cm.

R7 TEL EL KEBIR, September 1882 Beautiful Victorian cartography of the battle at the time of the Egyptian and Sudan Wars.

R10 THE SURREY HILLS Zincographed maps at six inches to a mile. 108 X 76 cm.

6 - Aldershot & The Hogs Back, 1863.

12 - The Farnborough Area, 1864.

15 - The Royal Military College, Staff College & Bagshot, 1864.

R11 PLAN OF BADAJOZ & ITS ENVIRONS Shows how it was invested and carried by storm on April 6th 1812 by General the Earl of Wellington.

R12 D-DAY BEACH MAP (MAY 1944) 1:12,500 scale map of Luc-Sur-Mer showing details of German defences. Size 65 X 93 cm.

SURVEYING - CAN WE AFFORD TO FORGET THE BASICS?

By Peter Wood and Ted Price

We are always reading about the latest whiz-bang technology that takes much of the little grey cells somersaulting (some may say tedious) work out of surveying fieldwork these days. Accurate positioning through the use of GPS satellites, immediate entry into palm-held computers, which can then be downloaded straight into a GIS. All 'untouched by human hands' but what if.....one may ponder.

Now, it is not being advocated that we should all return to standing on a wet and windy trigonometrical station with a T3 for hours on end taking countless readings. However, there are still situations, and therefore an important place, for fundamental measurement-taking and applying first principles.

There is no doubt that GPS is the most precise, speedy, reliable and cost effective method of providing positions on the earth's surface when applied correctly. It is easy to use with little requirement for the operator to have any knowledge of surveying. Nevertheless it does not resolve all our problems and there are occasions when "back to basics" is either a better choice or indeed, a must.

GPS data is provided by the US government and is, at present, free. However, the equipment is expensive to buy and/or hire and if the surveyor already has a theodolite then maybe a conventional survey is the more cost-effective option.

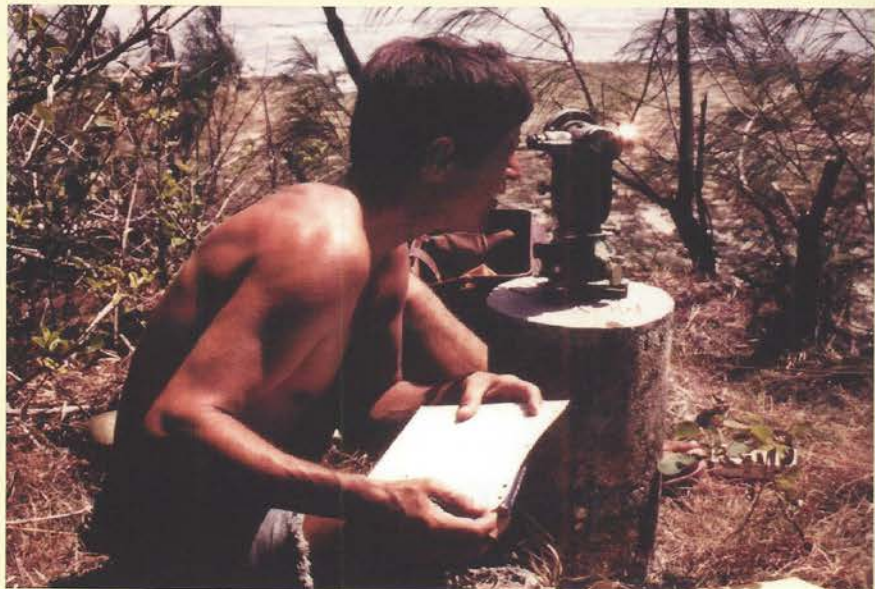
Whilst adopting the state-of-the-art technology is usually the prudent way ahead, there are other factors that now come into play. For instance, more consideration must be given to GPS site selection. Signal jamming, whether or not deliberate, and signal multipath are a real problem. Surveys on, or around, airfields or in the vicinity of metal structures are particularly prone to this type of problem.

