

THE RANGER

Journal of the Defence Surveyors' Association
Summer 2006

Volume 2 Number 13



Extract from the 1985 edition of the 1:25k London Town Plan covering Feltham showing the buildings of the DGI facility, then known as Military Survey.



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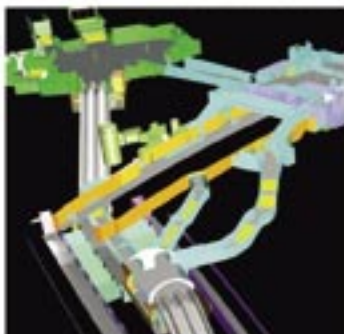
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In this edition of Ranger...

.....we see that 'change' moves ever more remorselessly onwards with yet more reorganisation resulting in new groupings of units, different affiliations and changed titles. Perhaps for many the key change will be the end of the Royal School of Military Survey as a Royal Engineers unit as it is now a part of the Defence College of Intelligence, seeing in the process the demise of the Chief Instructor post, an appointment that can be traced back to Denison.

However, the world is now a very different place than it was even ten years ago and 'change' is not necessarily all 'doom and gloom'. Today's Forces have an immense workload to meet with limited resources and, although technology is a great help, its procurement and implementation into service is in itself a major task demanding resources. On the 'plus' side, HM and Geographic specialists are now having a far greater direct impact on operations than their predecessors could ever have imagined and, to have the right mix of training and experience to meet this need, things have needed to change – and they have done so and will, no doubt, continue to do so.

In addition to news of organisational change we have our usual mix of looking forward, information about current happenings and recollection of past times. Of particular note, and a reflection of the giant political change of recent years, we have Peter Jones' account of an official visit by a Defence Geospatial party to their counterparts in Russia sitting near to John Davies' fascinating review of the clandestine Soviet mapping of Britain during the Cold War.

There are articles detailing advanced new concepts and technology such as the Recognised Environmental Picture and the Gunners' MIDAS system whilst another relates the passing of an icon - the end of the Canberra, an aircraft so advanced in its day that even the United States built it under licence. It was the platform for carrying survey cameras for over half a century and will have been known to many readers.

Perhaps the most surprising story is one that marks the passing of an era. It is Colin Price's poignant description of the selling of 84 Survey Squadron's camp and equipment to the Singapore Army for a single dollar; although only a small waypoint to the end of Empire, it was such an unbelievably low-key affair.

I hope you enjoy a good read

Alan Gordon

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

DEFENCE SURVEYORS' ASSOCIATION

Formerly the Field Survey Association

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

- To maintain a permanent liaison between serving officers, retired personnel and civilians working in the Defence domain who have a professional interest in geospatial matters.
- To keep abreast of current issues in the geospatial arena.
- To recognise the most significant contributions to Defence geospatial matters 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 geospatial business in the Defence sector.

Membership is open to personnel who are engaged, or have been engaged, in Defence geospatial-related disciplines at a management level. The cost of membership is a modest £15 per year payable by standing order on the 1st January. New members joining while still serving get free membership for the remainder of the year in which they join.

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

DSA's NEW WEBSITE LAUNCHED

The Association's new website, found at www.defencesurveyors.org.uk, was launched in May and has been well received. The website is aimed at providing a shop window for the world at large to view the DSA as well a vehicle to provide timely information to members. Those members who do not have access to the Internet at home can view the site by using the computer facilities at their local library or whilst drinking a cup of coffee in an Internet café.

The site holds information about the DSA such as an up-to-date version of the Articles of the Association and details of the annual prizes. The news page includes not only minutes of Council meetings but also any documents of importance to the Association including the recent paper produced by Peter Walker debating the way forward. There are also links to all the websites relevant to the DSA's core business. Ranger has a page of its own which includes an index of every article ever published in the journal and there is an on-line application form for non-members wishing to join.

The intention is to keep the website vibrant by publishing monthly updates. Anyone wishing to provide input should initially contact Ranger's editor, details are on page 2.

Bereavements

It is with regret that the Association announces the deaths of Gerald Smedley Andrews, Commander Anthony Fanning MBE RN, Commander Nisbet Glen OBE RN and Major General Brian StG Irwin CB. An obituary for Gerald Andrews appears in this issue and obituaries for General Irwin and Nisbet Glen will be published in the next edition of Ranger.

Visit to the PLA at Gravesend

By David A Wallis

A party of twenty members visited the Port of London Authority, Vessel Traffic Services, Control Centre at Gravesend on Thursday the 2nd March.

The visit was preceded by an excellent lunch at The Three Daws, an historic waterside inn which is said to be over 500 years old and is complete with secret passages used by smugglers and men escaping the press gangs. Alongside the Inn is the oldest surviving cast-iron pier in the world which is in the process of being converted into a Thai restaurant!

The weather was just perfect for a short stroll along the Thames-side path leading to the PLA Control Centre, passing the house that was the home of General Gordon when he was commanding the Royal Engineers based at Chatham and also the remains of a fortress which was used to ward off intruders trying to enter London by river.

Barry Goldman CBE, who is the Vessel Traffic Services Manager and John Pinder FRICS, the Chief Hydrographer, hosted our visit. The party was first shown a film on the work of the PLA followed by a PowerPoint presentation by Barry Goldman highlighting the more technical aspects of the PLA operations in the task of managing all the traffic on the tidal reaches of the Thames which stretches from Teddington to the estuary, some 76 miles in total.

The PLA, which is a non profit making body not an agency, derives most of its income from providing pilotage for large vessels entering the Thames as well as managing the commercial docks that handle, in terms of value, the highest revenue in the UK. It is predicted that this volume of commercial traffic will continue to grow especially when the new development of the Isle of Grain container port comes into full operation in 2007/8.

The PLA Hydrographic Office, under the control of John Pinder, is kept very busy with a continuous requirement to survey the shifting sands that lead up to the Thames Estuary in order that the shipping channels are kept open for the larger vessels using the Port of London. The shipping on the Thames is continually monitored by a chain of interlinked radar stations stretching along the river from London Bridge to the estuary, as far as Margate on the south side and Harwich to the north. This chain of radar provides the picture of shipping that is being continually monitored by the controllers based at Gravesend.

Everyone agreed that it was a most interesting and enjoyable visit; some saying it was the best DSA visit in recent times.

NEW MEMBERS

James Kenneth Atherton: In 1963 Ken joined the United Kingdom Hydrographic Office. He has been a compiler of Admiralty Charts, a Drawing Office manager and Head of two Chart Branches (South East Asia, from Burma to the Philippines, and Africa and Adjacent Islands). He also held an appointment in Whitehall, spent 15 years developing air survey techniques for hydrographic charting and held the post of Curator of Original Documents. He took early retirement in 2001 and formed "Sextant Consultancy" concentrating on historical map and maritime chart research, and lecturing.

Tony Baggs: Call up found Tony attending a National Service survey course at the School of Military Survey in 1957 after which he was posted to 84 Field Survey Squadron RE in Malaya as a Troop Officer and OIC of a field detachment. Following his demobilisation he was a volunteer in the Army Emergency Reserve until 1965. His civilian career has been as a university archaeologist.

Jason Cartwright: Jason joined 94 Locating Regiment RA in the autumn of 1989 and found himself in a Survey/Sound Ranging Troop. He quickly grasped survey and qualified as a detachment commander in the summer of 1993. To date he has carried out surveys in the UK, Germany, Hungary, Turkey, Italy, Gibraltar and the majority of the former countries of Yugoslavia. He successfully completed the Gunnery Careers Course (Tgt) in the summer of 2004. Currently he is the Sergeant Major Instructor Gunnery for Survey/BMETS.

David Lain: Squadron Leader David Lain completed the Army Survey Course in 2003 and is currently serving as OC UKNIC in JFC Naples (formerly AFSOUTH).

David joined the RAF in 1990 in the Ops Support Intelligence specialisation and spent much of his career as an imagery analyst at JARIC and overseas RICs. It was whilst being an instructor in imagery analysis at JSPI at Chicksands that he decided to swap roles and become a student once again when with the convergence of Geo-Int, a place on the Army Survey Course was offered to the RAF. He fondly remembers his time at the RSMS, particularly “Analytical Techniques using Least Squares” and “Linearising the Collinearity Equation”. Mathematics not being his strongest point, he thanks both John Knight and John Sach for their patience and perseverance!

Since leaving the RSMS, David spent a couple of years at the DGC heading up the Geo Support Team before moving on to Tactical Imagery Intelligence Wing at RAF Marham. The value of the Army Survey Course was fully realised whilst back in the hands of the RAF, as light blue knowledge of sensors for coordinate derivation purposes is woefully limited, and accurate coordinates for time sensitive targeting by GPS guided munitions is the future. He acknowledges that without doubt, the Army is indeed very fortunate to have a team of geographic specialists.

Angus Main: Having qualified as a staff hydrographic surveyor, Angus started his professional career with Thales. After 8 years he joined the UK Hydrographic Office in 2004 as a Mapping and Charting Officer.

Roderick Gordon Munro: Roderick had a 38-year career in military map/chart production. He initially trained at No1 Survey Production Centre RE. He then undertook his National Service at JARIC. He returned to his civilian career as a cartographer with the Mapping and Charting Establishment RE where he became head of the QA Branch. He undertook a tour of duty with the Directorate of Military Survey (Survey 2). Having retired from the Civil Service, he taught cartography to ONC/HNC level at Kingston College of Further Education for a further 20 years.

Richard Perry: Richard is currently serving in the Royal Artillery and has commanded P and Q Batteries which included Survey Troops. He is currently serving at HQ DRA with responsibility for Sound Ranging. Richard is keen to join the DSA Council as the RA Representative.

David Swann: David spent 12 years service with the Royal Engineers. From 1985-1989 he was in combat engineering appointments before transferring into the Military Survey Branch (1990-1997) having completed No 75 Army Survey Course. He joined 512 STRE and enjoyed tracking satellites from exotic locations. He went on in 1994 to gain an MSc in Geographic and Geodetic Information Systems from University College London. He headed the Field Support Office and was Project Manager of TACISYS in the period 1995-1997. Having retired from the Army he joined ESRI in 1997 as Manager, Defense Business Development and currently lives with his family in Redland, California.

Christopher Underhill: Christopher joined the Royal Engineers in 1985 and was trained as a Cartographer. He is still serving and is currently the UK Warrant Officer at the NATO Allied Command Operation HQ in Mons, Belgium. Chris’s appointments have been numerous but include HQ 24 Air Mobile Brigade, HQ Land Command, HQ ARRC (Germany), 42 Engineer Regiment (Geo) as well as operational tours to Kosovo, Bosnia and the Middle East. Other significant appointments have included a three year posting to the Permanent Joint Headquarters in Northwood where he gained wide experience across joint and combined operations and was subsequently honoured with an MBE for geospatial support during the planning stage and whilst on deployment with the UK National Contingent Command during Operation TELIC I (Iraq War).

Geraint West: Geriant entered the Royal Navy in 1983 and specialised as a Hydrographer in 1986, subsequently serving in HM Ships *Hecate*, *Fox*, *Herald* and *Bulldog*, before attending the Long Hydro Course in 1991. After appointments as OPS of *HMS Roebuck* and XO of *HMS Bulldog*, he served with the USN at the Naval Oceanographic Office and finally as Charge Surveyor of *HMS Endurance*. On leaving the RN in 1998 he returned to the USA to run the SHOALS airborne LIDAR system until 2001 when he joined Southampton Oceanography Centre as Head of UK Ocean Research Services.

Times are changing for DGI, with the re-brigading of units and a name change to become the Intelligence Collection Group (ICG), creating output focused, task force working and network enabled command and control. Major changes are taking place within the Geospatial Information and Imagery Intelligence world, which will enable the goals of the ICG to be achieved.

Background

The Defence Intelligence Staff (DIS), Management Board (MB), met in January 2006 and endorsed Director General Intelligence Collection's proposal to re-brigade his Area of Responsibility (AOR), into three one-star groupings. This will provide a more coherent organisation with a clearer focus on output. It was further agreed that DDGI, Director Intelligence Joint Environment (DIJE) and Commandant Defence Intelligence and Security Centre (DISC) would formulate the project plan under DDGI's lead (because of the greater changes that are taking place in the DGI AOR).

The three key activities are as follows:

- Creation of a one-star led Intelligence Collection Group (ICG), including the Joint Service Signals Organisation (JSSO), JARIC, Geographic Engineer Group (GEG), No 1AIDU and Defence Geographic Centre (DGC), with a headquarters initially at Feltham and thereafter subject to the Programme for the Rationalisation and Integration of the DIS Estate (PRIDE), as that programme develops.
- Streamlining of DIJE in order to form a one-star Intelligence Collection Strategy and Plans (ICSP), co-located with DGIC comprising the majority of DIJE, SIGINT Policy Branch and management of the customer relationship with the Met Office and UK Hydrographic Office.
- Royal School of Military Survey to transfer from Commander GEG to Commandant DISC's AOR (wef 31 March 2006).

The GEG will become the Joint Aeronautical and Geospatial Organisation (JAGO) upon assuming command of No1 AIDU with effect from 1 June 06.

An implementation plan has been issued with the aim to direct staff actions through the allocation of Force Elements, critical/milestone activities and timelines in order to achieve the AOR restructure with 1 June 2006 as the vesting date.

The desired endstate is a streamlined Defence Intelligence Collection Strategy and Plans (DI ICSP), focusing on policy and strategic issues and a Defence Intelligence Collection Group (ICG), providing Intelligence, Information, Services and Force Elements in support of Defence, Other Government Departments, deployed forces and other customers.

Who do we do it for?

The list of ICG customers who use our products and services are extensive. Defence takes a large part and all will be familiar with MOD, PJHQ, FLEET, LAND, STRIKE, DSF and Attachés. Many Ranger readers will know of the international Quad, Alliance and Bilateral connections to allow for exchange of data and burden sharing. Not so well known is that from time to time (when authorised), other Government Departments request our help, such as the – Cabinet office, FCO, GCHQ, Security Services, Home Office, Nuclear Accident Response Organisation, HM Custom and Excise and the National and Regional Police forces,

The Mission

The DGI current mission to meet Defence needs for Geospatial Information and Imagery Intelligence does not reflect all that we do. The current mission does not cover the SIGINT that will be part of the ICG. Also, it does not reflect the Force Elements that we deploy, nor does it cover our future aspirations or describe our wide customer base. Consequently, the ICG mission statement will change.



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Where does ICG fit in?

Primarily both internationally, where ICG will play a leading role in the international GEOINT community, and nationally with increased collaboration and horizontal integration with intelligence partners. Additionally, of equal importance, within UK Defence ensuring effective exploitation of DGI/ICG strategic capabilities by deployed forces.

Finally, DGI/ICG will develop the ability to meet more coherent delivery of capability, exploiting great human capital, organisational change and technical opportunities.

In summary

With full operating capability planned for April 2007, the major changes reflected above will be implemented across the DGI/ICG structure. The HQ will become more purple, task force working will become routine and, all areas of the organisation will be driven by output focused requirements – exciting times for all!



Brigadier David R Potts MBE

Director Defence Geospatial Intelligence

Brigadier Potts took up his appointment as Director Defence Geospatial Intelligence (D DGI) on 6 July 2005. He was born in Belfast in 1957 and commissioned into the Royal Artillery in 1976. He has served in Germany, Great Britain, Northern Ireland, Belize, Cyprus, Kosovo and Afghanistan.

During the 1991 Gulf War he served on the staff in the United Kingdom MOD Joint Operations Centre. He later commanded 5th Regiment Royal Artillery, comprising Multiple Launch Rocket System batteries and a Special Observer battery. He also commanded the Nicosia sector of

the UN Force in Cyprus and was Military Assistant to an Army Board member. He has held logistic and combat development appointments, including Assistant Director Land Warfare (Concepts). He was promoted to Brigadier in January 2003 and served in Kosovo for a year as Commander British Forces (COMBRITFOR) Kosovo and Assistant Chief of Staff Support in Headquarters Kosovo Force (KFOR), with additional responsibility for Civil Affairs and the KFOR 'Inspectorate' of the Kosovo Protection Corps. From January to July 2005 he served in the International Security Assistance Force (ISAF) as Director of NATO's Provincial Reconstruction Teams (PRTs) in Afghanistan, their mission being to extend the authority of central government into the provinces.

He holds a Bachelors' degree in American Studies from Nottingham University and Carroll College Wisconsin and a Masters' Degree with Distinction in International Studies from King's College London. He attended the Army Command and Staff Course in 1989 where he won the 'Commandant's Prize' and the Royal College of Defence Studies in 2004. He writes on military issues and has been published in the United Kingdom, Australia and United States. He was appointed a 'Member of the British Empire' in 1991.

He is married to Dinah Labouchere, an Oxford Scholar and former police officer. They have two sons, Sam and Luke, age 7 and a daughter, Mariette, age 5.

End of an Era

RSMS Joins the Defence College of Intelligence

By Major (Retd) A Keeley: Training Adjutant, Defence College of Intelligence RSMS



On the 1st of April 2006 the Royal School of Military Survey (RSMS) transferred from the Geographic Engineer Group (GEG) to come under command of the Defence College of Intelligence (DCI), part of the Defence Intelligence Security Centre (DISC). Coincident with the handover, RSMS has undergone a re-organisation which will enable it to be better placed to respond to the increased demands for Defence Geographic Training. The post of Chief Instructor has been redeployed and RSMS is now headed by a civilian Principal. The Royal School of Military Survey has ceased to be a Royal Engineer establishment.

A handover ceremony took place at Hermitage on the 31st of March 2006 when the opportunity was also taken for the Director General Intelligence Collection (DGIC) to tour the GEG including 42 Engineer Regiment (Geo) and RSMS. The following were in attendance:

- Director DGIC – Major General JG Rose MBE
- Commandant DISC – Brigadier ER Duncan OBE
- Director Defence Geospatial Intelligence (D DGI) – Brigadier D Potts MBE
- Commander GEG – Colonel DHE Attwater
- Director DCI – Captain JP Ratcliffe RN
- Principal RSMS – Mr JA Knight

RSMS, as part of DCI, is now the Geospatial Training Delivery Department (TDD) but the priority, level and volume of training will continue to be managed by the Customer Executive Board (Geo) (CEB(Geo)). The four training departments in RSMS have been re-organised into five Training Delivery Wings as follows:

- Geodesy and Navigation Wing
- Geospatial Imagery Wing
- Geospatial Information Exploitation Wing
- Geospatial Information Management Wing
- Map Production Wing

RSMS Headquarters has increased in size to remove much of the administration from the training delivery wings and now includes a Training Support Wing. The School is now headed by John Knight, the new Principal, who brings many years of experience to the role. His experience will be invaluable as the School faces its next challenge, DTR, the Defence Training Rationalisation, privatisation by any other name!



Brigadier David Potts MBE hands over command and control to Brigadier ER Duncan OBE

email and the DSA

If you have an email address and the DSA is not using it to contact you then please let the secretary know as it provides a far more timely and cost effective means of communication than the traditional post. Also, please do not forget to let the DSA know if you change your ISP. Contact the secretary at secretary@defencesurveyors.org.uk.

Soundings from the Devonport Flotilla

By Commander Jeff Faulkner RN: Commander HM

Change continues apace in the HM Division of DEVFLOT. Hot on the heels of the Hydrographers and Meteorologists merger (1996) came the decommissioning of *Herald*, *Hecla*, *Beagle* and *Bulldog* and the introduction into service of the SCOTT (1997) and Survey Vessels Hydrographic and Oceanographic (SVHO) *Echo* and *Enterprise* (as detailed in the winter 2004 report). This last year saw the end of Naval Party 1016 and a re-invigorated *Roebuck* and *Gleaner* re-joining the Fleet, as well as continued improvement in equipment and working practices in the SVHO's.

After playing a large part in the T200 International Fleet Review *Enterprise*, *Scott*, *Roebuck* and *Gleaner* returned to Devonport to join up with *HMS Echo* on the 4th July 2005 for a set of Officer of the Watch manoeuvres and a photo opportunity. With *Echo* returning from an 18 month deployment, and *Scott* and *Enterprise* returning from deployments just short of a year a piece, this provided an almost unique opportunity for the HM Division to get together and share experiences and knowledge. Since then the Ships have been spread both near and far undertaking maintenance packages and conducting an array of oceanographic, surveying and other roles.



