THE RANGER 2007

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Royal Sappers and Miners in working dress with instrument 1854

Royal Engineers (Geographic) in working dress with instrument 2007

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Designed and typeset by David Johnson.

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In this edition of Ranger…

……we advertise two very welcome and unique new books that will be of great interest to military surveyors. 260 years ago, somewhere near Fort Augustus in the centre of the Great Glen, a 21-year old Scotsman called William Roy made the first observations for what was to become one of the great surveys of all time – the Military Survey of Scotland. Roy was destined to become one of the nation's most important surveyors and the project itself marked the formation of the organisation that was to be known until recently as Military Survey. The survey itself resulted in a map at a scale of 1:36,000 produced as a series of strips each concertina folded and stored in wooden boxes made to resemble large books. It was drawn by an equally young artist, Paul Sandby who was only 16 years old when he joined Roy; it is essentially a water colour masterpiece – truly a work of art but the result of science and great endeavour.

The map has remained hidden from the public gaze since its completion in 1755, residing latterly in the Map Library of the British Library where a small group of DSA members had the opportunity to see it earlier this year. An extract was printed in 1997 to commemorate the 250th Anniversary of Military Survey and now, at last, the entire map has been reproduced in a very high quality individually numbered limited edition book to be published in December. The Defence Surveyors' Association applauds Edinburgh-based publishers Birlinn for bringing this unique and so significant map to the marketplace and hence making it available to all.

Also reviewed in this issue is a monumental work by DSA member Massimo Mangilli Climpson telling in infinite detail the story of Larkhill's Wartime Locators – the twelve Artillery Survey Regiments of the Second World War. It is apt that an all-embracing volume on sound ranging should be published in the 80th Anniversary Year of the Association. A number of our more senior members are mentioned in the book which will not only appeal to sound rangers past and present but will act as a definitive reference source for generations to come.

Both works have particular significance to DSA members and have been published just in time to make stunning Christmas presents.

We complete the DSA 80th and Falklands 25th Anniversary year with further articles on both events. Of particular note is a detailed account by Bill Taylor, who also reviews Massimo's book, of the work carried out to use sound ranging to locate the launch sites of Hitler's V2 rockets which pounded London and then Antwerp. This ground breaking research and its application in the field was very much top secret at the time and as a result has never before been in the public domain.

Enjoy a good read over the Christmas break.

Alan Gordon

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

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DEFENCE SURVEYORS' ASSOCIATION

Formerly the Field Survey Association

DSA is a registered charity which maintains liaison between officers, warrant officers and senior non-commissioned officers, both serving and retired, and civilians who are working or who have worked in the Defence domain where the focus is environmental information, hydrographic, oceanographic and geographic surveys, locating and target acquisition, navigation, and geospatial intelligence.

The Association provides a variety of services to its members which include:

- A copy of each edition of Ranger magazine, published two times a year.
- Visits to a wide range of technical, military and historical sites, often not available to the general public.
- Opportunities to attend technical and historical seminars.
- Opportunities to attend events organised by other professional organisations working in related fields.
- Opportunities to network with senior personnel in the Defence environmental and geospatial sector.

If you would like to join the Association please complete the application form at the back of this edition or visit the Association's website (www.defencesurveyors.org.uk) where you can complete an application on line.

Falkland Islands Map Display

By Peter Walker

A display of the mapping which was used to support Operation CORPORATE, the British deployment to the Falkland Islands in 1982, was put together to mark the 25th anniversary of the campaign. The display consists of 12 boards covering events from the initial deployment from the UK, through the landings at Port San Carlos, the various battles fought across the Islands to the Argentinean surrender at Port Stanley. Approximately 40 maps have been included in the display, showing how British forces used mapping ranging in scale from 1:1 million down to town and airfield plans at scales as large as 1:500. The display also shows one, if not the first, use of computer generated digital geospatial information to provide terrain visualisation, a technology that was still in its infancy at that time.