Satellite positioning in built-up areas, under canopy such as trees or inside buildings proves problematic and the employment of a traverse, triangle or even bearing and distance may be the only method available. Similarly, when a station that is to be positioned is inaccessible then the intersecting angles measured from a theodolite become very useful indeed.

So 'back to basics' suddenly becomes very important and this is where GWA's comprehensive 'Survey

Computations' software suite reintroduces the user to an easy way of overcoming the necessary post fieldwork computations. Its usefulness and relevance has been attracting interest from around the World including France, Bahrain, Mauritius, India, Australia and Papua New Guinea as well as all three of the UK Armed Forces.

This suite of programmes has been designed as a manager's tool, performing the manipulation of complex formulae for the geomatics world and is especially useful to confirm the "black box" output from proprietary software. It is ideally suited for companies and academic departments associated with land and



Ted Price surveying by traditional methods

hydrographic surveying. Written and compiled by DSA member Ted Price, the package not only contains the necessary 'engine room' for all surveying tasks, but also includes a plethora of sample data, ellipsoids, projections and grids, together with on-line help and manual.

The suite is growing in popularity among both large and small organisations. It is extremely user friendly and is easily operated from a single main menu accepting up to a thousand stations and observations in any one file. A comprehensive choice of powerful options is always available to the user assisted with clear and concise data and graphic displays that can be printed out at any time. All the traditional methods of computing position are covered and, yes, there is also the facility for upgrading the world-wide ITRF fiducial stations co-ordinates, so GPS is not entirely forgotten!

Finally a cautionary note here - GPS can be denied to the user for various reasons and surveyors who discard all of their tried and tested tools for the satellite system are in danger of limiting their capabilities. Realising this, many well-established organisations, together with the smaller opportunist users, are now retaining the knowledge and equipment for the more, perhaps economic, conventional survey option. So perhaps 'back to basics' needs to be recaptured by the professional and here is the software suite that will gently guide the user through the fundamentals again without the pain - good hunting!

'Survey Computations' and the teaching package:

Ted Price served in Military Survey as a Field Surveyor from 1962 until 1986. From 1986 until 1991 he was a Survey Production Manager involved with GPS surveys around the world consultancy at Canary Wharf in London. He then returned to the Royal School of Military Survey to teach geodesy and land surveying before leaving in 1997 to become the Production Manager for the Saudi Arabia Military Survey Department. Ted is now in semi-retirement concentrating on the development of geomatics associated software.

'Datums, Projections & the UTM Grid System' by the same author are available from GWA. Ted Price provides a very useful helpline and the customisation of the software can be arranged to meet the specific needs of users. Both single and multi-user licences are offered. Version 3.02, which includes improved routines for ED50, the addition of the Laborde projection (Madagascar) plus a "Law of the Sea" option, as required by the United Kingdom Hydrographic Office at Taunton, is now available. Call 01962 760497 or e-mail: info@gordonwood.co.uk for further information.

Peter Wood joined the Army as an apprentice in 1958 and served with Military Survey in Aden, Cyprus, Singapore, Norway, Australia, United States and with the Royal Navy before retiring in 1995 and co-founding GWA. In 1990 he won the FSA prize for his management of the Army's first 'Terrain Analysis' project. Peter is currently busy on a number of projects including the production of maps for a future publication on the Bengal Sappers and, together with Ted Price, the promotion of 'Survey Computations'.

NEW MILITARY MAPPING GROUP

A new Special Interest Group of the British Cartographic Society (BCS) is to be formed. The BCS Historical Military Mapping Group will join the other Special Interest Groups of the BCS: the Map Curators' Group, the Design Group and the Teachers' Group.

The group was formerly known as the Greenwich Group for the Study of the History of Military Cartography, which was formed after a very successful 20th Century Military Mapping Conference, organised by Peter Chasseaud and Professor Peter Doyle and held at the University of Greenwich in January 2001. The Greenwich Group was chaired by Peter Chasseaud, a member of the BCS, who will continue as the Convenor of the new Group. It was a research-based group providing a point of contact and discussion for those engaged in research into any aspect of the history of military survey, photogrammetry/remote sensing and mapping. The intention is to continue this approach, with meetings held every few months at which members would give position papers on current research interests, and to organise conferences, write papers for publication, conduct oral-history interviews, and in other ways try to ensure the preservation of information and corporate memory which might otherwise be lost. Watch out for the group's involvement in the Reading Symposium in September.