The Hydrographic Surveying Squadron carrying out Officer of the Watch manoeuvres off Plymouth in July last year

HMS Scott started the 05 summer in upkeep in Rosyth after Babcocks had won the reverse auction for this maintenance period some months earlier. After several extensions to the period, she sailed straight after Christmas for the deep and calmer waters off Gibraltar to conduct a Technical Evaluation of the work conducted on her High Resolution Multibeam Sonar System and associated

systems during the upkeep period. Successful participation in Operational Sea Training (OST) in March 06 has ensured she is safe to deploy to conduct surveys for the submarine community in the North Atlantic, taking in visits to New York for Fleet Week and Halifax during the commemorations of the 100th anniversary of the final departure of British Forces from Canada. After a brief Fleet Time Support Period in Devonport in September she will then start an 8 month deployment around the Cape of Good Hope into the Indian Ocean. Her work off Sumatra in the wake of the Boxing Day Tsunami continues to be of great interest to rest of the world, with regular requests for *Scott* to visit countries and for people to visit her. It is with regret that due to the military work she has to complete, she can not provide more data to the wider community in this and other areas of great scientific interest.

HMS Echo took a break from work in the SWAPPS in August 05 to help the Royal Netherlands Navy search for one or their last remaining unbound submarines from WWII in the North Sea and to attend the 150th anniversary celebrations in Helsinki of the British lead bombardment of the Russian held Island of Suomenlinna. She then returned to her work off the South Western and North Western Approaches (SWAPPS and NWAPPS) often in horrendous weather conditions. At one point she even swapped a planned visit to Reykjavik for a stop off in Faslane to avoid the Strom Force winds! Having completed a generator change and maintenance period in Falmouth, and OST in early April she sails in May for an 11 month deployment to the Gulf, Far East and East Africa including both Survey and Oceanographic work as well as taking part in Exercise BERSAMA PADU, a multi-national exercise off Singapore where she will be working in her capacity as the Mine Counter Measures Tactical Authority platform.

HMS Enterprise was working alongside *Echo* in the SWAPPS prior to a maintenance period in August/September 05 that saw her fitted with Degaussing, Command Support System, an extra INMARSAT terminal and Miniguns. Prior to these fits, she was unable to conduct operations in the Gulf AOR, which meant that out of the two brand new SVHO's only *Echo* could really be used

in earnest in a conflict situation. Now fully operable, the ability to roulement these two sister ships anywhere in the world, provides the RN with a flexible and relatively cheap option to provide a significant military presence where needed.

Since sailing on the last day of September she has conducted some 4 months of oceanographic data gathering off the Horn of Africa, and a month of collaborative surveys with the Saudi Arabians along their Arabian Gulf coast line. In addition to this, she was able to conduct a Survey Motor Boat (SMB) survey of the approaches to Mahe Harbour in the Seychelles after a short notice request from the local authorities during her 4 day Christmas standoff. She returns to the UK in early June to conduct OST prior to deploying in September to take part in OPERATION VELA off the Western African Coast. From there she heads East of Suez to once again continue survey efforts in the Gulf.

The squadron's smallest ship, *HMSML Gleaner*, has been actively involved in surveys off Milford Haven, Liverpool and in the Rhu Narrows. These military surveys have proved an ideal proving ground for her new Simrad Multi-Beam Echo Sounder especially in the challenging tidal conditions off Liverpool. The remainder of the year will see her move across to the East Coast of the UK via the Caledonian Canal and commence surveys in and around several strategic ports.

HMS Roebuck, extended in service following her success in OPERATION TELIC emerged from her Ship Life Extension Period (SLEP) in September 05, with an updated version of the Simrad Multi-Beam Echo Sounder that is fitted in *Echo* and *Enterprise*. Her Survey Motor Boat (SMB) was also replaced with SMB Nesbitt, taken from the HM School, which has been fitted with an EM3002 MBES. This all adds up to a significant improvement in her data collection capability and places her very favourably to play a significant part in our campaign to gather environmental data. After conducting OST for the first time in Devonport she deployed in early December to the Mediterranean. During her Christmas stopover in Cyprus she was able to help out the Sovereign Base Authorities by locating a recent wreck that had sunk several months earlier. The rest of the deployment was taken up with surveys off Malta and Gibraltar where she fully proved all her new systems. Now preparing for Exercise STEADFAST JAGUAR she departs the UK in May to take part in the exercise and conduct a number of survey periods off the troubled coast-line of Sierra Leone. Throughout the whole of 06 *Roebuck* will remain on call as the UK survey asset for the NRF.

The five Hydrographic and Meteorological teams attached to the Devonport Flotilla have been kept fully employed in Frigates and Destroyers across the world, getting fully involved in Towed Array Patrols, Exercise GREEN OSPREY, Atlantic Patrol (North) and NEPTUNE WARRIOR as well as helping in the development of tactics for the 2087 sonar system. Although not attached to the HM Teams, the efforts of Lieutenant Commanders Forester Bennett and Toby Foster during OPERATION SHANDON should be mentioned. With little notice they flew out to Louisiana in the wake of Hurricane Katrina to offer surveying assistance in clearing the Mississippi and locating sunken oil rigs in the Gulf of Mexico. Their work was very well received and they were awarded the US Humanitarian Service Medal for there efforts.



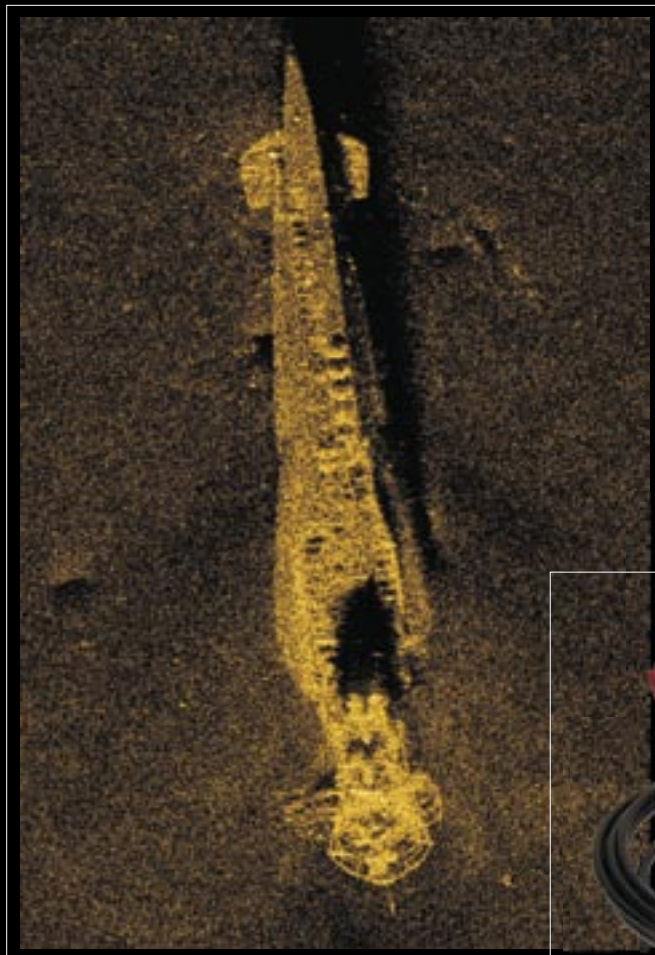
HMSML Gleaner leads the Hydrographic Surveying Squadron into Plymouth

Synthetic Aperture Sonar, HISAS



Synthetic aperture sonars combine a number of acoustic pings to form an image with much higher resolution than conventional sonars, typically 10 times higher.

The HISAS sonar is part of the HUGIN system solution for mine countermeasures, which has been ordered recently by the Norwegian Navy. HISAS is a wideband SAS sonar with frequency range of 70-100 kHz, capable of producing ultra high resolution acoustic images as well as co-registered bathymetry. The sonar is tightly integrated with the INS navigation and motion sensing platform of the HUGIN AUV, and makes use of modern signal processing such as DPCA (Displaced Phase Centre Analysis) to process the raw data into images.



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Fishing Vessels left stranded on the highway after Hurricane Katrina

Naval Party 1016, a team of surveyors that were embarked in the commercial vessel *MV Confidente* continued to provide excellent data along the East and South Coasts of the UK until they were demobilised for the last time in September. This move away from providing a tailored product for the National Hydrographic Programme continues the RN's policy to move its HM assets more and more into the realm of Military Environmental Data

Gathering. The loss of the Surveying Naval Parties will be much lamented within the HM branch as it provided personnel to the rest of the Squadron who had gained a great deal of knowledge and more importantly experience in this highly specialised field.

Against a background of continued financial constraints the HM units of the Fleet have fared exceptionally well reinforcing the view that environmental information superiority is an appreciated warfare enabler and a battle-winning component of any campaign. To this end the five Ships of the Division are playing an ever increasing part in the Fleet Exercise and Operational Programme. Apart from Military Data Gathering (MDG), the ability of HM ships to offer a "passive but positive" influence for Defence Diplomacy and MOD support to HMG Foreign Policy, in addition to their general utility is a significant strength. When this is added to their operational profile, driven by MDG, of a heavy bias to seagoing activity, thereby providing a deterrent presence and a source of intelligence, the wider benefits of operating these vessels in higher profile areas become evident. In all, by holding on tightly to the core professionalism and knowledge of the HM Officer and Rating, but allowing the Ships, their support mechanisms and operational cycles to adapt to requirements, the HM Division continues to provide high quality relevant outputs to the rest of the Navy as well as the wider world as a whole.



HMS Scott

Singapore Relief Map 1945

By Mok Ly Yng BSc(Hons), MSc, FRGS

Purpose of the Map

The year 2005 marked the 60th anniversary of the end of World War II and to commemorate the event, I generated this shaded relief terrain map of Singapore Island and the surrounding area. In late September 2005, I was approached by the Geography Department of the National University of Singapore to help them out with a data conversion project. The aim was to digitise the coastline and contours from a set of WWII era topographical maps of Singapore Island. The digital data was to be used in the production of a physical 3-dimensional relief model of the island of Singapore. The mainland area of Johore was not required for this model.

This 3D model is now in the newly opened permanent WWII historical museum, known as the *Memories at the Old Ford Factory*. The old Ford Motor Factory along the Bukit Timah Road was where the surrender of Singapore took place on 15th February 1942. The preserved and renovated factory itself was gazetted as a National Monument on 15th February 2006, the 64th anniversary of the surrender.

Digital Map Production

The digital map was produced using ESRI's ArcGIS 9.1, which was relatively new at that time, with 3D Analyst extension. The editing software was ArcMap under Arc/Info with ArcCatalog and GeoDatabase as the default database management system. The entire digital relief map took over 200 hours of work, spread over three months ending on the 20th of December. The major production steps were as follows:

1. Georegistration of base maps
2. Clipping and mosaicking
3. Digitising of features
4. TIN generation
5. Relief shading
6. Exporting the graphics

Georegistration of Base Maps

Nine map sheets (more later) cover the entire area of interest. One of the original deliverables was a mosaic of all these maps. The base maps were made available as high-resolution 24-bit colour scans in TIFF format. Each sheet was in turn georegistered to the map grid system, the Johore Grid, as printed on the maps themselves.

Clip and Mosaic Maps

After the maps had been geocoded, each sheet was clipped (i.e. cropped) to the neatline. After a few failed attempts, it was discovered that the TIFF file format did not allow for multi-sided polygonal clips — only regular rectangles are allowed. The resultant rectangular clipped image would have fill-in pixels instead of a transparent blank space. However, paper shrinkage in the original maps contributed to a worse final fit between map sheets than the inability to get a perfect clip from each scanned and rectified map. After the clips had been accomplished, the mosaicking process was left to run overnight. It took more than three hours to complete the process. The final mosaic in 24-bit, 300 dpi TIFF format is about 850 Mb in file size. This final mosaic is also on display at the Ford Factory museum with a near full-size printed copy mounted on the ceiling overhanging the 3-D physical model of Singapore.



Digitising Features

Due to the large file sizes involved, individual clipped map sheets were loaded as and when needed. The coastlines of Singapore and other smaller islands were digitised first. Each 25-foot contour was digitised into a separate 3D 'line' feature layer. All of the spot heights were captured in a separate point data set. The three reservoirs in Singapore were digitised as 3D polygon features. To ensure the low lying coastal areas would form proper triangles during the TIN (Triangulated Irregular Network) generation process, a duplicate coastline was added, tagged with either a 3 or 4-foot value. The coastline itself was tagged at 0 feet. This entire process was repeated for the areas in Johore with separate data layers created based on identical feature types and attributes.

TIN Generation

Before generating the TIN model, each of the contour layers was assigned its respective elevation value by using 3D Analyst extension. Each contour line layer was converted to a 3D Shapefile with an assigned constant elevation value. This might not be the best way to tag the contour values but within the time and knowledge constraints at the time, this method worked. Finally, a polygonal border was added to frame the TIN model.

With all the data layers ready, the TIN model was generated using 3D Analyst. The frame, coastline and reservoir layers were marked as 'hard' breaklines. The rest of the contours were 'soft' breaklines. The TIN model was checked for errors using ArcScene as a visualisation tool. Several pits (lows) and spikes (highs) were readily visible in ArcScene. The erroneous data points were verified and corrected. A new TIN was then generated. This process was iterated a few more times until no further visible errors were noted.

Hypsometric Layering

The default hypsometric layering colour scheme did not bring out the subtle terrain differences over the area. However, a great number of pre-selected colour schemes are included with the software and, after trying out a few of the schemes, I decided upon one which closely resembled that which was defined for the now discontinued International Map of the World (IMW) series. The IMW colour scheme was designed to depict the highest mountains in the world however, Singapore is a rather flat place with elevations in the TIN model ranging from 0 to 609 feet hence the IMW colours are spread over a much reduced range: the sea at 0 feet is in blue, the green areas are the lowest in ground elevation, progressing and increasing through yellow, brown and pink with the highest elevations represented by white

Coming from a topographical mapping background, it was customary to assign colours to equal and whole intervals in elevation. However, in order to highlight the subtle differences in terrain elevation, another method was required to apply and spread the elevation tints. After some experimentation with the various built-in statistical functions, I found that Jenks' optimisation for natural breaks gave the best representation of the terrain. This classification method is usually used for thematic or statistical mapping purposes.

A final tweak in the colours was applied to the lowest and highest elevations. The lowest elevations were assigned the colour blue, with a range from 0 to 0.001 feet. This was a custom selected colour as the original scheme had a darker shade of green. This forced a clear separation between the land and sea areas. For the high elevations, I wanted to show the highest peaks on Singapore Island (348–581 feet) in white too. The lower end of the white band was thus dropped from 590 to 290 feet. With the hill shadowing effect on, the colours took on a darker shade. The default setting of 315° (NW) in the Sun's azimuth was used.

In short, the relief and elevation representation here is purely for aesthetics only. It is not technically correct in the strict sense of layered topographical mapping. To use a local colloquial term, this is a 'swee-swee' map, 'swee' is Hokkien (the most commonly spoken Chinese dialect here in Singapore) for pretty, repeated for emphasis.

Exporting the Graphics

After the TIN model has been finalised, a flat 2D graphics version was exported. The whole model was placed within an A3-sized landscape format and saved as a 600-dpi high-resolution 24-bit TIFF file.



GIS Is Making Defence Information Systems Spatial



ArcGIS uses data from a distributed set of sources to improve analysis, whether that information is on the Web, Intranet, WAN, or LAN.

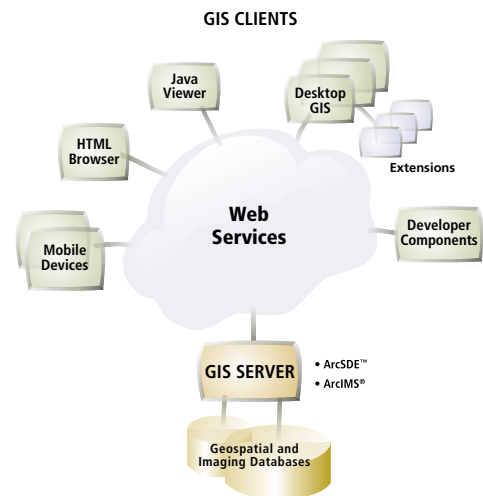


ArcGIS offers a MIL-STD 2525B solution that provides unit symbology and tactical graphics.

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Base Maps: Brief Description

The base maps used in the production of the shaded relief map are part of series HIND 610. This 1:25,000 scale topographical map series was produced by the Indian Engineers and was published by the Survey Production Centre, South East Asia in 1945. The Southern Islands of Singapore were not included in series HIND 610. The nine sheets used, arranged in their relative positions were:

3L/11/2 3L/12/1 3L/12/2

3L/11/4 3L/12/3 3L/12/4

3L/11/6 3L/12/5 3L/12/6

The Tekong and Pengerang area was based on series GSGS 3772, 2nd Edition (1:25,000), as reprinted by the Inter-Service Topographical Department with intelligence overlay, sheet 4I/9a (Tekong, 1945) and sheet 4I/9c (Pengerang/Johore Hill, 1944). In 1948, the British War Office republished series HIND 610 as GSGS 4686 without any changes to details.

Key Terrain Features During WWII

The shaded relief image map extends from 103° 37' 30" E to 104° 7' 30" E in longitude and from about 1° 14' 45" N to 1° 30' N in latitude.

Topography of Singapore

Singapore Island is diamond-shaped with a maximum length from east to west of 27 miles and a maximum width from north to south of 13 miles. The Strait of Johore separates the island from the Malay Peninsula. A causeway links the island with the town of Johore Bahru on the mainland. The island of Pulau Ubin lies in the widest part of the Johore Strait. To the east of Pulau Ubin is the island of Pulau Tekong. North of Pulau Tekong is the mouth of the Johore River. To the east of Tekong is Pengerang Hill (or Johore Hill) at the southern tip of the Johore mainland.

The islands of Blakang Mati (now called Sentosa) and Pulau Brani lie immediately south of Singapore Island across the waters of Keppel Harbour. Further to the southwest coast of Singapore Island lie the Sembilan Islands, a group of low-lying islands of varying size. These islands have today been joined into one large island called Jurong Island.

The town of Singapore is situated in the south of the island. The central area of Singapore Island looks like a hand with five outstretched fingers. The major roads trend in the NE-SW direction (i.e. top-left to bottom-right). All main roads converge towards the Kallang River basin (large green patch) and ultimately to the town centre of Singapore. The Bukit Timah Road is the principal artery to the north, crossing to the mainland by the causeway.

The major hill features on Singapore Island are found in the central area with Bukit Timah the highest at 581 feet. To the south of the island running parallel to the coast is the Pasir Panjang Ridge, about 4 miles in length. There are a number of smaller hills all over Singapore Island, the name 'Tanglin' means 'Eastern Hillocks' in Teochew or Hokkien (both similar Chinese dialects). The three reservoirs — MacRitchie, Peirce and Seletar — are also located in the centre of the island within the Municipal Catchment area.



Battle of Singapore

The Singapore Fortress area comprised the Island of Singapore, the adjoining islands and the Pengerang area in South Johore. On 8th February 1942, Japanese forces launched their main attack on Singapore Island from the northwest sector across the narrowest part of the Johore Strait. The area was defended by units of the Australian Imperial Force with attached Indian troops. That is at the top-left corner of the map.

The Battle of Bukit Timah took place on 11th February 1942 near the village of Bukit Timah which is close to the high ground in the centre of the map. Bukit Timah was a strategic location where stockpiles of ammunition and other war reserves were stored. The battle determined the final control of the reservoirs and water resources and also led to the fall of Nee Soon further to the east.