The display has been on show at the Joint Aeronautical & Geospatial Organisation at Hermitage, the United Kingdom Hydrographic Office in Taunton, the Defence Geographic Centre in Feltham, the Defence Intelligence & Security Centre at Chicksands and the Royal Engineers Museum at Chatham. The display has also been set up to support Service charity events for the Army Benevolent Fund, the Royal Engineers Association and the Defence Surveyors' Association.

Descriptions of the geographic support provided during the operation have made use of a variety of sources, but in particular they have been drawn from an article 'Operation Corporate - The Military Survey Involvement' by Lieutenant Colonel JS Himbury RE BSc, published in the Royal Engineers Journal in 1982 and reprinted in the previous issue of Ranger.

John Himbury enjoying the chance to see once more the mapping for Operation CORPORATE when the exhibition was staged at Hermitage.

MacLeod On The Field Survey Association

Mike Nolan came across the following piece in the Report of Proceedings of the Conference of Empire Survey Officers 1931, published by HMSO in 1932. It is particularly interesting in the DSA's 80th anniversary year.

THE FIELD SURVEY ASSOCIATION AND THE "EMPIRE SURVEY REVIEW"

Colonel M. N. MacLeod: Though I am down to talk about the *Empire Survey Review*, I am proposing to talk about something else first. Some of you are members of a body called The Field Survey Association, and as I may not have an opportunity of talking about it again I want to advertise it a little now. Some of you may know that when the Great War broke out the survey organization consisted of one Officer with one clerk, at G.H.Q. (I am not sure that there may not also have been two M.T. drivers), and a similar "force" on the line of communications; it finished up the war with some 200 Officers and nearly 4,000 other ranks. I doubt if any other branch of the Service expanded more. Our Military Survey organization now, though larger than that of 1914, is the only part of the Army which is on a "long service" basis. That means to say that, whereas the ordinary soldier serves for five or six years and then goes to the Reserve, his place being taken by another man, the survey soldier serves for 21 years, and then goes into the Ordnance Survey as a civilian. Although we have a bigger organization now than we had at the beginning of the War it has no "reservists." With our world-wide commitments, it is most difficult to estimate beforehand what our requirements will be in the matter of supply of survey material to the British Army in future wars. We can put in an estimate which the Treasury may divide by two, or some other figure which they think appropriate. As we are not prophets, some means of expanding the organization is very desirable. Now surveying is to the Army something like a "key" industry. One might almost call it "*The*" key industry and any failure in respect to it would have serious effects. Not much has been written about survey work in histories of the Great War but this only means that not many people understand it. Those who do will find reasons for thinking that the turning point of the War was the surprise artillery bombardment at the Battle of Cambrai on 20th November, 1917, which was based entirely on the work of the 3rd Field Survey Company. That attack was the first *really* successful attack of the Great War. This type of surprise—artillery bombardment based on maps and surveys—was repeated with similar good results in all the battles of 1918 and had great influence on their results. The survey work involved was done by Field Survey Battalions, the Officers of which after the War maintained an informal Association for holding an annual dinner, and by that means tried to keep in touch with one another. A few years ago, largely through the efforts of Brigadier Winterbotham, that informal Association was put on a more formal basis and called the "Field Survey Association." Brigadier Winterbotham also secured its "recognition" by the Army Council. The object of the Association is to "ear-mark" qualified personnel who are interested in survey, who have the necessary scientific knowledge, and who are prepared to offer their services as officers in the event of war. No military obligation is incurred by joining the Association. The only obligation is to pay an annual subscription of 5s. On the other hand, the fact that the Association is recognized by the Army Council would undoubtedly be of assistance to its members in obtaining suitable military employment should their services be offered or required in the event of a future war. That is all I need say about it here. As to those who would wish to enquire further about it, I would ask them to take one of the prospectuses that are on the table, together with the proposal form of membership, and I hope as the result of what I have said that I may co-opt a few more members.