Anyone interested in joining the group should contact either:

Peter Chasseaud at: peter@parvenupress.freemove.co.uk, or

Ken Atherton at BCS Administration: admin@cartography.org.uk

NOTES ON SURVEY FOR TRENCH MORTARS IN THE FIRST WORLD WAR: PART 2

By Peter Chasseaud FRGS

British Training Manuals.

The following section gives some idea of British practice, and makes it clear that normal artillery survey methods of gunlaying were expected to be used for mortars:

'Artillery Notes No. 6 - Trench Mortars', March 1916.

The first British official document to provide a comprehensive picture of trench mortar organisation and tactics was *Artillery Notes No. 6 - Trench Mortars*, of March 1916'. This was clearly written with the forthcoming Somme offensive in mind, and may have been, at least in part, a translation of a French document. It made it clear, in Section III on Gunnery, that the usual artillery principles of indirect fire were to be used. Under the heading 'Laying out lines of fire' it stated that:

'Lines of fire may be laid out in the following ways:-

- (a) By directing the sighting line of the periscope on to the target, or on to some point in line with it.
- (b) By measuring the angle from an aiming point to the target, and laying the dial sight, set at this angle, on the aiming point.
- (c) By taking the compass bearing off a map or on the ground, and placing the centre of the bed on this line.

When the correct line has been found aiming posts are placed in line with the axis of the mortar. An aiming point is picked up in line with the sighting line of the periscope, or the periscope is laid on the aiming posts.

If the dial sight is used, the angle from the aiming point is noted, and the sight is laid on this aiming point from round to round.

Subsequent corrections are given in degrees of the traversing gear.²

Under 'Ranging', it continued:

'Ranging consists in finding by trial shots -

- (a) The elevation.
 - (b) The line.
 - (c) The length of fuze.
- (a) Elevation - the target must always be bracketed, bold corrections being made until a bracket is established. A 'short bracket' of 10 yards should be obtained and verified, and fire for effect may then be proceeded with at the longer range, or the mean of the bracket.

(b) Line - Corrections for line are given in degrees after each round, as required -

1 degree	equals 1ft yards at	100 yards range
1 degree	equals 5 yards at	300 yards range
1 degree	equals 8 yards at	500 yards range'

Meteor and other variables were taken seriously; under 'Causes affecting accuracy of fire' it detailed:

Variable weight of projectile. To obtain uniform results, projectiles must be weighed and grouped according to their weights.

Temperature of charge.

Force and direction of wind.'

The attention was also drawn to *Artillery Notes No. 1 - Close Shooting in the Field*; 'Although these apply particularly to ordinary guns and howitzers, a study of this note will be found of great value to Trench Mortar officers.'

Registration was dealt with at length:

'A clear systematic record must be kept of all registrations, showing:-

The number and position of the emplacement.

The target, described with reference to the map, or by its generally accepted name.

The elevation.

The line.

The length of the fuze.

This record must be handed over to an incoming battery. In addition, each emplacement should have a range card of its special targets, and this must be kept up to date.

To avoid disclosing the position of the trench mortars, registration should be carried out under cover of artillery fire . . .

When a large number of trench mortars are to be employed in an offensive operation, the fact that such a concentration has taken place must be concealed up to the last moment. Some previous registration, however, is absolutely necessary if the fire is to be accurate and the desired effect on the enemy's trenches or wire. By a careful study of aeroplane photographs, registration on one target may be used as a basis for calculating the line and range to other targets, and in this and every other possible way registration must be reduced to a

minimum. Every precaution must also be taken to conceal what is being done. Not more than 2 or 3 mortars should be firing at the same time; those firing should be some distance apart; the fire should be slow and desultory, and should be covered by artillery fire as above.'