One of the last battles fought on the island was the Battle of Pasir Panjang when, on the 13th February, advancing Japanese forces moved towards Pasir Panjang Ridge. Units of the Malay Regiment and 5th Battalion Bedfordshire and Hertfordshire Regiment offered fierce resistance but they were heavily outnumbered and could not hold back the Japanese. By 14th February, the position was lost and on 15th February, which coincidentally was the first day of the Chinese New Year, the General Officer Commanding Malaya Command, Lieutenant-General Arthur Ernest Percival, surrendered Singapore

Kirby Hill in Johore

Note the patch of 'pinkish' hills in the northwest (top-left) corner of the image, across the Johore Strait. One of the high points there with an elevation of 317 feet is named 'Kirby Hill' after Captain Stanley Woodburn Kirby of the Royal Engineers. Captain Kirby was the first Officer Commanding the Colonial Survey Section (later numbered the 1st; the 2nd being sent to Hong Kong in 1925), which was sent by the War Office to survey and map the SE part of Johore state from 1923 to 1926. After the war Kirby, by then a retired major general, was asked to compile the official War Office history of the war against the Japanese. The last volume of the series was published in 1969, after his death in 1968. In 1971, his personal account of the war '*Singapore: the chain of disaster*' was published posthumously. These two sets of books are standard reference works for anyone studying the WWII history of Singapore. It is quite a coincidence that the official compiler of the history of the war against Japan had a hill named after him at the very location from which the attack on Singapore was launched.

Kirby on the Fall of Singapore

Associate Professor Brian P Farrell, a military historian from the National University of Singapore, sent me the following regarding Kirby.

After leaving Singapore in late 1935 as Officer Commanding a Fortress Company, Kirby wrote extensive briefing notes on the situation in Singapore. He handed the notes to, of all people, the then Lt Col. AE Percival, who was on his way to an appointment as Chief of Staff to the GOC Malaya Command. Percival would himself take up the appointment of GOC Malaya Command in May 1941. Kirby went on to serve under Field Marshall Sir Archibald Percival Wavell who, as Supreme Allied Commander Southwest Pacific, was Percival's last commander and the person who authorized him to surrender. Percival and Wavell did not get on well and did not work together effectively.

After the war Percival protested when Kirby was assigned to write the official history and in the 1950s kept up a lively exchange about the work with Kirby and others on the official history team. Eventually, Percival went to his grave thinking Kirby had whitewashed Wavell's role in the debacle. Kirby published his own more revealing examination of the campaign because he was very frustrated at all the things he was forced to cut out of the official history.

Conclusion

It has been said that the past is like a foreign country. Producing this map and writing about it has really been a journey of exploration and discovery. To end on a lighter note, sometime during the production of the map, a famous Chinese *fengshui* master (i.e. geomancer) in Singapore stated that there are five dragons (traditional Chinese variety) in and around Singapore. See if you can locate all five of them from this map?

The Last Days of 84 Survey Squadron RE

By CR Price

Preface: January 2006

I have been asked to commit to paper my memories of the final days of a proud unit as I was in a unique position, being the SQMS of the Squadron and present at its close. It has been 36 years since these events took place and the fine details have faded as one might expect, so please forgive me if facts are inaccurate in any way. If any kind soul can correct me let me know, as I would be pleased for the history to be recorded correctly for posterity.

SOLD FOR A DOLLAR

Singapore 1970

84 Survey Squadron RE was situated as some may remember, off the North Buona Vista Road at the end of Dover Road opposite the Garrison Church, on the Pasir Panjang Estate in Singapore Postal District 5. The Squadron shared the small camp with 556 Field Survey Depot RE. It was a quiet military backwater where it seemed only Squadron members, Map Depot staff and its customers, military funeral parties and visitors to the Church and its congregation ventured.

It was sometime in late 1969 that the then Officer Commanding, Major TWG Farmer RE, informed the Squadron of its forthcoming fate. This was, that towards the end of 1970 or early 1971, the complete withdrawal of British Forces from the region would take place as the responsibility for the defence of the independent and Sovereign (Island) State of Singapore (9 Aug 1965) had come to an end after 151 years. I think it was in March or April 1970 that the last OC, Major MR Richards RE, broke the news to all of Headquarters Troop that 84 Survey Squadron was to disband upon closure at the end of the year and that the unit's real estate and assets were to be handed over to the Singapore Government. I am of the belief, if my memory serves me correctly, that early indications lead us to think that the Chief Surveyor of Singapore was to take the Unit over as a going concern but this was to change much later to become a unit of the Singapore Army,

As a very green SQMS at the time, having only taken over the post late in 1969, I remember quaking in my boots and putties at the thought of all the work and preparation that would have to be done to make the Squadron ready for handover, and the prospect of dispatching all our soldiers' MFO safely on its way to Blighty (UK) was daunting.

1 Troop was still in Sarawak, up river from Kapit, doing its best to conquer the jungle hazards whilst performing their trig and heighting tasks and being resupplied from Dover Road by my small team of able and hardworking staff comprising; Corporal Roy Campion, Sapper Jock McCullagh and not to forget the Malay Corporal, whose name, forgive me, escapes me now.

As the months passed, key dates were revealed slowly. 1 Troop members returned progressively to Singapore in June and July and it was planned that all of them should return to UK to their various postings in their turn as the administration demanded. Whilst these moves were in progress the Squadron was given its final dates for closure and handover, which was to be at the end of November/early December.

The process for winding down had been meticulously planned and was starting to be executed. In essence, the plan was to release key staff as their tasks came to an end and that the fully equipped unit, except for certain 'controlled' Field Survey and Air Survey instruments and equipment, was to be presented to the Singaporeans. The Drawing Office had little or no work by this time and the Printers were doing only limited reprinting to top up stocks for 556 Field Survey Depot.

In late June the Squadron received orders to send a detachment of field surveyors to Pontianak in Kalimantan (Indonesian Borneo) on Operation Mandaw, to compliment a unit of Australian surveyors for two to three months assisting the Indonesian Government in marking out plots of forested land for a mass migration scheme to relieve pressures on the population of the Island of Java. Equipping this small force entailed unpacking equipment destined for UK and demanding new stores before they could travel. All this at a time when my over-worked staff, already working a full day, was brought under additional pressure to perform further feats of effort and dedication.



Guard Room and the HQ and Drawing Office building with the corner of the Graining Room in the foreground.

The process of carrying out the 100% stock check of the G10 stores (Unit Equipment Table) and accommodation stores had to proceed despite these interruptions. Deficiencies had to be made up and damaged stores replaced. The Q Stores was to be complete and laid out as for inspection and all offices including the Print Shop, complete with tools and equipment, were to be up to scale and set out ready for use.

It was at about this time when one calm, dark, humid afternoon whilst doing paper work and making up boxes, my team and I experienced what it is like to be struck by lightning. Out of nowhere it seemed, the bolt cracked above our heads onto the telegraph post attached to the end of the Store roof and the thunder echoed skywards getting louder as it departed. We each froze as we felt the shock and slight tingle of the charge as it passed through us and the rain started to beat hard on the corrugated iron roof. The pole was split and our invaluable telephone was out of action for about a week. The last thing we needed at a critical time!

All through this period our soldiers were departing for UK and, of course, not being replaced. In September our Malay soldiers were discharged and returned to their homes in the North, some as far as Alor Setar. They were sadly missed for their hard work and devotion to we British.

October saw the return of the Detachment from Kalimantan. Some amongst them were highly disgruntled at the lack of work ethic in the locals and the colourful language of the Australians did not impress many. I recall that inflation in Indonesia was rampant at the time. One Singapore Dollar (2s 8d - 13.3 pence today) bought a suitcase full of Sen notes, wrapped roughly in bundles of 100 notes. This applied to all denominations and the paper used was poor quality repulped unbleached newspapers, for one could see the old typefaces under the currency image.

Having checked their stores, they were repacked and returned to the Ordnance Depot or to UK as required, and the procedure of running down the unit continued a pace. The OC, Major Richards, was posted early, roughly 6 weeks prior to the close, which left the newly promoted 2 i/c Major Deane (Dixie) in charge of the final phases.

By early November the camp had begun to take on a deserted feel as non-key personnel returned to the UK. The stores staff remained along with the Squadron Clerk to complete the final administration work after which they departed towards the end of the month.

I am unsure of the actual date of relinquishment and I cannot even remember what day, but from my records my flight date home was Monday 7 December 1970 and it was about a week prior to that when the handover took place. This would place the date at Monday 30 November or Tuesday 1 December 1970 (I can do no better than that).

The last three remaining members of the Squadron, acting OC Major EM Deane RE, WO2 (SSM) Mark Maunder RE and myself Staff Sergeant Colin R Price RE were left to tie up the few remaining tasks and perform the final ceremony.

As I remember it, the Depot vehicle served as taxi for the final journey along the North Buona Vista Road to Dover Road when on the final morning, in nervous anticipation of what was about to happen, the three of us paraded on the verandah of the Guard Room at 0900 hours. A few minutes after the allotted hour a Singapore Army truck drew up outside of the open front gates. A very young looking Army Lieutenant alighted from the passenger seat and six or eight soldiers piled out of the

rear and lined up. I cannot remember any orders being given; it was all very quiet and subdued. The officer came forward and saluted and we all returned the complement. We then withdrew into the room behind us. Prepared papers were signed and the young officer handed over the token sum of 'One Singapore Dollar' for the site and its contents. We lowered the Squadron flag and the Army detachment mounted guard as the three of us, somewhat bemused, walked to the connecting door at the rear of the building that



Air Survey Building

was 556 Field Survey Depot and withdrew. The door was locked behind us and that was the end of the history of the proud independent Survey Squadron, numbered 84.

PS. My last days on the island were spent moving out of Married Quarters in Jalan Rumia, Holland Village, which I handed over to an Australian corporal. I took the short journey down the North Buona Vista Road to the Military Families Hostel on the Ayer Rajah Road from where, a few days later on the 7th December, we flew home to Brize Norton.

PPS. 556 Field Survey Depot RE continued to operate providing map support to the few remaining British Forces and an increasing number of Australians until its close in 1971. I will leave those events for someone else to recall.

TODAY'S WORLD!!

One is constantly bemused if not actually angered by today's politically correct nonsense epitomised by warnings printed on packets of salted peanuts stating that they "contain nuts" – probably a better description of the labeller that the purchaser. However, when Puma recently included on the labelling of a box of trainers the text "average contents: 2" it really made you wonder how many people drew the short straw and only found a single shoe inside and who were the lucky ones who discovered a bonus three!



A fascinating place to visit - for all the family

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.

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The Recognised Environmental Picture and Tactical Systems

By Roger Brackin, Technical Director, Tenet Defence Ltd

Background

The Recognised Environmental Picture (REP) is a concept which is very new to many people. If it is recognised at all it is seen as a background picture layer which provides an indication of the weather. In practice over the last 5 years of serious evolution, it has started to deliver an integrated picture of the geospatial, topographic, oceanographic, atmospheric and bathymetric environment in which an operation is conducted.

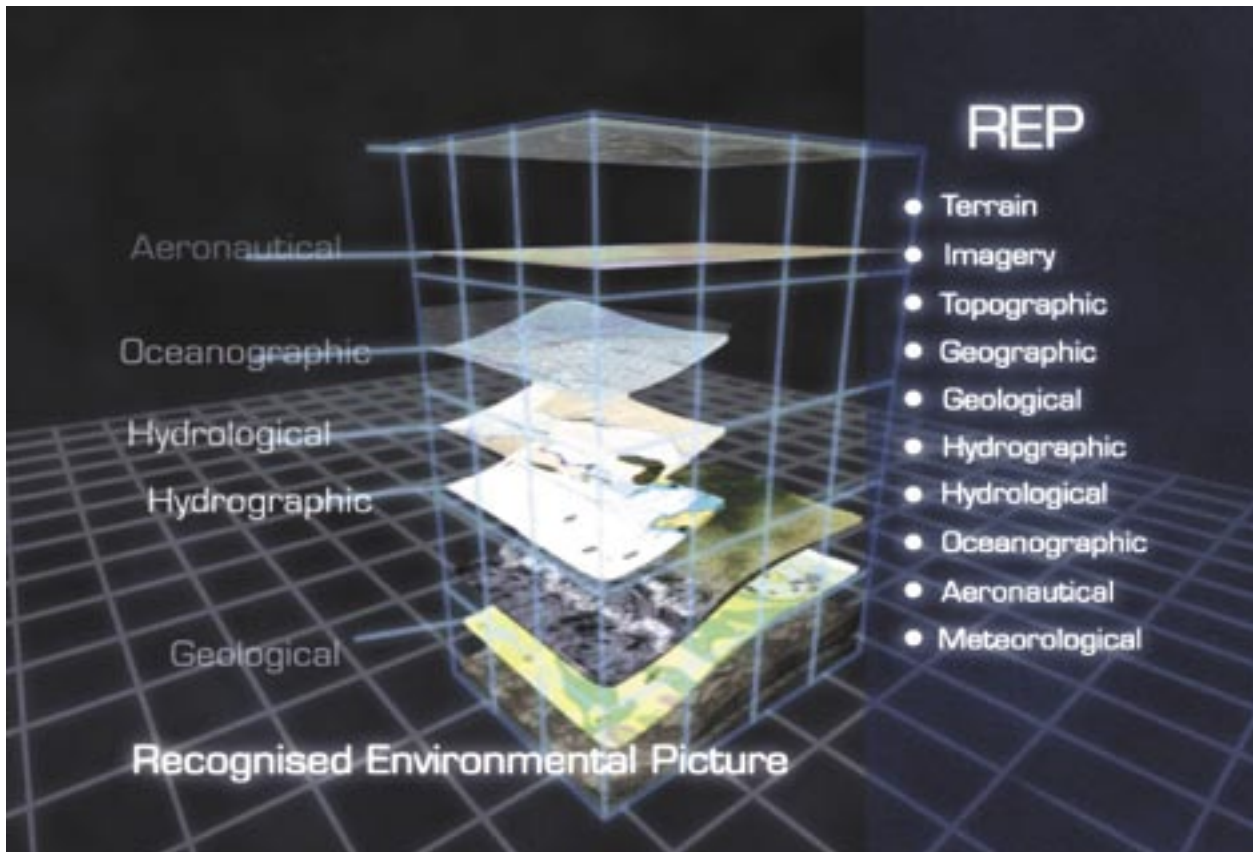


Figure 1 – The REP

The key requirement for the REP stemmed from the change from the cold-war scenario to a much more expeditionary stance in UK and NATO forces. Operations are now conducted in a range of different environments. These present two challenges. The first challenge is that less detailed information on the environment in the deployed theatre is available and it is of poor or unknown provenance. Secondly the environment is now widely different, presenting new and unknown challenges.

In the previous decade, research has developed an approach to deal with these issues, known as Rapid Environmental Assessment (REA). The idea is to quickly assess the available data (REA 0), the gap in knowledge and deploy assets to fill that gap (which may be using remote sensing, or using covert or overt surveying, leading to REA +1, +2 etc.

Because the deployed force view of the data is, by necessity being continually updated, all data (static maps, charts, wreck locations, imagery, weather, and even the sea bed - as seen in the Asian Tsunami) are all potentially dynamic. The only method to deliver such a story is therefore not by CD and total replacement but by incremental delivery and careful 'asset tagging' of data. This is what the REP is and does. Every user can see the part of the environment he needs, which will be up-to-date and consistent.

TENET has supplied the system which provides all force level commanders with the REP, which is delivered via a number of means in the UK and where necessary coalition joint force. REP is by its nature integrated across land, sea and air and so is truly joint. This does not mean though that all users have to see the entire picture; users can select which elements are really relevant.

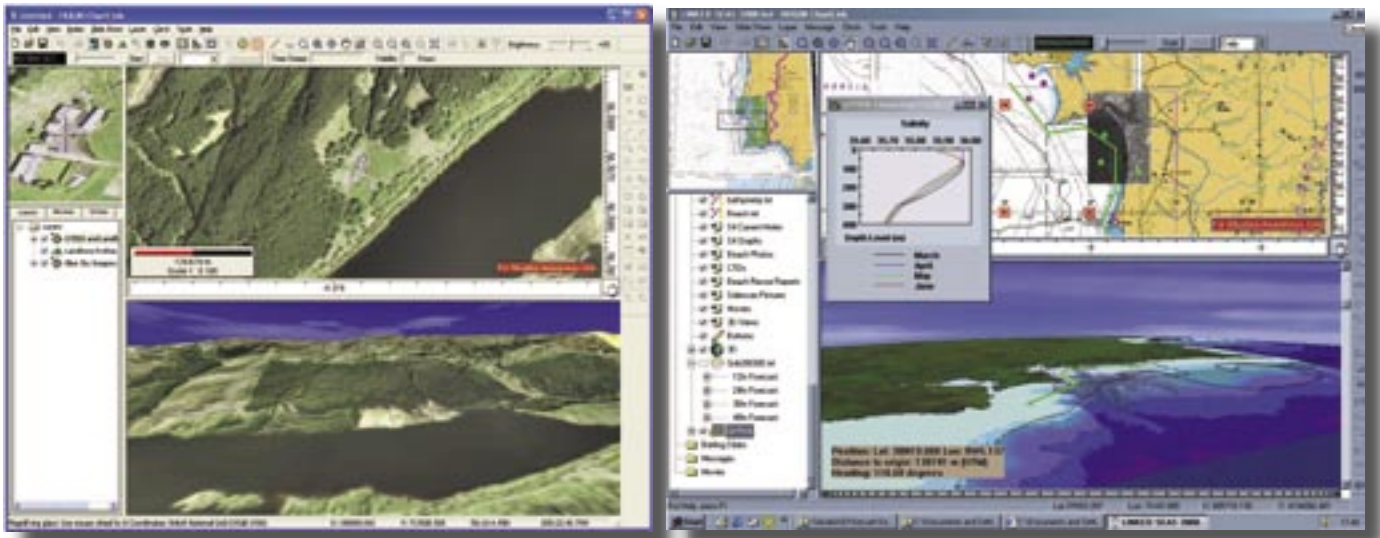


Figure 2 - Views of the REP configured for different users

For a land force it may be very important to consider the opportunity to assess the likelihood that roads are passable. The REP can take roads, and their type (for example tarmac or dirt) and the predicted rainfall or likely range of rainfalls for that period and determine which roads will be, on balance of probability, passable.

Equally, REP can help assess where ASW platforms could be sensibly placed to maximize sonar detection ranges or distance from a target beach based on HELO flying time, but also take into account fresh water generation requirements of the platform which is highly dependent on water salinity. This latter characteristic is not a significant problem in the Atlantic but is a critical issue in high salinity areas such as in the Persian Gulf.

Similar analysis could identify areas where an atmospheric characteristic could have a significant positive or negative effect on a mission.