After this digression I will come back to my proper subject, the *Empire Survey Review*. Really I am not the person who should talk about it, because both the editors are here, and I hope that they will take up the running after I have finished. *Here* is the *Review*—most of you have seen the first number—the idea of which was first suggested at the Survey Conference three years ago. Three years may seem a long time to bring out the new *Review*, but the difficulties to be overcome have been considerable. We could not guarantee, of course, that it would be from the outset a financial success;

Defence Surveyors' Association Prizes 2006

For some considerable time the DSA has awarded a prize each year to a serving member, military or civilian, of the Royal Navy, the Royal Artillery and the Royal Engineers Geographic community who has made a significant contribution in their particular field of defence geomatics. This year, in accordance with the Association's aim to include all areas of Defence geospatial activity, the number awards has been increased to include the UK Hydrographic Office (UKHO), the Defence Geographic Centre (DGC) and No 1 Air Information Documents Unit (AIDU).

As the quality of nominations, particularly in the new categories, was exceptionally high a number of supplementary awards were made this year.

In addition to these annual awards, the Council have instigated a new award to be known as the Ernest Ramus Award for Outstanding Service which is the subject of a separate article in this issue.

The Association President, Major General Patrick Fagan, presented the Prizes to the winners during the AGM at the Museum of Army Flying at Middle Wallop on Saturday the 28th of July.

ROYAL NAVY

Petty Officer (Survey Recorder) Martin Godfrey

Martin Godfrey is employed as a Petty Officer (Survey Recorder) onboard *HMS Enterprise* a ship that has an unparalleled ability to gather high density multi-beam sonar bathymetry, side scan sonar imagery, tidal and current data, oceanographic data and seismic sub-bottom profiling information. Managing the collection, processing and delivery of all this new information requires very considerable dedication, organisation and skill and Petty Officer Godfrey proved to be the right man in the right place at the right time to rise to the challenge.

Having joined the ship from build, he became intimately involved with the acceptance into service of the numerous new hydrographic and oceanographic surveying systems onboard, and since then he has led the development of procedures for handling and analysing data onboard the ship. Always willing to go that extra mile, Petty Officer Godfrey has compiled a comprehensive set of standard operating procedures, which have been adopted across the Squadron. These are clear, concise and cover the full range of operator requirements from junior Able Seaman operating the equipment to the final Officer's quality assurance checks and controls. In compiling these procedures he has spent many hours patiently teaching all those involved about the capabilities, limitations and intricacies of the onboard systems.

Further evidence of Petty Officer Godfrey's outstanding ability was shown during *HMS Enterprise's* involvement in the VELA Deployment off West Africa in the Autumn of 2006, when he master-minded the planning and execution of surveying support to an Amphibious Task Group and produced novel chart products which received widespread acclaim. He has led by example, passing on his technical and management skills to the team around him, and inspiring excellence in the Surveying Department onboard *HMS Enterprise* as well as supporting his peers in the other ships of the Surveying Squadron.

ROYAL ENGINEERS (GEOGRAPHIC)

David Pegg

David Pegg enjoyed a successful career as an air survey technician achieving the rank of Warrant Officer Class 2. Following retirement 10 years ago he worked in the Field Support Section at 42 Engineer Regiment (Geo) as TACISYS systems manager. During this period, he planned and executed a number of technical upgrades to the fleet, ensuring TACISYS remained at the cutting edge of technical innovation to meet the needs of the deployed Geographic community.

The latest and most significant upgrade has been that of TACISYS to G BOX. Dave conceived the original plan to upgrade the systems in April 2005 but financial approval was not given until September 2006 hence he had to rework the original upgrade to incorporate the latest hardware advances to achieve maximum user benefit. In short, his plan was to replace the hardware heart of TACISYS, upgrade the software and retain the original peripherals.

This achievement cannot be understated; the aging TACISYS fleet was deemed to be of little use compared to other newer IT equipment and quite simply lacked the processor punch required in support of Operations. Without doubt, the upgrade project has been the greatest single technical contribution to improving the effectiveness of the Geographic community in 2006.

In completing the upgrade, Dave was absolutely resolute and unwavering in his customer focus, continually and selflessly putting the needs of the Geo community before his own. He always accepted responsibility willingly, was dynamically flexible and willing to put the needs of the job before his personal life to carry out technical support and upgrades globally. While maintaining his G BOX focus he also continued to provide critically valuable CRYPTO custodian and NGA liaison cover, for which he has received recognition for his dedication, diligence and accommodating attitude.