Under 'Methods of engaging objectives [targets - 'objectives' was the French word]', it noted that:

'Accuracy of fire is always of the utmost importance, and all fire must be observed, since, however carefully a target has been registered, slight corrections will almost always be required.'³

Appendix A consisted of an ungridded coloured sketch map (no scale, but approx 1:10,000?) of a section of the front lines including a German salient, titled 'Type of Trench Mortar Battery Position', with the British dispositions in red and German in blue (i.e. reversed from normal British practice, but consistent with French and German practice). British and German trenches, trench mortar emplacements, German machine guns and arcs of fire of British mortars and British alternative emplacements were shown. 'The trench mortars are so placed that each mortar except M1 can cover the salient, and that all mortars enfilade either portion of the enemy front line or communication trenches, while the fire of M4, 3 and 2 can be crossed if necessary.'⁴ Appendix B comprised a plan 'Types of Trench Mortar Emplacements.' No indications of survey were given in either appendix.⁵

Appendix D gave 'Details of Trench Mortars.'⁶

			Range [yds]	
			Max	Min
Heavy	240mm	[Flying Pig]	1,100	600
Medium	2-in	[Toffee Apple]	500	100
	1ft-in	[ditto - in fact	290	100
	1.57-in,	copy of Krupp] (stick bombs)	500	200
Light	4-in	[Stokes]	600	100
	3-in	Stokes	430	170
	3.7-in		340	40

Section II was entitled 'Selection, Preparation and Occupation of Positions.' Under 'Selection of positions,' it was noted that: 'On receipt of [orders from the Divisional Trench Mortar Officer] the Battery Commander will make as thorough a reconnaissance as time permits of the ground and of the enemy's defences. The use of trench maps and air photos will be of great assistance in this reconnaissance.' Under 'Positions for holding the Line,' it laid down that 'observing stations will be selected so that from the different stations the whole of the enemy' front covered can be well observed. The exact position and extent of front that can be observed from each will be noted on a map.'⁷ No mention was made of carrying out any preliminary survey work, or of preparing artillery or plotting boards.

'Artillery Notes No. 6 - Trench Mortars', March 1917.

Artillery Notes No. 6 - Trench Mortars, March 1917. SS 139/6, O.B.751, London, Printed under authority of HMSO by Darling & Son Ltd, Bacon St, E2. 1917. This was a revision and updating of the publication of the same name of a year earlier. Under 'Maps,' it ruled that:

'Every Battery Commander should keep a map showing:-

- (1) All emplacements with their arcs of fire.
- (2) All mortars in action with their night [SOS] lines.
- (3) All emplacements in process of construction.
- (4) All observation stations showing exact field of view from each.
- (5) Battery Headquarters.
- (6) Ammunition stores and routes of supply from each.

The Divisional Trench Mortar Officer should keep a similar map embodying this information for all Trench Mortar batteries in the division and each Infantry Brigade should have a map giving this information with regard to its own front. All maps should be kept up to date and handed over to relieving units.'⁸

There were some changes since March 1916 in the guidelines for gunlaying, no mention now being made of periscope or dial sights; the new publication stated under 'Gunnery':

'Lines of Fire:

These lines should be laid out by one of the following methods:-

- (a) By planting 2 aiming posts in line between the Trench Mortar and target [this sounds suicidal!], visible from the Trench Mortar, laying the Trench Mortar on these aiming posts and noting the reading on the graduated arc [implies dial sight?].
- (b) By measuring the angle included between an auxiliary mark, Trench Mortar position, and the target, from the map and planting an aiming post by means of 3 pins and a board or by prismatic compass.
- (c) By compass and map.

Line must be corrected by observation. Lines to various objectives [targets] should always be registered, the graduated traversing arc being used for this purpose . . .'⁹

Under 'Distribution of Fire' the new Notes recommended using a 'Chart prepared on squared paper' and showed an example of such a chart - of an enemy salient - graduated for line in degrees right and left of a zero line and for range in yards from 300 to 370. Once one target point had been registered, new points could be plotted relative to this in degrees and yards. It was noted that the chart shown was not geometrically correct, but that this did not affect the accuracy of the

procedure.¹⁰ Under 'Registration,' the use of map and air photograph was recommended as in March 1916. It was added that the 'Error of the Day should be obtained by firing a few rounds on a datum point which has been carefully registered.'¹¹

Appendix A showed the same coloured sketch map as in March 1916.¹² Appendix B - No.3, '9.45-in Trench Mortar Emplacement, Magazine and Dugout (Typical)', showed plans and elevations in a large, concertina-fold page of diagrams.¹³ In none of this publication was there any mention of survey, dial sights or artillery boards.