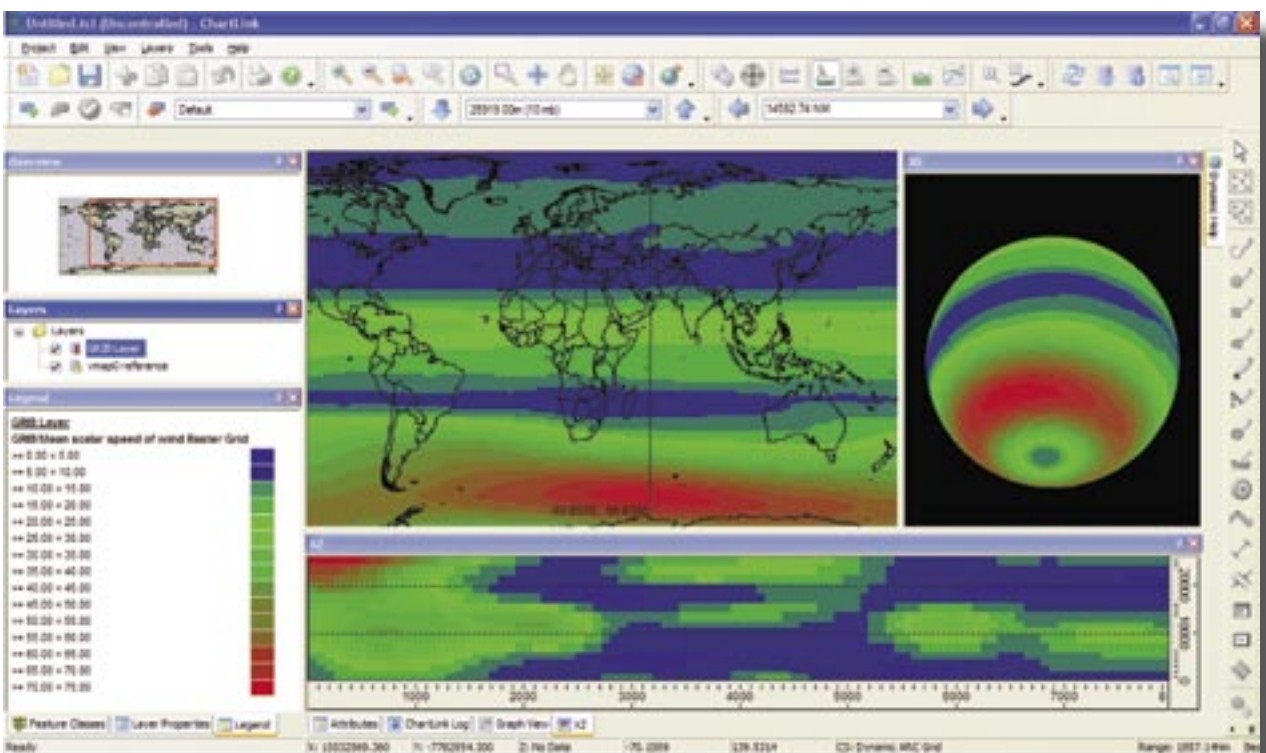


Figure 3 - Wind speed thresholds showing low, medium and high risk

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The Next Step

At present it can and does deliver into a range of systems across intermittent and slow communications networks. As NEC evolves the capability to deliver to a wider range of users becomes attractive. The REP has to date delivered to users at an operational level of command primarily providing improved situational awareness for command. There is though a much bigger community who could benefit, users operating at a tactical level. Figure 4 provides some idea of the problem which needs to be solved.

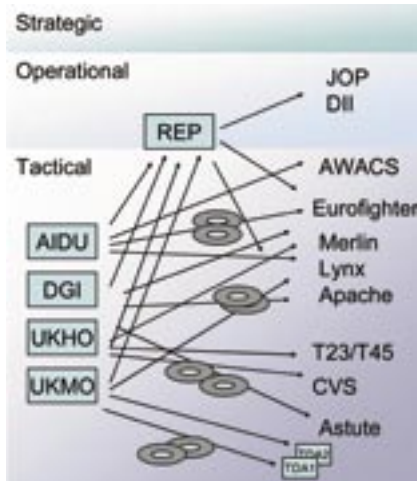


Figure 4 – The Tactical Level Problem

The concepts of REA and REP are delivering a timely and consistent environmental backdrop to all users at a situational level, but the many tactical systems still receive data via a series of specialist data delivery systems operated using very labour intensive processes. This is of course costly but it also introduces risks.

The information feeding the REP itself is often delivered from deployed platforms or via specialist routes.

Because of format issues, the manual conversions required and the expectation in delivered systems that data will be delivered on hard media, and infrequently updated while platforms are in port, it becomes impossible to maintain the deployed coalition assets (air/land or sea) at the current state of knowledge.

The problems to be solved in providing an integrated data feed to all systems at all levels of command are significant, they range from simple practical issues such as the range of data interchange formats, lack of shared terms (for example the different meaning of mine to land and maritime users) and the time and money required to migrate the specialist hardware on all platforms to a single standard interface. One approach, which has proved effective at an operational level has been to provide a single integrated data management centre (The Environmental Fusion Centre) which would receive, ingest and then distribute the REP. This concept has worked effectively at the Operational level of command. And the REP System as currently deployed does do this.

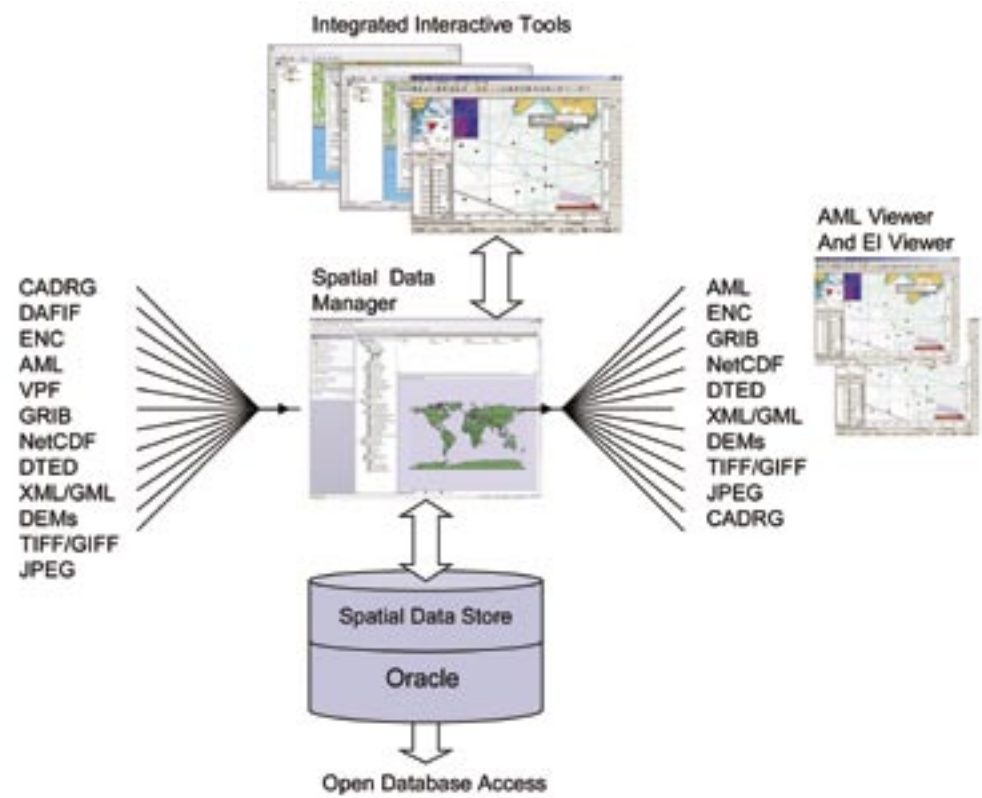


Figure 5 – The Current REP System's Approach to Interoperability.

The problem with this approach is that it is sustainable only for medium scale datasets. There has to be a large degree of delivery autonomy and federation to ensure delivery to all the assets requiring data. The general view, which TENET wholeheartedly supports, is that given the timeline for system upgrades being decades, any delivery must migrate to a modern open standard whose evolution is not dependent on one company but is instead controlled by a community and is in line with mainstream geospatial standards.

Thus the group of standards developed by the Open Geospatial Consortium, and being slowly but surely taken into ISO (191xx/TC211) seem the obvious choice. The model on which these standards operate includes XML, Service Oriented Architectures and well thought out extensible schemas fit well with the evolution of modern defence systems and particularly with NEC Technologies.

A Test Case for a Tactical Rep

Presented at last year's Underwater Defence Technology conference was the concept of an open architecture tactical decision aid for ASW. Under a DEC-UWE programme TENET developed an Anti-submarine Warfare Tactical Decision Aid. This aid has been recognised as having great potential to deliver improved sonar performance by exploiting the best environmental data for each situation. Thus if the prediction is to support an operation in November 2006 then climatological environment is the obvious choice. If on the other hand the plan is being developed for the next day, then the best Met/Oc forecast information for the next 24 hours should be used.

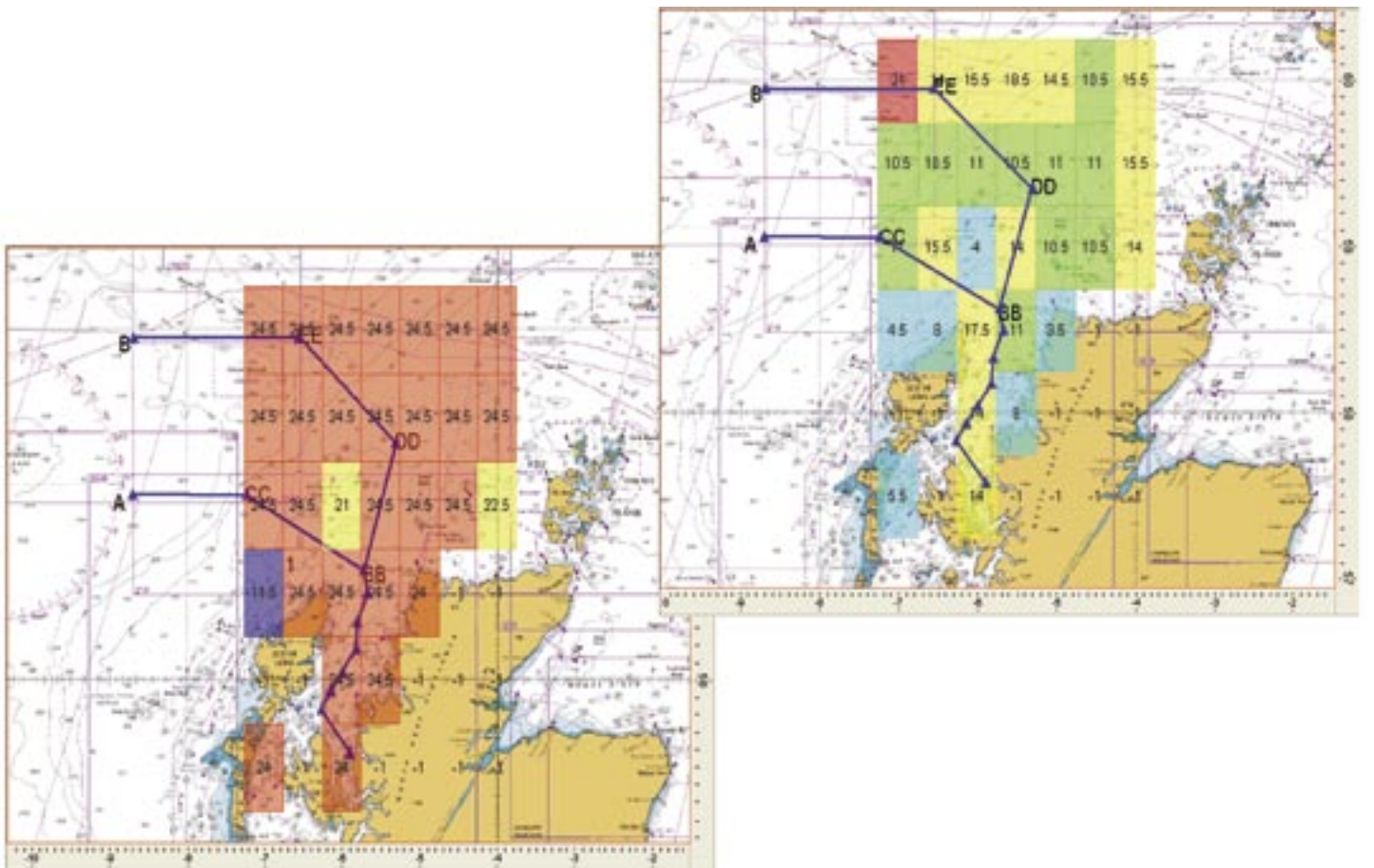


Figure 6 – Performance Assessments Colour Coded to ensure easy interpretation.

The sonar model itself has been integrated into an open systems wrapper. It can take environmental properties in XML (actually data compliant with the GML XML Schema) and deliver results in the same format. The results were then also treated as environmental products available for inclusion in further analysis and assessments. The concepts used also work well for Radar and Communications propagation models, and thus integrated planning based on all of these aspects is then possible.

Because the model used in the ITDA was very open, the specific location at which a calculation is done is largely irrelevant. With the advent of NEC a fully federated environment is possible, with different calculations being performed at different locations and all users sharing the results.

In addition it is possible to compare planned results with those achieved as they are all available in the data servers. This allows very effective monitoring of the progress against the plan and its deficiencies. These comparisons are possible not just after the event, but as an interactive process.

Integrated Planning/Execution Cycle

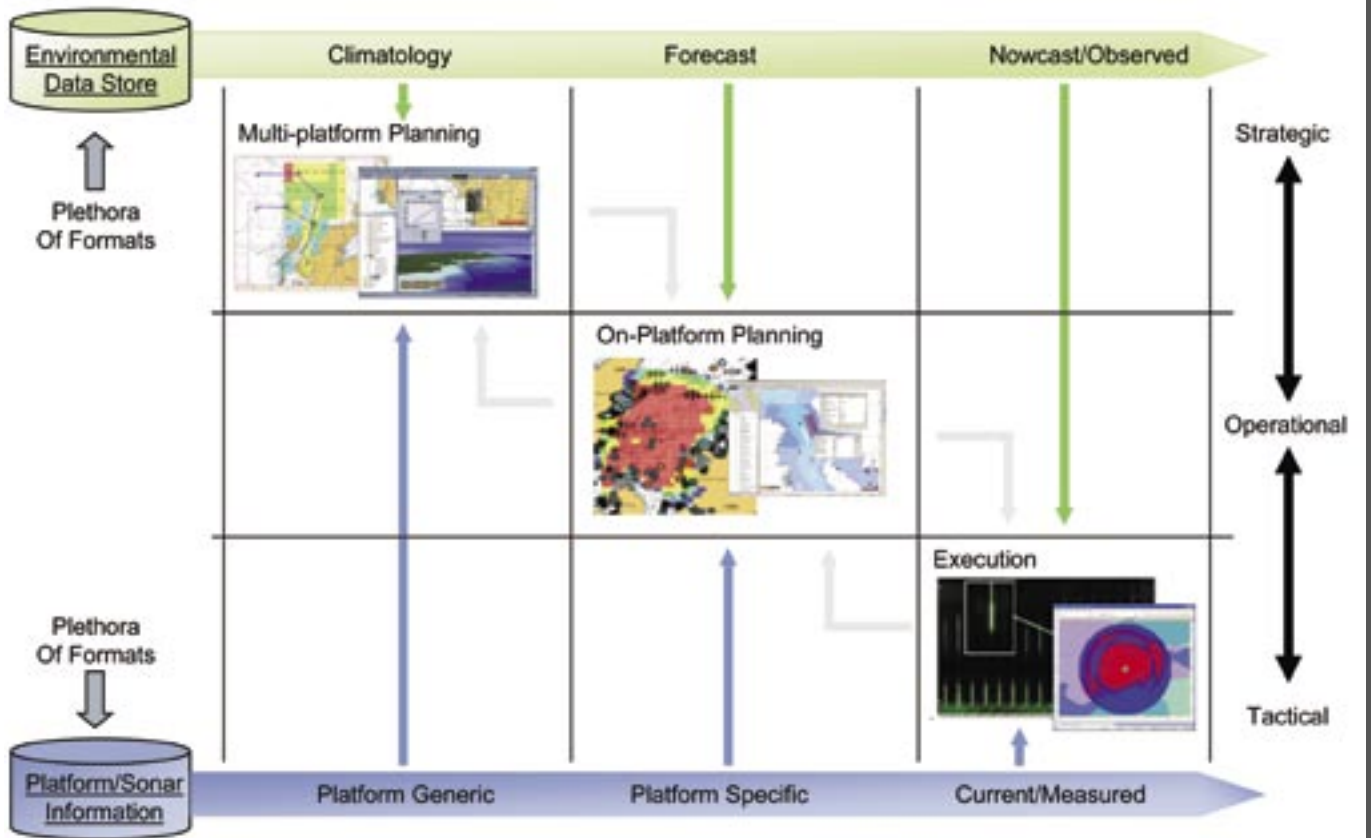


Figure 7 - The Integrated Planning/Execution Cycle demonstrated during Trials.

Migration

Having identified the Holy Grail for the data delivery architecture (at least for the foreseeable future) the knotty issue of legacy needs to be considered. Things will not switch immediately, and the strength of the current REP System model is that it can service both the legacy user and the future user. The current aim is to move to a middle state. For delivery, the REP Server is not the delivery mechanism, but simply the broker or register declaring the current authoritative service for information of a particular type.

The REP System can still perform legacy conversions if required. Deployed components must be migrated to an open infrastructure. Again there will be dual running for a long period. In some cases, where equipment upgrade allows, integration will naturally occur. The alternative is to develop adapters which provide an interim solution. Both of these approaches were proven in the research and are equally applicable.

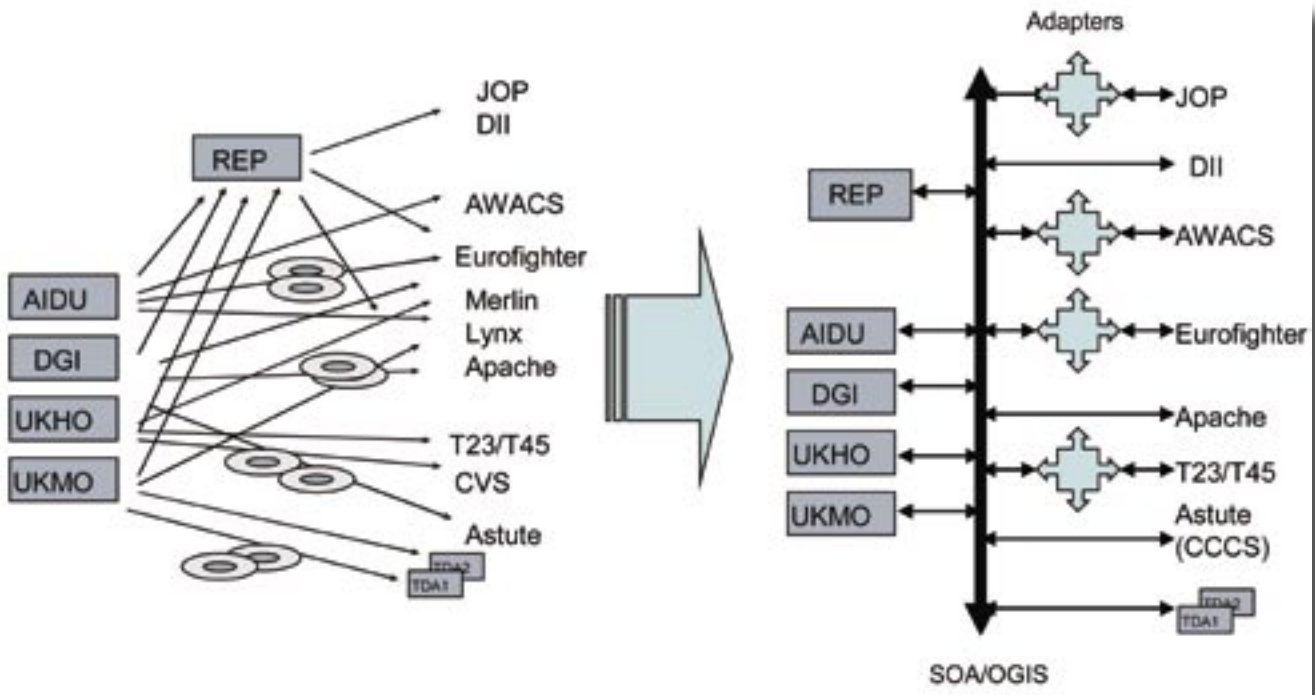


Figure 8 – Migration path, the first steps.

Conclusions

The REP concept is here today (although really needs a new name. It is much more about being an information feed than about pictures). The REP System has been proven to work well and deliver real operational benefits. Tactical Level Systems are another story and require the same treatment to avoid the stove-pipe problems which will persist unless action is taken to consolidate the multiple feeds. UK MOD is doing this but it is obviously time consuming.

The most obvious future direction to support interoperability is the OGC/ISO 19100 group of standards and this is very much the subject of current experimentation. NATO seems to be moving solidly in that direction and as a result a much higher degree of inter-operability seems likely in the future. We should all hope this is true as people's lives genuinely depend on it.



US Submarine San Francisco which hit a Sea Mount at 28 knots. The chart showing the sea mount was on board but not available to the navigator at the time of the accident.

Reported: 1 killed, 11 injured. \$88 Million dollars damage.

The Time of Our Lives

In January this year the NAVY NEWS looked back through its pages to recall some of the January headlines of past decades....

40 YEARS AGO

Front page news was the commissioning of *HMS Hecate*, the second of a new class of three survey/oceanographical ships.

The ceremony was held in Glasgow, unusually, on a Sunday, as the ship's programme was tight and there was a need for the ship's company to get their Christmas leave in at Devonport before sailing for operations in the Bay of Biscay. Novel features of the ship included air conditioning, a strengthened hull for ice operations, a propeller fitted athwartships in the bow for position maintenance and she had a Wasp helicopter and a Land Rover.

30 YEARS AGO

Ten years later and *Hecate's* sister-ship *HMS Hydra* was operating in much more agreeable and sunny climes. She was carrying out survey work in the Seychelles and Amirante Islands. On board for their visit to the nearby d'Arros Islands were His Imperial Highness Prince Chahram, Crown Prince of Iran and Princess Niloofar. They had just purchased the islands and were planning to build an airstrip there. The ship's helicopter was put to good use during the visit, airlifting the ship's surgeon ashore to treat an 18-month Seychellois boy, suffering from severe burns.

20 YEARS AGO

HMS Herald divers swim the Equator – well, sort of!

The seven divers had rigged up a swimming pool on the upper deck, and as the ship sailed across the Equator they took part in a "marathon" swim in the pool! *HMS Herald* was at that time in the Pacific making her way north from a seven-month deployment in the South Atlantic. She passed through the Panama Canal and then on home to Devonport. It was an especially joyful homecoming for PO Kevin Graves who saw his four-month-old baby son for the first time.



Sisters side by side, HMS Hydra (foreground) with sister HMS Hecate in 1976

MIDAS: A HALO Deployment Aid

By WO2 (SMIG) A Fenton RA

General

The improved Hostile Artillery Locator system, HALO 2, is currently in service with the Royal Artillery and is known as the Advanced Sound Ranging Programme (ASP). It is a transportable, semi - passive, acoustic sensing system for detecting and locating the source of artillery fire and loud detonations (explosions). The equipment is of ruggedised construction and, subject to normal periodic routine inspections, is suitable for worldwide deployment including Special Operations.

The HALO system provides the following functions:

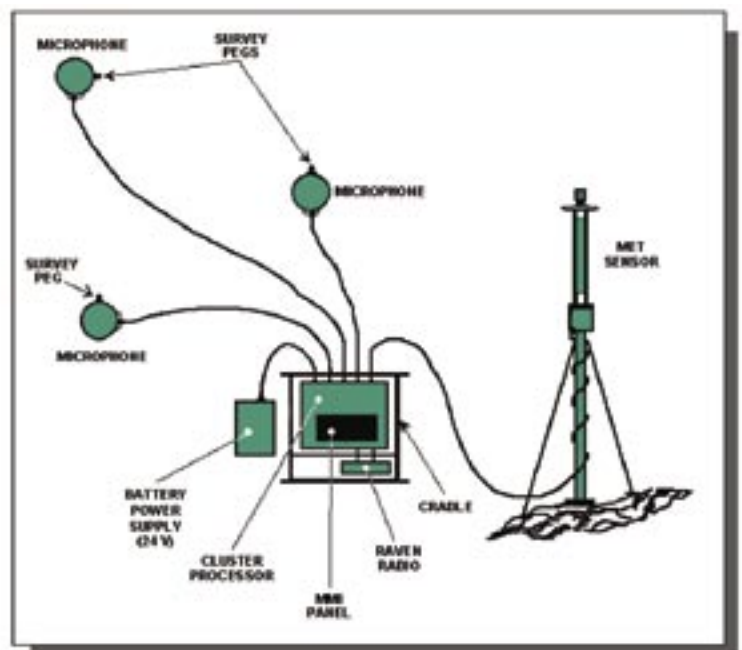
- Detection and location of artillery firing positions, displaying detected acoustic sources on a Visual Display Unit (VDU) at the Command Post (CP).
- The recording and storage of detections, locations and other information transmitted from Sensor Posts (SP).
- Processing of data for operator analysis.
- Provision of reference grid co-ordinates overlaid by map features.
- Adjusting of friendly indirect fire assets onto designated targets.

Each Sensor Post consists of a cluster of three microphones surveyed in to an accuracy of 3 mils or better. Also connected at the sensor post is a Meteorology Sensor assembly mounted on a tripod stand. This calculates local wind speed and direction, temperature, pressure and humidity. This information is then used to create a system generated 'Met' model to aid in the calculation of the sound propagation.

Data transmitted from the SPs is received and processed at the CP and then displayed on a VDU in the form of vectors and map locations for operator review and analysis. When the HALO System is fully deployed and set up, the microphones at the SP detect any acoustic disturbance caused by gunfire from artillery weapons. The sound pressure pulses produced by gun fire or explosive events pass over the microphones which then take a pressure reading hence correct deployment of the equipment is paramount.

Deployment

The deployment of the 'Sound Ranging Base' requires the command element of the Troop to site both the Command Post and Sensor Posts such that the 'links' between the Command Post and the equipment deployed in the field (Sensor Posts) will be able to send the acoustic information they gather over a radio or by line. This link must be maintained if the HALO System equipment is to carry out its primary task of locating hostile artillery.



The Map Interface And Deployment Aid System (MIDAS) software package was designed to assist the Troop Commander in siting the HALO System which it does by analysing the performance of the HALO System for a chosen deployment of both Command Post and Sensor Posts. The programs he/she has access to are:

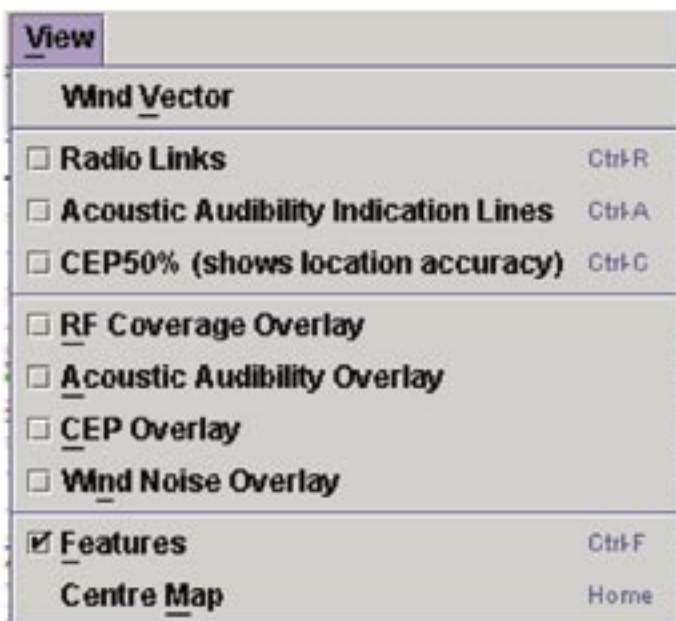
Radio propagation model – This will advise the Commander on a potential future deployment. It will show the feasibility of achieving communications between the Sensor Posts and the Command post. This works in a similar fashion to carrying out a path profile analysis.

Acoustic propagation model – This will advise the Commander on a potential future deployment. It will show the feasibility of whether the deployed sensor post will be able to hear any acoustic activity from the area in which we believe there to be enemy assets. It will generate this information by taking into account basic Met parameters and by using the installed DTED and Vector Mapping software.

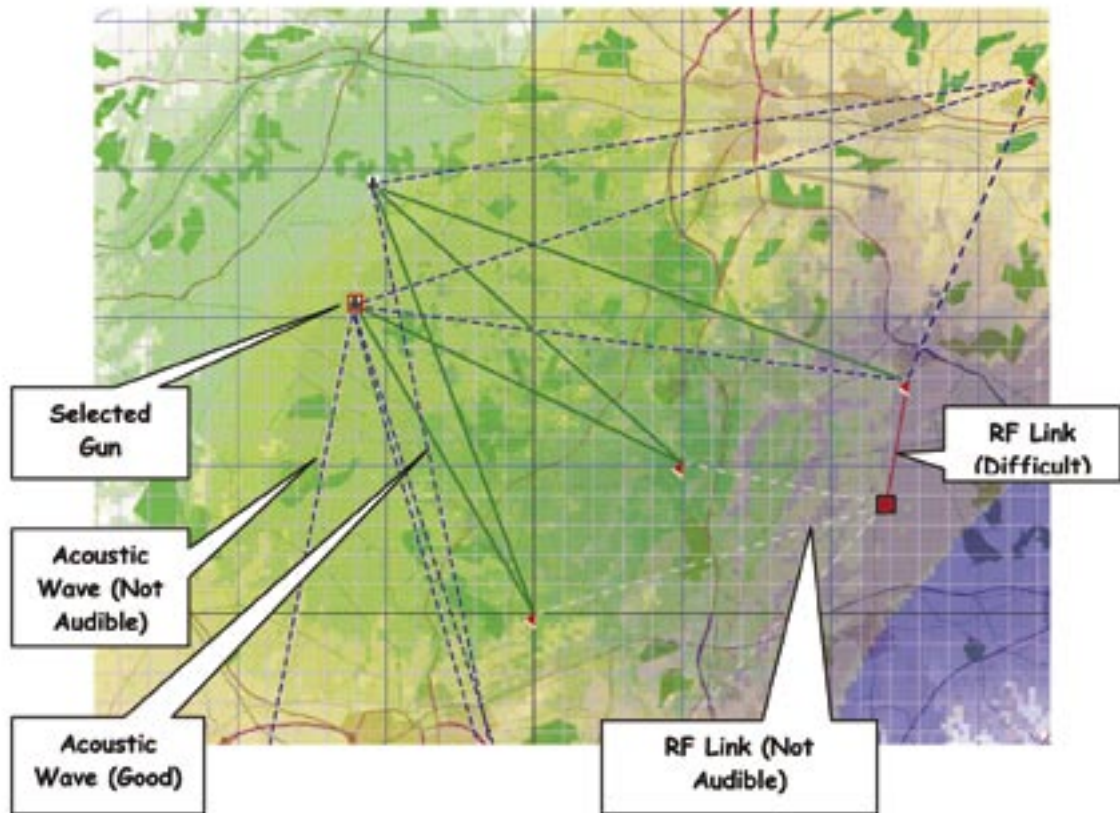
This information is then calculated and displayed in pictorial form to give the Troop Commander a set of clear (overlay) maps of derived data useful to making the deployment decisions. Once all information is input to the system, it can be interrogated and options are available to the operator, each giving different information that is useful for the commander to make a final deployment decision.



Display of MET information entered



The option of Radio Links and Acoustic Audibility Lines produce lines on the screen. The Overlay option produced the same information but uses coloured areas, the lines are the most accurate and therefore most used by the operators. The red triangle icons depict Deployed sensor posts and the red square to the rear symbolises the CP. The dotted lines from the Sensors to the CP mean that if the Commander were to deploy them at the specified location then communication back to the CP would not be achievable. (The line should be solid).



The red square with the icon of a gun in the north of the map denotes the suggested enemy location. The lines from the enemy gun to the sensors shows the Commander that if he/she was to deploy the sensors in those locations, with the current Met conditions he/she may or may not acoustically detect any firings. (Dotted is not good, Solid is recommended).

The HALO deployment aid is, as it says, an aid to deployment and not the definitive answer. It is designed to save the commander time, not do the job for him.

Christmas Cards

Many Military Survey units and RN Hydrographic ships, particularly during the Second World War, produced their own Christmas cards. These cards were often of a very high quality as they were drawn by cartographers who also had considerable artist skill. The editor would like to borrow any examples of ship/unit cards that readers may have in order to produce an article for next winter's issue of Ranger. All cards will be very well looked after and quickly returned to the owner. Cards should be sent to Alan Gordon, 1 Majorca Avenue, Andover, SP10 1JW. Any queries - please call him on 01264 359 700.

Hugging the Bear

A Continuing Thaw in UK/Russia Relations

By Peter Jones, Former Director International, DGC

Having started my career in what was then Military Survey in the late 1970s, I spent my formative years concentrating on the fact that the threat came from the Red Army, preparing to roll west across the North German Plain. It was with a certain sense of irony, therefore, that I led a delegation from Defence Geospatial Intelligence (DGI) to Moscow in May 2005 to visit our Russian counterparts the Russian Military Topographic Directorate, *Voyenno-topograficheskogo upravleniya (VTU)*. In addition to me, the delegation consisted of David Watt from the Defence Geographic Centre (DGC), Colonel David Attwater, Commander Geographic Engineer Group (GEG) and Dr Yolande Hodson, who had received a personal invitation from Lieutenant General Filatov, having previously hosted his visit to the Royal Library at Windsor.

Our visit was the return leg following the hosting of a visit to the UK in November 2003. The primary aim was to maintain and strengthen professional relationships with senior VTU staff, the long-term aim being conclusion of a Memorandum of Understanding (MOU) for the exchange of geographic data between the two countries. The programme was a mix of professional and social, giving us opportunities to conduct discussions and visit military technical facilities at the 29th Research Institute, the Aero-topographic Unit at Noginsk, the Moscow Aero Geodesy Organisation (MAGP), the Air Force Museum at Monino and the Russian State Library.

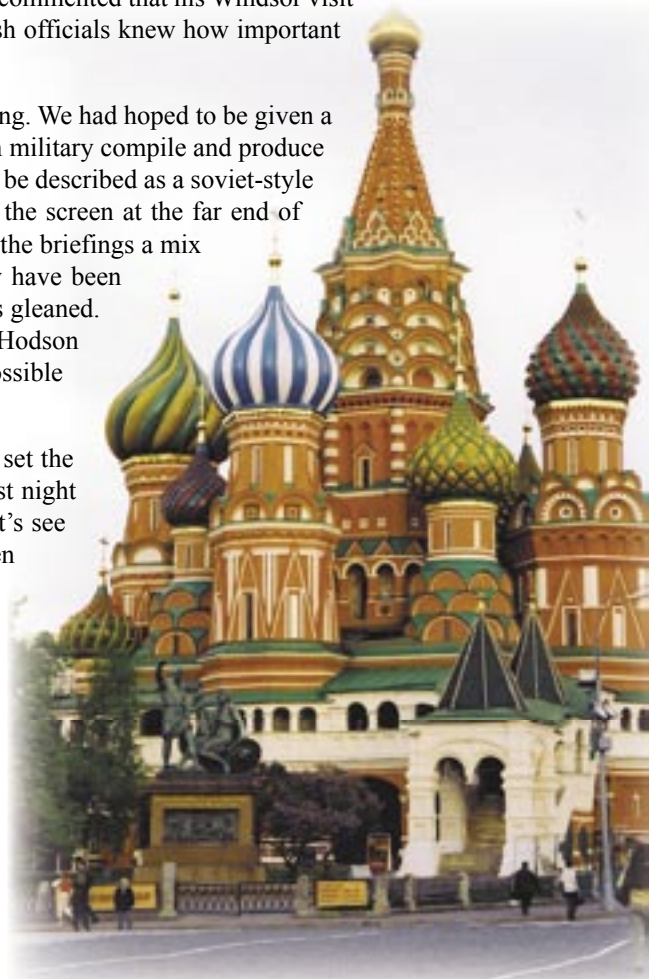
Our visit was hosted by the head of the VTU, Lieutenant General Filatov who had fond memories of his visit, the first ever to UK by a Russian Military Geographic delegation, especially the visit to the Royal Library. Like Military Survey, VTU (and predecessors) has a long history having been part of the General Staff of the Armed Forces since 1812.

General Filatov told us that he faces some significant challenges in that he finds it very difficult to persuade senior military staff of the value of maps, particularly digital data. He produced the 2003 edition of the Topographic Officer's Handbook to try to educate them, but overall his assessment is that only 3-5% of the Russian military can read maps. Interestingly he commented that his Windsor visit suggested to him that even in the 17th century, high ranking British officials knew how important maps were.

Our first visit to the 29th Research Institute was a little disappointing. We had hoped to be given a tour of the facility in order to gain a better idea of how the Russian military compile and produce mapping, but instead we were treated to briefings in what can only be described as a soviet-style conference room such that you almost needed binoculars to read the screen at the far end of the room. Although we were invited to ask questions at the end of the briefings a mix of being 'lost in translation' and a reticence to answer what may have been viewed as sensitive topics, meant that little useful information was gleaned. We did make use of our stealth weapon, however, in getting Yo Hodson to ask the awkward questions as we assumed that they couldn't possible risk offending the 'lovely English lady'.

The visit was followed by the first of several official lunches and set the tone for the remainder of the week. I will draw a veil over our first night in Moscow, suffice to say that the Russian tactic seemed to be, let's see how much Vodka we can get the British delegation to drink and then ask them questions. Thick heads the next morning were quickly forgotten during the drive to the 29th in a blue light convoy that seemed to ignore every rule of the road – or are Russians just appalling drivers? The head of the 29th hosted us to the lunch at a local restaurant at which a suckling pig was the centrepiece. Although MA Moscow (Colonel Colin Bulleid, who gets a very honourable mention in dispatches for all that he did for us) had outlined the procedures, it was nonetheless a trial that was repeated over three successive lunches.

The Russian toast system does not wait until the end of the meal but goes on throughout, seemingly about every five minutes. They



Red Square



The official party at the 29th Research Institute.

*Seated are General Filatov, Dr Yolande Hodson, Peter Jones and Colonel Konon.
Standing are various Russian officers and Colonels Attwater and Bulleid and Dave Watt*

start with the senior man on either delegation proposing a toast and then progressing round the table going down in seniority. Given that there were fourteen people at the table and each toast is supposed to be downed in one, rather than sipped politely, by the time we came to stand up at the end of the meal several of us found it hard to do so.

The lunch was followed by a visit to the Russian State Library during which we were shown a sample of some fascinating historical maps held in their collection. Unlike the UK, where we have good relationships with our historic archive collections, the librarians

appeared genuinely amazed as this was the first time a party hosted by VTU had wanted to see their maps. Although parts of the library were closed for renovation we were also given a short tour and shown some of their military geographic book collection.

On the second day we were taken to Noginsk, north east of Moscow to visit the Aero-topographic Institute. The Russian delegation from Noginsk was initially rather dour in their presentation and it was only when we started to ask technical questions that I felt they started to take us seriously. In demonstrating our knowledge I believe that they realised it was worth doing business with us. This was a much more useful visit that started to give some idea of what they do and “appear” capable of, although it is very likely that this was all that we were going to see at this stage of the relationship. Almost certainly we did not see their state-of-the-art methods. Although they are using a tried and tested flowline which produces an entirely satisfactory product and the data produced is stored digitally and output to CDs/DVDs, it is with technology and production methods that the UK abandoned in the early 1990s.

The lack of digital imagery was surprising, although we concluded that there was more to their use of imagery than we were seeing. As at the 29th Research Institute it was noticeable that the only staff we saw were in the rooms we visited. Other doors were locked with recent wax seals.

The staffing is a mix of civilian and military, the average salary for a civilian operator with 10 years experience being between £150-200 a month. We were also told that operators tend to be female as they can be paid less, begin with and develop fewer eye problems, have steadier hands and don’t drink as much as men. The 1:50,000 maps have a claimed absolute accuracy of less than 8m. They are revised every 3 years for urban areas, 5 to 10 for rural areas and 20 or 30 years for deserts. Russia is revised roughly every 5 years but VTU as a whole only revises around 3 000 sheets a year so the maths does not tally.

On our return to Moscow we visited the aircraft museum at Monino, the Russian equivalent of Duxford. For someone who spent much time musing over Floggers, Fencers, Fulcrums, Badgers, Bisons, etc, this was very much an eye-opener. Needless to say it was followed by an impromptu picnic produced from the boot of a car, which consisted mostly of more vodka.

Our final visit was to the Moskovskoye Aerogeodezicheskoye Predpriyatiye (Moscow Aero Geodesy Organisation), a “commercial” business with an obvious acumen to raise revenue. It was not surprising that MAGP was in many respects significantly further ahead than their military equivalents. We learned that MAGP is around 80 years old and is the largest company within the state owned Roskartografia organisation. It employs around 800 staff, many of whom, even at the most junior level, have degrees or further qualifications from the Moscow Institute of Geodesy and Cartography. Technologically they were still in the early 90s and were using mono-comparators to exploit often poor resolution photography most of which had frayed edges or tears.