Light (Stokes 3-in) Mortars.

Light (Stokes) Mortar Drill, September 1917,¹⁴ contained the following:

This mortar, introduced in August 1915, was not equipped with sights. The method of sighting for line was to sight along a line painted down the back of the barrel. A clinometer was provided for range elevation. Gunlaying was as follows:

No.1 aligns base plate on target and sets clinometer.

No.2 aligns gun on target or zero line, No. 3 moving legs as No. 2 directs.

No.1 then places clinometer on barrel and elevates or depresses as required.

6-in (Newton) Trench Mortars.

Trench Mortar Drill. 6-in (Newton) Trench Mortar, revised edition March 1918.¹⁵

A sight and clinometer are mentioned in this pamphlet. Under 'Action' the drill was:

No.1 ascertains the line and elevation from the battery or section commander. The bed is then laid centrally on the target or in the direction of the centre of the arc of fire by Nos.2 and 3, who unhitch and lengthen the guys . . . No. 1 fixes the sight, elevates the mortar to the approximate elevation and lays for line; he notes the reading on the traversing arc and reports it to the battery or section commander.'

Under 'Line - Elevation - Charge - Fuze' the instruction was: 'No. 1 repeats all orders . . . lays the mortar at the line and elevation ordered.'

9.45-in Trench Mortars.

9.45-in Trench Mortar Drill, March 1917.¹⁶

The 9.45-in TM of French design was taken into British service in 1915; it was laid by plumb line until 1917, when this was replaced by a simple mirror sight designed by Sgt. Wooderson RA of First Army Trench Mortar School. The Mk III design of 1916, with its longer barrel, had a range of 2,400 yards, against the 1,100 yards of the original.¹⁷

A clinometer, traversing arc and plumb line, but no

sight, were mentioned in this pamphlet. The responsibilities were:

No. 1 General supervision, laying for elevation, firing.

No. 2 Laying for line (using the vent rimer as a pointer on the traversing arc)

Nos. 3 & 4 Elevating, traversing etc.

The carriage was traversed until the reading was zero on the graduated arc. No. 2 laid for line, No. 4 traversing, as directed by No. 2.

Donovan Massey, an officer in the 46th Division Trench Mortar Batteries (under Capt. Lowndes), sited and prepared one of these for action at Pigeon Wood, Gommecourt, in 1917.¹⁸ Massey wrote that there was a 360° scale bedplate (scaleplate). The carriage was on a cradle to pivot 360°, with a clamp. A clinometer was used to obtain the correct elevation for range. As the trenches of the two sides were anything up to 500 yards apart, the mortar had to be sited in or near the front line trench to get the torpedoes over No Mans Land. At Loos they had a mortar in front of the front line! The rate of fire was a maximum of 1 per minute, the 46th Division Heavy Trench Mortar Batteries always taking first place at the Third Army Trench Mortar School at St Pol. Rounds dropped short if the charge got damp, which it did once a box of 12 charges was opened. The British-made charges were better - each was packed separately in tin containers and sealed with adhesive tape.¹⁹

Conclusion.

Neither the definitive official *Report on Survey on the Western Front*, nor any of the extensive British literature on survey in the First World War mentions survey for trench mortars. It must be remembered that the British Field Survey Companies/Battalions RE only provided battery survey for the gunners down to corps level (Corps Topographical Sections) - there was nothing at divisional level, which was the level at which trench mortars were organised. Trig survey was rarely carried out in the vicinity of the front trenches; reliance therefore had to be placed on the 1:10,000 scale trench map, with its detail plotted where possible from cadastral plans and air photos. While in position warfare heavy artillery batteries were instrumentally fixed by trig observers and field artillery batteries by topographers using the plane-table, it can only be concluded that any survey considered necessary for trench mortars was left to individual trench mortar batteries.