Although progress on any form of agreement remains frustratingly slow, the Defence Section have confirmed that things are going well and that the relationship is prospering. Despite problems in translation we did discover that ‘special’ and ‘spatial’ are not necessarily two different words and that Saint Pete is a city in northern Russia formerly known as Leningrad. I will also take away from the visit that Russian drivers are certifiable; Russian vodka is bad for you; a ‘control’ toast is a contradiction in terms; if we attend 29 RI’s 70th anniversary celebrations the attendees should donate their bodies to science and - being kissed by a Russian general isn’t as bad as it sounds!

14 Geographic Squadron RE Celebrates 180 Years

The Officers, Warrant Officers and Senior Non Commissioned Officers of 14 Geographic Squadron RE held a regimental dinner on the 12th of January in the Reaction Forces WOs' and Sgts' Mess to celebrate the Squadron's 180th year. Guests included the GOC UKSG(G), Major General Bill, and a number of former Officers Commanding, Sergeants Major and soldiers who had served in the unit. Between

courses the diners were treated to a presentation on the Squadron history which led to much discussion of 'the old times' and questioning of "where did the pictures come from?"

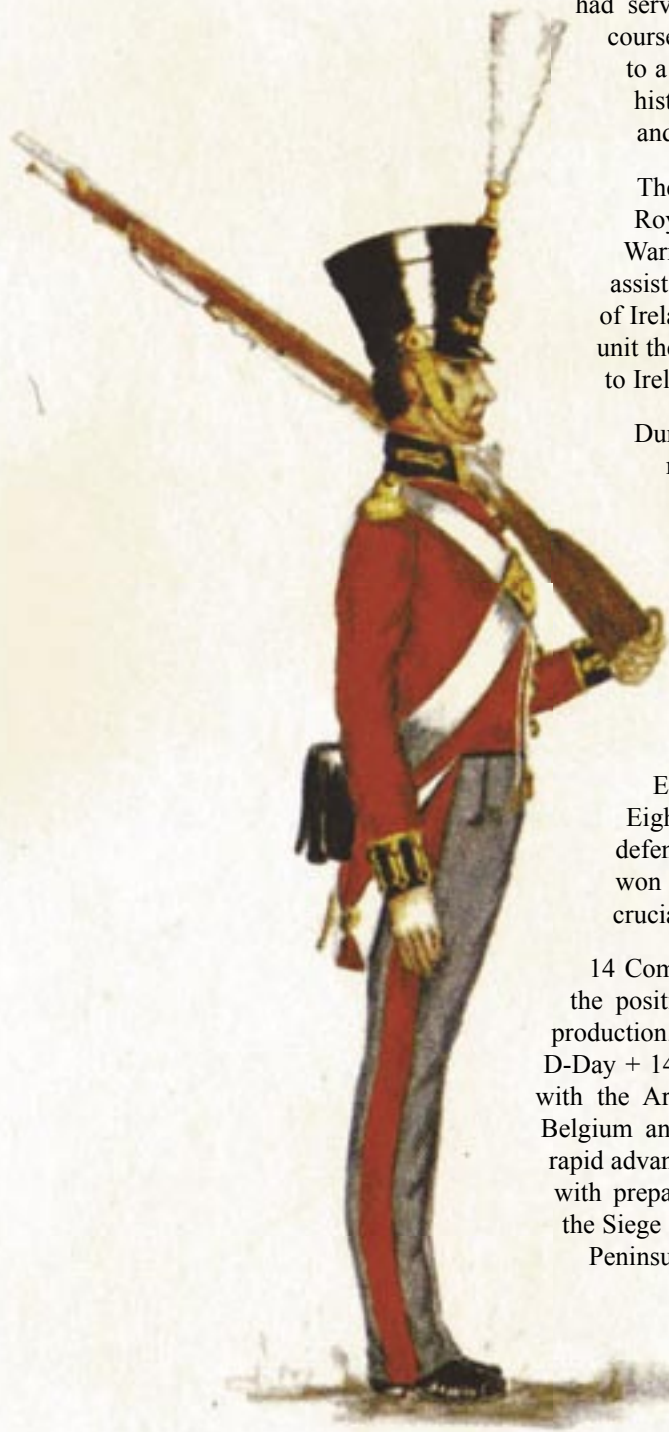
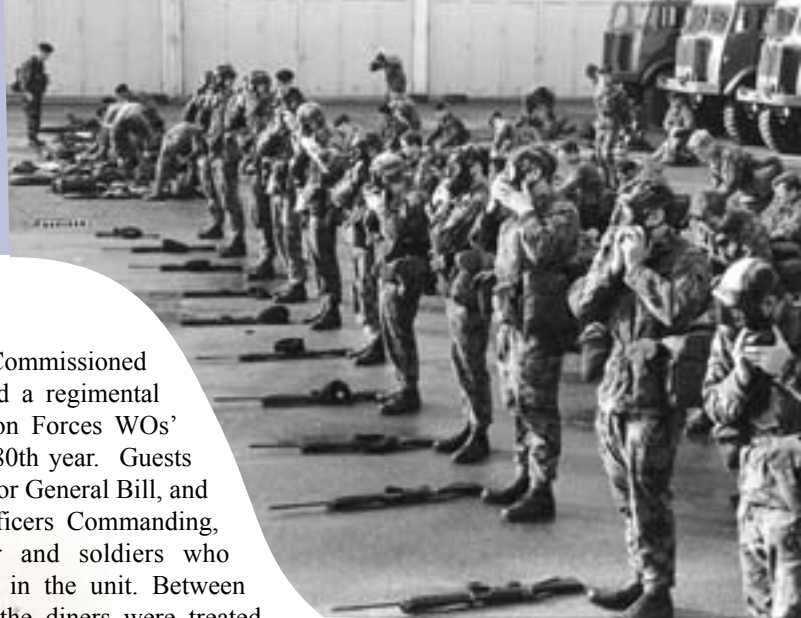
The Squadron was formed as the 14th Survey Company Royal Sappers and Miners, in Chatham under a Royal Warrant dated 4th April 1825. The Company was raised to assist the 13th Survey Company in carrying out the Survey of Ireland; a task that took some 17 years to complete. The unit then moved to England but in 1879 returned once more to Ireland where it remained until 1914.

During the First World War the company was re-rolled to carry out general engineering tasks in the Middle East. In 1919 the company returned to Dublin and continued with its surveying commitments in Ireland. 14 Company, along with the other survey companies, was disbanded between the wars but, prior to the outbreak of the Second World War, reformed as 14 (Corps) Field Survey Company RE and moved to France with the British Expeditionary Force on 10th September 1939.

Eight months later saw the unit forming part of the defence line at Dunkirk, where Lieutenant Halliday won the Military Cross for the destruction of a crucial bridge, prior to evacuation to England.

14 Company reorganised in England and worked on the positioning of coastal defence artillery and map production. The company crossed the Channel again on D-Day + 14 as part of the British 2nd Army and moved with the Army Headquarters through Northern France, Belgium and across the Rivers Maas and Rhine. The rapid advance on the River Elbe saw the company tasked with preparing overprints ready for the Elbe crossing, the Siege of Hamburg and the clearing of the Cuxhaven Peninsula.

Following the German surrender in 1945, 14 remained in Germany where it is still located today. The company has been based at Bad



Dress in 1825



'Fitness For Role' during the Eighties

Salzuffen, Minden, Bielefeld, Lemgo, Dortmund, Mönchengladbach and Düsseldorf, before moving to its current location in Ayrshire Barracks Mönchengladbach.

The Squadron's mobile role has always been at the fore with equipment in many guises from the heavy print train of the 1950s and 60s, through the more 'agile' TACIPRINT of the Cold War 1970s and 80s to the flexible component equipments used today.

The squadron was the lead geographic element on Operations GRANBY and GRAPPLE, IFOR, KFOR and Operation TELIC. Squadron members still man the geographic detachments in all of the operational theatres and are currently earmarked to support HQ ARRC during the imminent deployment to Afghanistan.



The Print Train in Germany sometime in the 1960's



UN deployment to the Balkans in the 1990's



On the streets of Northern Ireland in the Seventies



Squadron command vehicle at Shaibah, Iraq



Hydrographic Surveying and Chart Production in South East Asia Command (SEAC) *HMS White Bear* 1944-1946

By Eddie Winterbourn

The private purchase of a luxury yacht from America by the British Government at the outbreak of World War II and its conversion for use by the Royal Navy proved a very profitable investment. *MV Iolanda* (3000 tons), built in 1908, cost Britain just one US dollar!! On duty as a Hydrographic Survey vessel with the East Indies Fleet she, and the other smaller survey vessels - British Yard Mine Sweepers¹ (BYMS) 2006 and 2207, Motor Launches (ML) 1248, 1285 and 1288 and also the yacht *HMS Nguva* attached to her, played an important but little-known part in the Burma Campaign and in the vital surveying work in the immediate aftermath of the war.

Whilst *HMS White Bear* worked under South East Asia Command a smaller ship, *HMS Challenger*, worked with the Eastern Fleet around Australia with two Royal marine sergeants, one printer and the other a lithographic draughtsman, working on board. The officer in charge was Commander Sabine followed by Captain GS Ritchie who completed his career as the Hydrographer of the Navy.

The 'dollar' yacht had already performed valuable work as a submarine escort when it was realised by the Hydrographer of the Navy that the task in South-East Asia would call for navigation in coastal waters, either uncharted or not charted for many years. It was further realised that speed was the keynote of success. If the ship was equipped as a vessel for not only survey work but also with printing plant it would enable her to produce on board the finished article – the charts which are the “field maps” of those who fight at sea. Hence, she became a floating advanced printing unit – *HMS White Bear*, acting as mother to the smaller vessels which by reason of their size were better suited to make their way into the shallow and treacherous creeks and rivers, for example, on the Arakan coast. Their task was no sinecure, operating under hazardous conditions in enemy occupied waters. The data they collected was brought back to the mother ship so that the cartographers on board could translate this into vital charts.

HMS White Bear had a crew of some 140 men. Most were seamen and career RN survey officers. The chart production unit consisted of sub lieutenants and lieutenants RNVR cartographers, a lieutenant RNVR with Royal Marine sergeants and corporals as lithographic draughtsmen, photolithographers and printers. The chart making Marines other role was to man the manning the ship's Oerlikon gun. The original Captain was Commander CW Sabine who then joined *HMS Challenger*

¹ US built craft provided to Britain under the Lend-Lease Agreement



HMS White Bear at sea

in Australia when Captain A Day, later to become Vice-Admiral Sir Archibald Day CBE DSO RN Hydrographer of the Navy, took command of *HMS White Bear*. Also serving on board *White Bear* was Lieutenant DW Haslam who later also rose to become the Hydrographer of the Navy.

The production unit on *HMS White Bear* consisted of a chart room for both compilation and drawing charts on tracing paper or zinc plates. There was a very large camera for copying, a Deffa proofing press for main chart printing and a medium size photo-litho offset printing machine for chartlets, Notices to Mariners, etc. Supporting equipment included a whirler for coating glass negatives and zinc printing plates, also a guillotine and small letterpress printing machine. The printing unit was below decks and normally not used whilst on passage at sea. Two on-board 28ft survey boats undertook the main surveys with other surveys by BYMS or ML's who could venture into shallow waters, rivers and chaungs. Surveying continued from sunrise to sunset. The data was brought on board the mother ship and transferred to a "master". In turn this was compiled to form the final chart for reproduction on board.

The ship left the UK on the 14th of September 1944 travelling in convoy eastwards through the Suez Canal eventually arriving in Colombo on the 11th of November. Initial work was around the Indian coastline and then in Burmese waters. Following the capture of important areas such as Akyab, Ramree and Rangoon, charts were quickly produced and made available for shipping which steamed into the captured ports to supply the means of consolidation and build-up. One chart was produced on board *HMS White Bear* in only ten days from the actual survey, quite astounding when considering the techniques and equipment of the time. Many were produced in just two or three weeks, achieved first of all by the cartographers at work making accurate compilations from the data. Lives depended not only on the accuracy and work of the survey parties and also on the precise work of those who chart their findings.

Conditions on board *HMS White Bear* in eastern waters were far from ideal for this work, with inevitable heat, poor lighting conditions and ship movement. Below decks the men who brought experience gained in civilian life, carried on where the cartographers and chart lithographic draughtsmen left off. They were the photo-lithographers and printers who complemented and worked with a shore organisation in Kandy (Ceylon, now Sri Lanka) consisting of a Civil Hydrographic Officer (a Lieutenant Commander in charge of an RE Survey production unit and two Royal Marine sergeant. printers. In all, this formed the East Indies Chart Production Unit which produced "gridded" chart maps used by all Services in operations, such as the combined attack on Rangoon.



Eddie Winterbourn at work in the Far East



Operating the whirler on board White Bear



HMS White Bear with BYMS and ML alongside

After charting Burmese waters the ship again worked along the Indian coast spending VE Day in Trincomalee harbour. Next was tasking around the Malayan coast joining the vast fleet assembled for Operation Zipper, the invasion of Malaya that thankfully proved unnecessary due to the Japanese

surrender. After some time, in Singapore and further surveys around the Malay Peninsula, the *White Bear* left in October to carry out much needed surveys in Indonesian waters around Sumatra and Java, then in the throes of a civil war. On the 8th of January 1946 the ship left Sabang in northern Sumatra for the Andaman and Nicobar Islands where there were still surrendered Japanese troops living in very poor conditions, and then on to Colombo.

The author left *HMS White Bear* in Colombo on the 1st of February 1946 to return to Eastney Barracks in Southsea for demobilisation and then subsequently to rejoin the Hydrographic Office at Taunton. As for the Royal Navy's only 1-dollar ship, she was last seen on the mud flats in the River Medway waiting to be scrapped.



HMS White Bear in King George VI Dock Singapore 1946

Farewell to the Canberra

By Dale Donovan, HQ Strike Command

When a grey painted Canberra PR9 touches down on the runway at RAF Marham at the end of June concluding yet another overseas deployment, it will bring to a close an era unparalleled in RAF history. It will mark the end of an operational career unequalled by any other aircraft in the Service, the Canberra having served for an incredible 55 years, not far short of two thirds of the existence of the RAF.

The Canberra is to be finally phased out of RAF service at the end of July this year, when 39 (1 PRU) Squadron, the last Canberra unit, disbands with due ceremony at Marham. Right to the end, the Canberra has been providing invaluable information to those pursuing peaceful objectives in overseas hot spots, whether they be in the Balkans, Iraq or Afghanistan, and the nature of its replacement is currently the subject of discussion.

Originally conceived at the end of the Second World War, the Canberra was introduced to the RAF as its first jet bomber in 1951, replacing such stalwarts as the Avro Lincoln and Washington (lend-lease Boeing B-29 Superfortress), and it went on to fulfil just about any requirement that could be devised for one aircraft type.

Despite the inauspicious first flight date of Friday the 13th in May 1949, the aircraft matured into a considerable success story both at home and abroad. During its test programme the aircraft, previously known as the English Electric A1, was given the name of "Canberra", following the practise of naming British bombers after cities, although the official naming ceremony was not carried out until 19 January 1951. This was performed by the Prime Minister of Australia, Mr Robert Menzies, at a ceremony at RAF Biggin Hill, Kent, on WD929, the first production Canberra B2.

The first squadron, No 101 at RAF Binbrook, received its first aircraft on 25 May 1951 and for nearly 10 years the Canberra was the backbone of Britain's home-based bomber fleet, equipping 23 squadrons at 12 stations. Canberras configured for the photographic reconnaissance task (the PR versions) joined them soon afterwards and it was to be in this particular role that the type has subsequently chalked up its remarkable Service longevity. The Canberra bomber wings in the United Kingdom propelled Bomber Command into the jet age, and paved the way for the Valiant, Vulcan and Victor strategic V-bombers – all of which the Canberra was destined to outlive in RAF service.

The Suez Crisis, which erupted in the Autumn of 1956, gave the Canberra an early taste of action when around a dozen squadrons deployed alongside a smaller number of Vickers Valiants to crowded airfields in Cyprus and Malta from where they flew bombing and reconnaissance missions, 72 operational sorties from Malta and 206 from Cyprus by the time the crisis came to an end later that year.

Canberras moved to Cyprus on a permanent basis from early 1957, replacing De Havilland Venoms, and remained there in varying quantities and variants until the last reconnaissance aircraft was withdrawn from the Mediterranean during 1978. Another operational arena for the Canberra was Malaya where Canberras were deployed from the UK from 1955 to help deal with the Communist terrorist problem, although it was to be 1957 before Canberra squadrons were permanently attached to the Far East Air Force (FEAF). The Malayan Emergency was officially declared over in July 1960, but a couple of Canberra units, including 81 PR Squadron, hung on for another nine years or so until the FEAF was finally wound down.

There was a Canberra presence with the RAF in Germany from late 1954 but although the original four bomber squadrons were gone by late 1956, that was certainly not the end of the Canberra in Germany. By the time the bombers left, four squadrons of photographic reconnaissance Canberras were in situ, and these continued to provide effective reconnaissance coverage until they were finally superseded in 1971 by Phantoms with their dual reconnaissance and ground attack capability. Alongside the photo recce squadrons, four others flew strike configured aircraft, Canberra B(I)6s and B(I)8s from the late 1950s until the final squadron re-equipped with Buccaneers in June 1972.

With the exception of the reconnaissance function, the main Canberra period was drawing to a close from about 1970 when many aircraft were converted to perform secondary roles which they did for many more years. Functions included radar calibration, unmanned target drones and target towing aircraft used by the RAF and Royal Navy, as well as electronic countermeasures and electronic warfare training. A considerable number of airframes were engaged over the years on a wide variety of trials work.



A classic image of a Canberra PR9

It is, however, in the photographic reconnaissance role that the Canberra has secured its place in aviation history. Taskings during the Cold War in support of NATO security were interspersed with deployments to some exotic locations to undertake surveying and mapping of foreign countries. There were also taskings to assist the civilian community such as supporting the investigation into the Soham murders.

The Canberra PR9, of which only 23 were built were among the last to leave the production lines. It really came in to its own again during the various Balkan conflicts of the 1990s and again in Iraq and Afghanistan in the new millennium, providing top quality and invaluable imagery right up to the end of its remarkable career. Much of their recent tasking remains classified but it is acknowledged that our US coalition colleagues appreciated the results achieved by PR9s in operational theatres.

During its lifetime the Canberra served with approximately 60 RAF squadrons, and many versions were exported worldwide seeing service with 15 countries in North and South America, Australasia, Africa, Asia, Scandinavia as well as France and Western Germany. India was the largest export customer for the Canberra, ordering more than 100 aircraft between 1957 and 1975 – a handful are thought to be still airworthy.

As an aside, two former Royal Air Force Canberras were shot down, one of them by a Sea Harrier, while serving with the Argentine Air Force during the Falklands conflict in May and June 1982.

A total of 925 Canberras of all versions, including 143 for export, were built in the UK, approximately two-thirds of which came from English Electric at Preston, Lancashire with the remainder sub-contracted to Short Bros and Harland of Belfast, Avros at Woodford and Handley Page of Radlett, Hertfordshire. In addition, the Canberra was built under licence in Australia (48 constructed) and a further 403 were built in the United States where it was known as the Martin B-57 Canberra. These aircraft served with the United States Air Force, notably in Vietnam, from 1954 and soldiered on, latterly with the Air National Guard squadrons, until they were finally retired in 1982. About 25 B-57s were supplied to the Pakistan Air Force.

The soundness of the Canberra's overall design and performance was emphasised by the number of record-breaking achievements during the early years of its career – nineteen point-to-point records and three height records between 1951 and 1958, the most famous of which was probably the London to New Zealand Air Race won by PR3 WE139 in 23 hours 50 minutes 42 seconds in October 1953.

Although the Canberra is finally coming to the end of its illustrious RAF career, that is not quite the end of the story. For 39 (1 PRU) Squadron's Canberra T4 trainer, WJ874, which made its last service sortie on 01 September 2005 fittingly painted to represent the first prototype Canberra, VN799, has been acquired by Air Atlantique of Coventry and is expected to take to the skies again as a display aircraft. And then there are the two Martin WB-57F long-spanned high altitude Canberra weather reconnaissance airframes still used by NASA which, if their operators are to be believed, will be around for another 20 years.....

The Provision of Geospatial Support to UK Operations

By Major Dave Rowlands, Officer Commanding 16 Geographic Support Squadron RE

Introduction

Royal Engineers (Geographic) of all ranks have been well established as organic staff in all deployable formation HQs and the concept of providing close geographic support to a formation staff is a proven and vital aspect of successful operations. However, UK Regional Force HQs have no such organic capability and are often unaware of what Defence Geospatial Intelligence (DGI), and specifically RE (Geo) can do for them. Much of the Regional Force routine requirements do not justify the establishment of organic DGI staff on a permanent basis. However, the growing emphasis and importance on Homeland Resilience and Homeland Security places greater responsibility on Regional Force Commanders who are having more liabilities placed on them to provide direct support to the emergency services in order to prepare for special events such as the G8 summit or playing a vital role in the event of a catastrophic event on UK mainland. In recent years, DGI's commitment to supporting UK operations has increased and 42 Engineer Regiment (Geographic) has played a significant part in this.



42 Engineer Regiment (Geographic) soldiers using an Electronic Total Station

Scope of Support

Director Defence Geospatial Intelligence (D DGI) supports the Standing Joint Commander (SJC) who has endorsed many UK 'standing' operations that require direct involvement by 42 Engineer Regiment (Geographic):

Technical Response Force (TRF). 42 Engineer Regiment (Geographic) have an important role in the MOD's standing commitment to provide Military Aid to the Civil Authorities (MACA) for Counter Terrorism (CT) and Chemical, Biological, Radiological and Nuclear (CBRN) events.

Nuclear Accident Response Organisation (NARO). 42 Engineer Regiment (Geographic) provides survey support to cordon efforts and situational awareness in response to an accident in the UK involving nuclear material.

Naval Emergency Monitoring Organisation (NEMO). With the UK's naval nuclear deterrence, 42 Engineer Regiment (Geographic) continues to provide survey support to nuclear berths in the UK.

Nuclear Weapons Integrated Project Team (NW IPT). A recent addition to the 42 Regiment's task list is the ability to provide support to the response teams nominated to react to an incident at any of the UK's atomic research establishments.

Special Events and Contingency Support. In addition to the liabilities listed above, the past 18 months has seen a significant rise in the requests for support to special events and contingency planning exercises across the UK. 42 Engineer Regiment (Geographic) and other DGI assets have supported eight Regional Force exercises spanning Scotland, England and Wales and some of these have included the provision of exercise planning support to the Combined Arms Staff Trainer (CAST) who, themselves have benefited from geographic products that complimented scenario and role playing requirements.

Of specific note was the very successful provision of geospatial and imagery support to the G8 Summit in Gleneagles in 2005. The Special Support Team (SST) in 16 Geographic Support Squadron was called upon to assist 51 (Scottish) Brigade with their security role during the G8 Summit. Teams equipped with Digital Geographic System (Light), the laptop GIS system, and appropriate datasets were deployed to Brigade Main at Stirling and Venue Command at Gleneagles.





Figure 2. The Gleneagles and Environs Pocket map.

Since most of the 12,000 police had been drafted in from English constabularies, it was quickly apparent that situational awareness would be paramount. To this end a “Gleneagles and Environs” pocket map was rapidly created and 6,000 copies reproduced by the Defence Geographic Centre at Feltham (Figure 2). The product was designed, electronically transferred, printed and delivered to Scotland within 24 hours.

It was also essential to ascertain where the greatest risk to penetration of the outer cordon might lie by identifying dead ground to the CCTV coverage. This was achieved using camera viewshed techniques with elevation data and imagery, as usually practised for more conventional battlefield situations. (Figure 3)

The Geographic Support Team (GST)

A recent development that has significantly improved support to UK operations within 42 Engineer Regiment (Geographic) has been the establishment of the Geographic Support Team. The team provides operational data sets for overseas theatres and UK operations. The UK data set comprises primarily of data provided by the Ordnance Survey (OS) with additional imagery from MOD sources. The team, comprising civil service and military personnel, has the ability to maintain several country data sets and if necessary work to 24/7 operating. It has focussed operators specialising in data discovery, data management, systems management, cataloguing and dissemination. In addition, the team works closely with teams dedicated to UK ops and has started to embrace the concept of providing a Recognised Environmental Picture (REP) for UK events.



Soldiers conducting a survey in 3 Romeo Dress

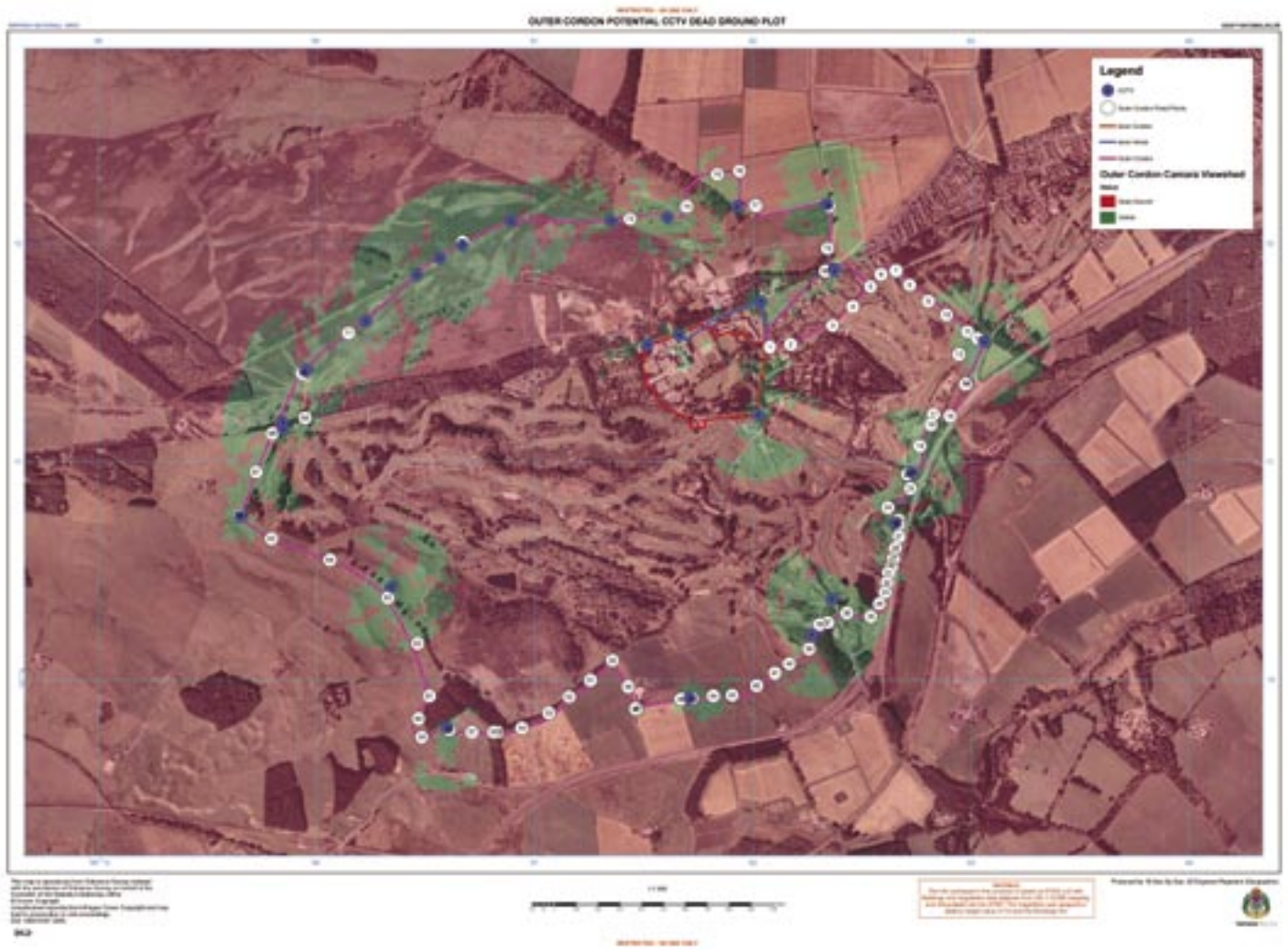


Figure 3. Viewshed of CCTV Dead Ground Plots.

Self Help

It has become evident that many of the Regional Force HQs can help themselves by investing in their own GIS capabilities. Acquiring GIS licenses is clearly the first step followed by sending individuals to the Royal School of Military Survey (RSMS) to conduct basic and advanced GIS user training. The training provides sound foundation skills that can be taken back to the Regional Force HQ and exploited. Data for the UK is readily available to the regional Force HQs via the Defence Geographic Centre. In many cases, ‘non Geo’ staff have acquired the GIS ‘bug’ and have gained additional training from Commercial GIS vendors to compliment the training already delivered by the RSMS.

42 Regiment hosted a briefing day for all Joint Regional Liaison Officers (JRLOs) in January this year and these JRLOs are now aware that the SO2 Geo at HQ Land sponsors a Geo site on the LAND Web for ‘customers’ to acquire briefing and planning products over the UK and, as importantly, they can request Geographic support for exercises and operations using the SO2 Geo at HQ LAND as the conduit for approval.

Ongoing Commitments

Since the success of the G8 Summit, the Regiment has



Soldiers being processed through a mobile decontamination unit

provided geospatial support to the European Ministers Conference in South Wales and is committed to supporting several Regional Force exercises across the country. The need to balance the limited amount of available resources committed to overseas operations whilst playing a significant role in Homeland Security and special events in the UK has never been so critical.

Training

In most cases, there are no additional training requirements for soldiers to provide support to UK events compared to those who provide geospatial support to overseas operations. The fact that 16 Squadron's 'Special Support Team' has a long standing history of working with UK emergency services means that there is already a great deal of experience across the Regiment. The Royal School of Military Survey satisfies 95% of the training requirements to support the majority of UK operations and the remaining 5% is covered through collective training opportunities with other organisations.

DGI Collaboration

It must be noted that whilst 42 Engineer Regiment (Geographic) deploy and provide the first line geospatial support to the events outlined above, a great deal of credit must be given to other elements of DGI. Specifically, DGC plays a significant role in data discovery and acquisition and close liaison between them and the geographic Support team is actively encouraged. The Joint Air Reconnaissance



Shaun Jones

Team Manager, Plowman Craven

DSA Council Member

Born in Whitby, North Yorkshire and brought up in the wilds of the North Yorkshire Moors, I have always been an outside type of person, but never imagined I would make a career out of surveying!

I settled on the Army and decided that a "potential surveyor" in the Royal Artillery would offer plenty of variety. I arrived at Bramcote in the summer of 1988 and I was promptly told that there were no surveyors in the Gunners and that I would most likely end up on the guns. I stuck with it and, having completed my signals course, I decided I could make a career in the Army. I completed my basic training and was then posted to 32 Heavy Regiment RA. On arrival in Dortmund, I was told that I was joining the Survey Section within 57 Battery RA and attended my basic survey course in the spring of 1990. Apart from my training, I spent my entire military career with 57 Battery, moving from Dortmund to Paderborn and then finally to Newcastle. During this time the Survey Section was deployed far and wide, providing survey support to the Gunners, this included the first Gulf War, Canada and almost every range that the RA use. I also spent 4 months in Bosnia as a surveyor with the HALO sound ranging equipment trials team.

After meeting my future wife, whilst on a tour in Cyprus and reaching the rank of Bombardier, I left the Army after 10 years and accepted a job with Plowman Craven & Associates. I spent the first two years working on various sites across the UK, including Waddesdon Manor, Downing Street, Kings Cross Station and Portcullis House. I was promoted to senior surveyor in May 2001, which coincided with PCA's involvement in a large contract to survey various London Underground stations. I was promptly placed on this job and spent the next three years of my life surveying underground stations.

I left PCA in April 2003 to take up a project management role with Atkins, again surveying underground stations, but returned to PCA in February 2006. I am now the Team Manager of the Property Services Group, who carry out "area" surveys of some of the largest and most prestigious commercial buildings in the UK. This includes the entire Canary Wharf estate, Swiss Re building ("the Gherkin") and the majority of the office blocks within the city of London. Plowman Craven is currently under going many positive changes and offers a more secure future with challenging projects on the horizon.

I recently married and live with my wife Claire and a dog called Harvey on the edge of the Chiltern Hills. This will all change in July, when our first child arrives - just in time for the DSA AGM.

Soviet Military Mapping of Britain

By John Davies

It's a bit of a shock to see a map showing your house or workplace depicted in detail with the street name in Cyrillic script. And the shock turns to awe when you realise the scope, accuracy and comprehensiveness of Soviet mapping of Britain; and to horror when you ponder what this implies.

To look at a town plan of a relatively unimportant place such as, say, Gainsborough, produced at the height of the Cold War, showing more information and greater detail than contemporary Ordnance Survey maps gives pause for thought. Why Gainsborough, you may wonder. And was Britain the object of special attention? What was the true purpose of these maps and how were they made?

To discover some of the answers we need to consider them in a world context. For over 50 years, from before WWII until the collapse of USSR in 1992 the Russians engaged in a massive global mapping project with astonishing productivity and consistency. The roots of the project date back to the days of the Russian Revolution and the economic and strategic imperatives to produce maps of the new country and its resources. Subsequently the Army General Staff nurtured and developed the Russian talent for mathematics and cartography to create a huge organisation with the objective of producing detailed, accurate mapping world-wide.

By the 1990s, the whole world had been mapped at scales of 1:1 million, 1:500,000, and 1:200,000; most of Asia, Europe, northern Africa and North America at 1:100,000; USSR and much of Europe, the Far and Near East at 1:50,000; USSR and eastern Europe at 1:25,000; and about a quarter of USSR at 1:10,000. In addition town plans at 1:25,000 and 1:10,000 were produced of thousands of towns and cities in USSR, Europe, the Americas, Asia and Africa. The maps were regularly updated and latest versions were held in map stores throughout the Soviet Union ready to provide topical and accurate information to support military operations anywhere in the world at short notice.



Extract from the 1984 1:10k plan of Chatham showing both Kitchener and Brompton Barracks in green, which indicates a military installation.

All mapping is based on a standard global grid, with a standard sheet numbering system such that any sheet reference number instantly conveys the scale and coverage of the sheet. Each 1:1 million sheet covered one grid square; its reference being a letter indicating latitude and a number indicating longitude. Lettered bands increase north from the equator at 4 degree intervals; numbered zones increase eastwards at 6 degree intervals; thus the south-east corner of England lies in grid M-31 (band M represents 48° to 52° north whilst zone 31 is longitude zero to 6° east).



Extract from the 1981 edition of the 1:50k sheet M-30-8-B, Gloucester showing Arle Court (Арл Корт), the building that today houses the offices of Face Group but, interestingly, not the near neighbours, GCHQ.

Larger scale sheets are numbered as divisions of these: there are four 1:500,000 sheets per grid square, with suffix А, Б, В, Г (the first four letters of the Russian alphabet); there are 36 1:200,000 sheets per grid square, with suffix I to XXXVI; there are 144 1:100,000 sheets per grid square, with suffix 1-144; there are four 1:50,000 sheets for each 1:100,000 sheet, with suffix А, Б, В, Г; there are four 1:25,000 sheets for each 1:50,000 sheet, with suffix 1-4.

Thus, for example, 1:50,000 sheet M-31-1-A occupies the top left hand corner of sheet M-31-1, the 1:100,000 sheet which itself occupies the top left hand corner of grid M31.

Sheet lines rigidly adhere to the grid; no exceptions are made for bits of land jutting off the edge. Sheet sizes vary but those of UK are typically rather larger than A3 paper size.

Town plans, however, are positioned regardless of grid lines and each may comprise several sheets of much larger size. They are not numbered but named with the town name followed by the reference number(s) of the relevant 1:100,000 sheets.

Specifications of style, colour, typography and content were tightly controlled and there is an exceptionally detailed and comprehensive manual of symbols to identify topographic features, places, buildings, industrial works, type of agriculture, soils, vegetation, hydrography and so on. There were major revisions to the use of colours and typography in 1950s and again in 1970s as printing technology improved but otherwise the maps show a remarkable consistency of visual style across time and place. Every sheet carries a three-part print code indicating the map type and serial number, month and year of printing and the identity of the print factory.

A considerable amount of information was collected as the maps were compiled. In addition to the cartography, a comprehensive description of the local topography, geology, transport, industry, climate and vegetation appears on the reverse side of the 1:200,000 sheets and accompanying the town plans.

The town plans are particularly impressive, both for the technical achievement of production and for the quantity and quality of the content. They are printed in 10 colours on sheets measuring typically 900mm by 1200mm to very high standards of registration and clarity. Plans of Greater London and Greater Manchester at 1:25,000 comprise four such sheets, as does Bristol at 1:10,000; Birmingham at 1:25,000 and Huddersfield at 1:10,000 each comprise two sheets.

The information shown on the town plans proves that a vast amount of local research was carried out. As well as the description of the locality, they carry a street gazetteer and a numbered list of 'objects' of strategic interest. These objects are depicted in detail on the map, colour coded green for 'military', purple for 'administrative' and black for 'industrial' and are indexed with specifics of names and purpose. Much of this information far exceeds the detail shown on Ordnance Survey maps or other published street plans or directories. The Chatham, Gillingham and Rochester sheet, for example, shows the details of the Royal Naval Dockyard that were not published elsewhere.

The London index is published as a separate booklet of 210 pages, comprising 12 pages of description, a list of 374 numbered strategic objects, 184 pages of street index and a fold-out A3-size geographically correct diagram of the tube network. Liverpool and Portsmouth also have separate booklets, but otherwise the description and indexes were printed alongside the map or, rarely, on the reverse.

Contours are at 2.5m or 5m intervals, submarine contours at 3m intervals. Spot heights are shown to tenths of a metre. Most streets and localities are named, major roads are annotated with carriageway width and paving material, bridges are annotated with dimensions, clearance and carrying capacity, tube stations are differentiated from railway stations, goods lines from passenger lines, and streams and rivers have their width, depth, flow and underwater cables shown.

So how were these maps compiled? Soon after they first appeared on sale in Britain, the Ordnance Survey put out a statement claiming:

“Technical examinations ... leave us in no doubt that it substantially reproduces Ordnance Survey maps ... the Russian mapping does contain small amounts of additional material but is almost entirely an adaptation of Ordnance Survey Crown copyright material. It was produced without the permission of Ordnance Survey and thus it infringes Ordnance Survey’s Crown copyright Ordnance Survey is anxious to see it removed from the marketplace ... it is unlawful to import, trade in and use infringing material and we reserve the right to take legal action against any parties importing or offering this mapping for sale or reproducing material from it.”

Not surprisingly, this statement had the effect of inhibiting the circulation of the Soviet maps in Britain, which is why they are relatively little known today. But the truth is probably not quite so simple. Whilst it is impossible to specify with certainty the sources of the material (particularly for a series covering such a variety of scales and territory over a period of 50 years), it is possible to reach some reasonable assumptions based on the evidence of the maps themselves.

Maps published in the 1950s and 60s carry a footnote declaring the source survey(s). In most cases, these are shown as 1:10,560 dated from 1910s and 20s and 1:25,000 dated 1950s. These obviously refer to the OS ‘County’ series 6-inch maps and ‘Provisional’ series two-and-a-half inch maps. This can be verified by the depiction of spot heights, where the Soviet sheets do indeed (largely) show the same values in the same places (converted to metres). Later Soviet maps do not specify sources, but do show spot heights which are generally the same as the relevant ‘County’ series, even though later OS maps may show revised values or omit them completely.



Extract from the 1985 edition of the 1:25k London Town Plan covering Feltham. The buildings of the DGI facility, then known as Military Survey, are accurately plotted but are not shown as a military installation or even as industrial or administrative.