In conclusion, it has to be stated that from 1915 onwards the Germans were alone in extending trigonometrical survey to trench mortars, and in creating a special mortar survey organisation (*MWMTs - Minenwerfermesstrupps*). They thus fully integrated their mortars into the artillery fireplan, as was seen to its greatest effect on the Eastern Front at Riga in 1917 and on the Western Front during the

great German offensives of March to June 1918. Bruchmüller, the master artillerist, took the greatest advantage of this integration to break through the allied trench systems in those battles.

The author would be grateful for any further information regarding mortar survey in the First World War.

¹**Artillery Notes No. 6 - Trench Mortars**, Issued by the General Staff, GHQ, March 1916. SS 98/6, O.B./751. (B198) 2500, 5/16 H&S. 3229wo. 20pp.

²Ibid: 9.

³Ibid: 10-11.

⁴Ibid: 12[a], Appendix A, Type of Trench Mortar Battery Position. (2,500. 4/16. 4406) (B198). 3229 W.O. Harrison & Sons, Lith, St Martin's Lane, W.C.

⁵Ibid: Appendix B: 13.

⁶Ibid: Appendix D: 19.

⁷Ibid: 6.

⁸**Artillery Notes No. 6 - Trench Mortars**, March 1917: 10.

⁹Ibid.

¹⁰Ibid: 16.

¹¹Ibid: 18.

¹²Ibid: 20.

¹³Ibid: 23.

¹⁴**Light (Stokes) Mortar Drill**, Issued by the General Staff, GHQ, September 1917. SS 183. O.B. 2084. AP&SS A-10/17-4984 (B) - 3000. 6pp.

¹⁵**Trench Mortar Drill. 6-in (Newton) Trench Mortar**. SS 181 revised edn. March 1918. O.B. 1793/91. 40/W.O./6019. AP&SS. Press A. 2/18. 5779S - 3,750. 4pp. (IWM: 1.86.3(41).9 [INCH 6]/3.)

¹⁶**9.45-in Trench Mortar Drill**. [March 1917] SS 147. O.B. 1269. AP&SS A-3/17-B1210-800. 4pp. (IWM: 1.86.3(41).9 [INCH 9.45]/3.)

¹⁷Saunders, Anthony, **Weapons of the Trench War 1914-1918**, Sutton Publishing, 1999: 46.

¹⁸IWM photos Q4921, 2, 3.

¹⁹Massey, D., IWM, K 73206, n.p: n. pub., 1970 - 8p.

Peter Chasseaud has been studying the survey and maps of the First World War for over twenty years, and is currently completing a doctoral thesis with the University of Greenwich on British, French and German maps and survey in that war. His last book was 'Artillery's Astrologers - A History of British Survey and Mapping on the Western Front 1914-1918' (Mapbooks, 1999). He chairs the Greenwich Group for the Study of the History of Military Cartography.

ARCHIVING FOR THE FUTURE

It is believed that the normal policy for Government Departments is to review and weed documents some thirty or so years after the event whence they are eventually deposited in the Public Records Office (PRO) at Kew. In the case of geographic products, the records may be a disparate collection based on map series

Due, no doubt, to the advent of the Second World War, much of the vast cartographic records of the First World War were not sorted and documented and made available to the public in the Public Records Office until very recently. The maps of the Mesopotamian Campaign at the PRO in Class WO 302 only became available to the public in 1989. However, despite this delay, anyone now wishing to research the work of Military Survey, and particularly map-making in the First World War, is fortunate in that a most comprehensive collection of the map and other products is well preserved and documented in the various WO Classes at Kew.

One wonders if, in thirty or more years' time, researchers of the 1992 and 2003 Gulf Wars will find such a well-documented set of graphics and perhaps the more ephemeral digital products that were used in these wars? Will there then be a struggle to collate an appropriate deposit?

It poses the question as to whether it would be easier to compile a comprehensive dossier of Campaign Maps and other products during or on the conclusion of a campaign for eventual deposit in thirty years' time?

OBITUARY

LIEUTENANT COMMANDER ALAN INGHAM ARICS RN (RETIRED)

1932-2002

It is with great sadness that we report the untimely death of Alan Ingham on 20 May last year at the age of 69. Alan had a remarkable life achieving success in a number of different and varied fields which ensured he will be long remembered by his wide circle of friends and associates.

Born in Skipton in 1932, in his beloved Yorkshire Dales, he joined the Royal Naval College, Dartmouth in 1945 as a 13-year old cadet. During his subsequent naval career he had many appointments both at home and abroad and specialised as a hydrographic surveyor in 1956. He served in ships in both the Indian and Pacific Oceans including service with the Royal New Zealand Navy where he commanded the survey vessel HMNZS TARAPUNGA. He was involved with many incidents, one of the more unusual being during the Zanzibar revolution in 1964 when he played a prominent part in negotiating the safe evacuation of some 160 British residents from that troubled island.

Alan took early retirement from the Navy in 1965, partly to spend more time with his family but also to pursue other interests. He was attracted to the educational world and realised the need for more emphasis on training civilian surveyors to support the growing offshore engineering industry. In 1970 he joined the North East London Polytechnic (now the University of East London) as a lecturer in hydrographic surveying. His ability and experience ensured he became a considerable influence in the field of Hydrography. In 1971 he was elected Chairman of FIG Working Group 413 responsible for establishing international standards for hydrographic surveyors. In 1972 he was the prime mover behind the founding of The Hydrographic Society which brought together, for the first time, those involved in the many aspects of marine surveying. He even found time to produce two books, "Hydrography for the Surveyor and Engineer" in 1974, and "Sea Surveying", in 1975, which are still regarded as essential reading for students.

By 1984 he had achieved much of what he had hoped for in the academic world and turned to his other inspiration in life which was to bring him considerable satisfaction as well as fame. His life long interest in art, particularly in painting water colours, became more than a hobby and he developed into one of the country's leading landscape artists. He produced over 1,200 original works, mostly depicting the British countryside, which have given pleasure to countless numbers of people over the years through his originals, prints and the book "Under a Watercolour Sky", published in 1996.

A man of considerable talents and a good friend - he is greatly missed.



A fascinating place to visit - for all the family

**The Royal Engineers Museum of Military Engineering
Prince Arthur Road, Gillingham, Kent ME4 4UG**

Telephone 01634 406397

The Royal Engineers Museum is like no other military museum you might have visited. It houses objects highlighting the enormous range of achievements of the Royal Engineers over the centuries from the creation of the Ordnance Survey to the beginnings of flying, from the designing of the Albert Hall to the dangerous on-going task of bomb disposal.

There is something for all the family such as the exquisite Chinese embroideries, a World War trench and dugout, a working model of a military railway and port, a Harrier jump-jet, and a Chatham house-interior in the Blitz.

There are special facilities for wheelchair visitors - ample car parking, designated toilet, access ramps and a lift to an overhead viewing walkway for the courtyard displays.

A lecture room equipped with a range of AV facilities and a school room with a handling collection and items of uniform for children to dress up, can be booked for group use.



A BETTER VIEW OF THE REAL WORLD

The best photogrammetry software suite just got better.

Powerful new GIS enhancements and interfacing capabilities from BAE SYSTEMS make SOCET SET[®] the world's premier photogrammetric software solution, even better.

As well as improved GIS database management competencies delivering major productivity gains, SOCET SET interfaces with Prevalent Technology's new Stereo Editor, an ArcGIS extension enabling simultaneous spatial data handling and stereo imaging control.

Users can also import and triangulate PREDATOR, GLOBAL HAWK, QuickBird and SPOT 5 sensor data, and export 3D data in formats directly compatible with today's market leading Visualization, Mapping and Simulation applications.

For more information call our sales and support team at (800) 316-9643 or visit the SOCET SET website at www.socetset.com.

The systems company innovating for a safer world.

BAE SYSTEMS

www.ms.na.baesystems.com

ESGR
FREEDOM AWARD WINNER

WORLD
USO
PARTNER