For the later Soviet maps (produced from mid 70s, after the advent of satellites and 'spy-plane' technologies), the likely sources are as follows:

- General topography and layout of roads, built-up areas, fields, forests, quarries etc are probably derived from aerial reconnaissance. This can be demonstrated by numerous examples where the Soviet maps are more up-to-date than the latest contemporary OS maps.
- Road classification and numbering derived from road atlases with supplementary information. Soviet maps show European road numbers (which do not appear on British publications) as well as the usual UK numbers.
- Outline of coasts, rivers, lakes, canals, etc. are derived from aerial reconnaissance. There are many examples where these vary from the shapes depicted on OS maps.
- Railways and ferries are largely derived from 1920s County series 6-inch maps. Intriguingly, these continue to appear long after disused or even dismantled according to OS maps (and as would be obvious from aerial survey).





- Spot heights, benchmarks and contours are derived from 1920s County series 6-inch maps. Similarly, these are not updated in accordance with later OS mapping.

- Place names are derived from combining information from all available commercial street atlases and town plans. However a number of cases are found where the names

appearing on the Soviet maps may be in common currency locally, but do not appear on any contemporary published maps or plans.

- Annotated details such as widths, heights, clearances, surfaces are probably obtained from visual inspection as they do not appear on published material. They are shown on Soviet maps extensively in some areas and not at all in others, further suggesting local inspection.
- Hydrographic information. Submarine depths and underwater obstructions cannot be seen from the air and they cannot easily be discovered by local visits, so it is natural to suppose that they must have been taken from Admiralty charts. However, apart from a very few specific cases, there is hardly any similarity between the information depicted on the Soviet maps and the respective Admiralty charts.
- Proposed roads, etc. Many of the maps date from the era of the boom in motorway construction and generally show later developments than contemporary OS maps, presumably by aerial surveillance. However some ‘proposed’ roads are shown ahead of construction (even one in Teesside which was never built) so some access to planning documents is implied.
- Index of ‘strategic objects’ and descriptive text seem to have been compiled from a combination of local investigations, trade directories and other publications.

Copyright in OS maps lapses after fifty years and when considering copyright the courts apply the test of whether the copied content is ‘significant’. In the context of the likely sources and dates described above, whether or not a court would uphold the OS claim is an open question. On the other hand, the Russian Federation now claims retrospective copyright to the maps, although USSR was not a signatory to the Berne Convention. Evidently the question of who, if anybody, can claim copyright will not be easily resolved.

There are about 80 known British town plans, which, together with the smaller scale maps may be seen in the British Library Map Library, the Cambridge University Library Map Department and the Bodleian Library Map Room in Oxford. In all cases a Readers card is required.

For more information and links, please see the author’s web site at www.Jomidav.com





Lieutenant Colonel Thomas Best Jervis, Bombay Engineer Corps, Indian Army (1796-1857).

A renowned geographer, he was the founder and first superintendent (1855-57) of the Topographical and Statistical Department of the War Office.

Cometh The Hour Cometh The Map!

Lieutenant Colonel T B Jervis, The Crimea and the Birth of the British Defence Intelligence Staff

By Major H McCarthy BSc MSc RE

The Crimean War's (1854-1856) causes are among the more obscure of any conflict. It was sparked by a minor squabble between the Orthodox Church and the Ottoman Turks over holy sites in Jerusalem, but for the western powers the real reason was to deny Russia a Mediterranean port from the then disintegrating Ottoman Empire. Worries over the Empire and the British abhorrence of the Czar's oppression of his population fanned the flames of media frenzy. A Russian attack on the Turkish fleet was the spark to rouse the Government, and fanned by jingoistic media messages, an allied army of British and French forces sailed to assist the Turks and capture the Russian port of Sebastopol on the Black sea coast. The first question was, rather as in the Falklands crisis 128 years later, where exactly was the Crimea?

The underpinning of most intelligence is a reliable map; help was at hand in the form of a retired officer of the Bombay Engineer Corps Major Thomas Best Jervis. Befitting a sapper officer of his day he had a penchant for maps. He had retired from service in 1836 aged 39, many believe piqued he had not been appointed Surveyor General of India.

An earnest Victorian eccentric, in his retirement Jervis continued his passion for cartography and maps; he was also a great letter writer and champion of the Empire's moral welfare too. He bombarded the Government of the day with his correspondence ranging from the moral dangers to young women acting as medical assistants at sea instead of as he argued more suitable elderly widows, to the use of perforated zinc for windows. ¹ But in response to growing European unrest and foreboding throughout the Empire from 1846 onwards, he urged Whitehall to create a 'Mapping Department' and an official Geographer - Cartographer that he believed he naturally should lead; Whitehall politely declined what they deemed an eccentric wearisome sapper. Throughout 1854, Major Jervis again petitioned the government² to establish this topographical department. In a letter to the Secretary of War in July 1854, Jervis wrote frankly:

" The fact is palpable and notorious, that this great, intelligent, powerful commercial country...is entirely dependent for good maps on the Continent for German, French, and other maps. What else we have are, in truth, but school atlases. We have an admirable hydrographical office for nautical surveys and charts, and another for the Tithe Commissioners' surveys; but for our colonial, commercial, or war purposes we have no resource but foreign information."

But in 1854 with the onset of the Crimean war Jervis's time had come; prior to this crisis, whilst on holiday in Belgium he had purchased in a Brussels shop a complete Russian series of the Crimea and the complete Austrian coverage of Turkey, which he offered to the government. Whitehall at the time was somewhat baffled by the lack of map coverage of their chosen battle zone and were reduced to buying school atlases in the Strand. The Commander of the Allied force, Lord Raglan, was heard to remark, "Sevastopol was as great a mystery to him as it was to Jason and the Argonauts".³ The Secretary of State for War, Lord Panmure, Duke of Newcastle, stated that Jervis's maps were most desirable but that the budget was marked out so categorically he could not contemplate such expenditure. He stated however that if Jervis reproduced the maps at private cost the Government would purchase as many copies as the commanders thought necessary.

The enthusiasm (not to mention his personal fortune) that his Crimean maps generated in the field among British and French officers, as well as the high-level recognition of his work (The Emperor Napoleon III invited Jervis to Paris and presented him with a massive gold snuff box) helped Jervis goad the British government to action. To his great satisfaction a letter arrived in February 1855 from the War Department, telling him of the Treasury's approval of the creation of a Topographical and Statistical (T&S) Department in the War Department and offering him the post of superintendent. ⁴

Under its newly promoted chief, Lieutenant Colonel Jervis, the T&S Department produced some excellent maps ⁵ in its first two years including:

- a. Map of the Principal Military Communications of the Caucasus and Contiguous Provinces, constructed in 1847 by the Divisional Staff of the Imperial Army of the Caucasus, and corrected to January 1, 1853. Two sheets in chromolithography (a colour print).
- b. Map of Khiva, the Sea of Aral, and the Country between the Caspian and Herat, constructed by Lieutenant Colonel Jervis. One sheet in chromolithography).
- c. Administrative Map of Moldavia, from the original Rumanian map; the names translated by Lieutenant Colonel Jervis. One sheet in lithography.
- d. Plans of Sebastopol with the defences and siege operations.

The Department also produced several books, the most notable being the collected 'Despatches and Papers of the Campaign in Turkey and the Crimea' which, as well as giving all the returns from the Commanders in the field, contained excellent colour maps of the major battles. Another 'side-line' of the Department was the production of lithographs that were sold to the Public; the two most popular being 'View of the Battle of Balaclava' and 'View of the Docks at Sebastopol'. In addition, this irrepresible man continued to send endless correspondence to the Whitehall. He urged that a limited number of officers and NCOs should be sent to the Military Depot at the Horseguards established in 1803, where the first lithographic printing of maps took place in 1808 ⁶, there to be trained in military drawing, modelling and intelligence. Jervis explained that:

"such instruction would involve no further charge to the State than that of proper accommodation, books, drawing materials, surveying instruments, precisely as heralded at the Depot de la Guerre in France".

From a Geographic Engineer perspective, like Major General William Roy (1726-1790) before, he argued in a very detailed memorandum that the best way of obtaining information was to go and get it oneself. He argued that a number of small 'brigades' should be formed to travel overseas and carry out geographic and statistical research, one could argue that this was in a similar vein to the Geographic Support Group and Operational Intelligence Support Group concepts, or what was 19 STRE from a field survey perspective. These brigades he suggested should consist of seven men; four draughtsmen, a geologist and someone who could sketch, all under the command of an officer who had a "flair for languages and a taste for adventure". In 1856 Lord Panmure agreed to this idea and a party of civil engineers, surveyors and draughtsmen with equipment supplied by the Topographical and Statistical Depot under Lieutenant Colonel Geils, did go to the Middle East and charted, for the first time, the entire upper course of the Euphrates River. This was Lieutenant Colonel Jervis's last achievement, for on 3 April 1857, racked by a disease brought from India, he died in his sleep.

Jervis's ideas of 'collecting intelligence and mapping the empire' lived on with a varying

degree of success throughout the 19th century to present day. Many commentators suggest that this extraordinary Victorian Topographical and Statistical Dept was the very first branch of the British Army General Staff ⁷ and that Jervis's typical sapper drive and energy led to the creation of The British Defence Intelligence Staff. There is still much passionate debate as to whether the establishment of the T&S Department in 1855 represent, as some commentators suggest, the birth of a permanent intelligence department at the War Office. The concept of a 'Depot of Knowledge'



Adelphi Terrace, Whitehall. Converted coach house and stables which served as the first home of the Topographical and Statistical Department of the War Office (1855-56)

had been started in 1801 but by 1854 it was almost extinct and although after the death of Jervis the T&S Department's performance was moot, it cannot be denied that Jervis's achievements in his tenure were the catalyst for the Defence Intelligence Staff's future greatness. Thomas Best Jervis was crucial as the instigator who picked up the threads of the all but defunct Depot of Knowledge and ardently pushed forward. From the makeshift Topographical and Statistical Department formed in cramped and dirty stables off Whitehall to the enormous Joint Service Directorate of Intelligence in the present Ministry of Defence there is an unbroken line of Majors, Colonels, Brigadiers, Major-Generals and now Vice Admirals and Air Marshals who carry on Jervis's mantle.

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- ¹ Hughes-Wilson: Weidenfeld and Nicholson, 2004.
 - ² Parritt, Ashford, Kent: Intelligence Corps Association, 1983.
 - ³ Hughes-Wilson: Weidenfeld and Nicholson, 2004.
 - ⁴ Hughes-Wilson: Weidenfeld and Nicholson, 2004.
 - ⁵ Parritt, Ashford, Kent: Intelligence Corps Association, 1983.
 - ⁶ Hodson and Gordon: Reproduction Division, Military Survey, 1997.
 - ⁷ Haswell, London: Weidenfeld and Nicholson, 1973.
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The Puppet Masters: Spies, Traitors and the real forces behind world Events by Colonel John Hughes-Wilson: Weidenfeld and Nicholson, 2004

Lieutenant Colonel Thomas Best Jervis a biography by his son

OS TO MOVE OFFICES

The Ordnance Survey has announced that it intends to vacate the Maybush buildings and move to new modern offices about a mile away at Adanac Park with the printing and warehouse facilities to be housed separately on an appropriate industrial site also in Southampton. Due to the scale of the project no move is likely before 2008.

The reason behind the decision is that their current headquarters, opened in 1969, was designed and built to house over 3,000 head office staff and to suit the largely manual and analogue processes of the time. With maintenance of the current dated premises ever more expensive and staff now down to under 1,200 and, all production systems very much 'state of the art', the time has come to move to new purpose-built facilities.

A First for Surveyors and a First for World Heritage



Friedrich Georg Wilhelm Struve
(1793 – 1864)

By J R Smith

On 15 July 2005 the UNESCO World Heritage Committee inscribed a new name on its list of important sites – the Struve Geodetic Arc. This is a triangulation network observed between 1816 and 1855 which stretched from near North Cape in Norway to the Black Sea. In today's geography it passes through ten countries, namely Norway, Sweden, Finland, Russian Federation, Estonia, Latvia, Lithuania, Belarus, the Republic of Moldova and Ukraine.

The Struve Geodetic Arc is the first survey scheme and also the first such scientific and technological landmark to be entered on the World Heritage List where it joins a select list of less than 900 such listed sites around the world. Whereas one is used to seeing ancient buildings, stunning scenery and famous archaeological sites as Heritage monuments, the Struve Arc is but a series of marks in the ground barely covering a square metre or so each. However, taken as a whole the Arc was, for its time, a major scientific achievement using state-of-the-art instrumentation to achieve amazing accuracies straddling such a vast distance and several countries. Much smaller similar schemes preceded it and longer and more accurate ones succeeded it but it was a veritable milestone in the quest to determine accurate values for the parameters of the Earth.

Arc measurement is the determination of the linear length of a section of meridian (line of longitude) on the earth together with the astronomical determination of the positions of the two end points. Whilst it should theoretically follow exactly along such a line of longitude in practice this is not essential, and indeed would be impractical, and appropriate corrections can be made. The terminal points of the Struve Arc are at Fuglenaes, latitude $70^{\circ} 40' 12''$ N and longitude $23^{\circ} 39' 48''$ E, and Staro-Nekrassowka, latitude $45^{\circ} 19' 54''$ N and longitude $28^{\circ} 55' 41''$ E. Hence it is said to run more or less along the 26° E line of longitude for a distance of 2,820 km.

The use of such a scheme was particularly designed to assist in the accurate determination of the size and shape of the earth. It was an extraordinary example of scientific collaboration among scientists from different countries and of collaboration between monarchs for a scientific cause. Additionally it formed the basis upon which long required accurate mapping of the areas concerned could be based.

The historic monument is defined by the initial preservation of 34 of the 265 main survey stations involved. The ten countries involved, with encouragement and help from the International Institution for the History of Surveying & Measurement (IIHSM), a Permanent Group within the International Federation of Surveyors (FIG), cooperated since 1954 in the recovery, verification, monumentation and documentation of the selected points. These were chosen (a) to give a spread of preserved points along the whole arc, (b) to be representative of all countries, (c) that could be verified as original points (d) were reasonably accessible to the public (e) were in such positions that if restored, they would not be liable to imminent destruction by building developments and (f) were generally in areas where the local population were keen to take such a monument under their wing for its up-keep.

Where possible the most prominent sites have been selected including the obelisks at each terminal, the Tartu Observatory in Estonia (known at the time as Dorpat) which served as the origin of the scheme and the point in the tower of Alatornio church. The church itself has remained unchanged since the time of the measurements. Other points take a variety of forms such as drill holes and crosses in rock and cairns.

F G W Struve (1793-1864), after whom the arc gets its name, was born in Altona, Holstein and died in Pulkova, Russia. He married twice and had 18 children. By age 20 he became Professor of Mathematics and Astronomy at Dorpat. His involvement in the survey of Livonia was



The obelisk at the southern end of the arc at Staro-Nekrassowka in the Ukraine



Tartu (old) Observatory, the origin of Struve's survey

the start of almost 40 years work on the meridian arc. He founded Pulkova astronomical observatory, then the best in the world, and the Russian Geographical Society. The other principal name associated with the arc was that of the Russian military officer Carl F Tenner (1783-1859). In 1816 he became Head of the vast Russian triangulation work in the western provinces of the Empire. He had started in 1817, on his own initiative, a triangulation scheme to the south of Livonia. After Struve and Tenner became acquainted with each other's activities they joined forces. Some of the route in the northern parts covered similar territory to that surveyed in 1735 by Maupertuis when observing his much shorter scheme that is particularly remembered, with a similar expedition to Peru, 1735-1745, for solving once and for all the controversy between Newton in England and the Cassinis in France, regarding the shape of the earth i.e. was it a prolate (flattened at the Equator) or oblate (flattened at the Poles) spheroid. The latter version was proven to be correct.

With the achievement of World Heritage Monument status for this arc what enhancements are possible? Monuments can be extended at any later date and a "monument" such as the Struve arc can be extended southwards as far as South Africa.

This is feasible because (a) in the 1930s a join was made from the Struve Arc in Belarus to Crete and (b) the Arc of the 30th Meridian through East Africa stretches from near Port Elizabeth to near Cairo but in the 1950s a connection was made across the Mediterranean Sea to Crete. Hence there exists a connection that would extend the whole arc to one of 105°. Such an extension would though, involve a further 20 or so countries and would be no small task.

Other related activities are also envisaged:

- The restoration of the Old Tartu Observatory (now owned by Tartu University) to become a Struve Museum.
- For the Struve archival material, presently in several locations, to be properly indexed – a task already well under way with the assistance of Vitali Kaptjg and the IIHSM.
- For there to be scientific experiments across the 34 points that could in the future be archive material for tectonic and other investigations.
- The translation of Struve's volumes into English.

Further information can be obtained from:
 J R Smith, 24 Woodbury Ave, Petersfield, GU32 2EE
 e-mail: jim@smith1780.freeserve.co.uk

Map of the Struve Arc from near North Cape to the Black Sea

Gerald Smedley Andrews MBE RCE FRGS

12 December 1903 – 5 December 2005

DSA Life Member Gerald Smedley Andrews, born in Winnipeg, Manitoba, passed away peacefully in Victoria, British Columbia on the 5th of December 2005. His passing culminates a long life rich in accomplishment and service. Highlights include teaching at Big Bar Creek and Kelly Lake, BC (1922-1926), obtaining a Forestry Degree from the University of Toronto (1930), working as Party Chief with the Surveys Division of the BC Forest Service (1930-1939), post graduate studies in aerial photogrammetry at Oxford and Dresden, Germany (1932-1934); mapping the Normandy Coast in advance of the WW II D-Day Invasion for which he was awarded an MBE and on return to BC, laying the foundation for a mapping service second to none in the world, as Surveyor General and Director of Surveys and Mapping, Government of British Columbia (1951-1968).

Gerald's wartime military service is recorded in an article published in the Summer 2004 issue of Ranger.

Upon retirement he undertook several term projects: one for the Federal Department of Energy, Mines and Resources and the other for CIDA teaching air photo interpretation to graduate engineers at the University of Paraiba, Brazil. He was active in the BC Historical Society and wrote prodigiously on matters related to history and surveying. He published his first book, "Metis Outpost" in 1985, a tale of two youthful years at Kelly Lake, and two adventurous packhorse trips through the Rocky Mountains before the advent of roads. He travelled extensively in his modified Ford van at home and abroad, spending many memorable summers at his cabin in Atlin.

For years he delighted friends and family with Christmas cards made from remarkable pen and ink drawings featuring scenes from BC and around the world.

Later in life he received recognition for his achievements with an Honorary Doctorate in Engineering from the University of Victoria, 1988; The Order of British Columbia, 1990 and the Order of Canada, 1991.

Colonel Freddie Hore was a long-time friend of Gerald and writes:

I was Officer Commanding 1 Air Survey Liaison Section RE working on the planning and acquisition of the photography being flown to produce the 1:25,000 mapping of Normandy in preparation for D-Day (see Ranger Summer 2004 issue for details). Working parallel with this unit was a Canadian Survey Unit commanded by Major Gerry Andrews RCE. He was a distinguished Cartographer who life has been recorded by his daughter, Mary.

I visited him in 1954 when I was entertained at a party to which his war-time colleagues were invited. In 1989, Pat, my wife, joined me on a visit. Whilst in his house we had a completely unexpected visit from a Film Producer, Louis Nowra, who was planning a film called "Map of the Human Heart" which was a love story that had a survey element. It was a remarkable coincidence that we happened to be there together at that moment. I was subsequently involved in the production of the film in the UK. Unfortunately it was not a great success.

We paid another visit in 1996. Now in his late eighties he could be seen regularly riding his bicycle in Victoria. His daughter, Mary, devoted her life to him after his wife Jean died. In compliance with his wishes not to have a Funeral or a Memorial Service, his daughters Mary and Kris held at the house what they called "A Celebration of his Life". The house was full, at least 50 attended, representing his many friends of "whatever race, colour, origin, creed, skill or estate". His ashes were scattered in some of the places he loved. What a wonderful productive life. He will be fondly remembered by all who knew him.

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