Dave Pegg's contribution was been pivotal to the Regiment's ability to support current Operations and enabled the Geographic community at large to reinforce the success it already enjoys.

Unfortunately Dave died before he could receive the Prize. His obituary is featured in this issue.

NO 1 AIDU

Kesh Patel with his prizewinner's certificate

Mukesh 'Kesh' Patel

Mr Patel has worked at No 1 AIDU since 1996 and throughout that time he has provided outstanding administrative support to the Unit covering many areas. Initially employed as the Finance Officer he was soon promoted into the new post of Officer Commanding Support Flight and Unit Business Manager heading up a team of 4 other civil servants managing customer services, procurement and all financial matters concerned with the outputs of No 1 AIDU with a place on the Management Board.

Over time his job has evolved and expanded to meet the ever changing and rapidly growing requirements of air cartography and aeronautical information. Kesh has absorbed these changes with ease and, using his extensive knowledge of No 1 AIDU business and processes, he has made a significant contribution to the development of aeronautical information products that the Unit is tasked with producing. Of particular note is the steady hand and expert advice that he has given to the development of the Aeronautical Production System (APS) project. This work will produce a state of the art 2nd generation digital production flow-line, designated APS, based on Laser-Scan's "Gothic" technology, providing a central repository of data. When fully deployed, APS will enable a radically new infrastructure to be employed at No 1 AIDU with resulting manpower and cost savings. Although not directly involved in the technological development, it is hard not to underestimate Mr Patel's enormous contribution to the advancement of this project. Without his direct involvement and calm negotiating skills with International Partners, Contractors, Civil Servants and military personnel the project would have stalled many years ago.

Kesh is immensely dedicated and conscientious and can often be found at his desk outside normal working hours addressing the many issues that affect the business processes of this Unit; he does this without complaint or looking for praise and is an example to all others of the true professional in the work place. Although not at the technical end of Air Cartography, Mr Patel has made the most significant contribution to Air Cartography over recent years.

DEFENCE GEOGRAPHIC CENTRE

Michael Wyman

Mick Wyman was a Section Head in Geographic Research Branch (GRB) until September 2006 when he was posted as DIS Liaison Officer for DGC.

Mr Wyman managed a 5-strong regional section in the GRB of five staff that covered Africa and parts of SW Asia, including Afghanistan and Pakistan hence his team was at the forefront of the operational work allocated to GRB on OP HERRICK. He planned the work programmes, led the team and personally worked on a huge range of tasks. Mick also led the GRB task force working group on 2 special tasks;

"A Military Geo-Spatial Analysis of Historic Patterns of Attack in Afghanistan", and *"The Effects of Human Migration, Drug Trafficking, and Ethnicity, in the CENTCOM area"*. This involved co-ordinating research by a team of up to eight staff and subsequently producing graphics that were used to brief the CDI and other senior MOD staffs. This briefing has subsequently been provided as a pre-deployment brief to all troops going out to Theatre, to a number of US agencies including the CIA, DIA and the National Geospatial-Intelligence Agency.

This proved to be a groundbreaking activity, not only through the first-time combination of a wide range of both open and sensitive sources, but doing so within a geospatially referenced context. The output of these tasks has been widely briefed and appreciated leading to a realisation across Defence of the benefits to be gained from a cultural geography approach.

In support of Operational Contingency work Mr Wyman co-ordinated the production of 5 SMGs, 5 Country assessments, 5 Geographic Research Information Papers, 2 Mapping Studies, & 60 mapping reviews of key locations over various countries, including Nigeria & Congo. In addition to this work he successfully supervised a programme of steady state map production and responded to a number of Ad Hoc queries. His approach to managing such a massive workload was to maximise the strengths of his team in allocating tasks, and he also put a great deal of emphasis on developing his team.

UK HYDROGRAPHIC OFFICE

UKHO prizewinner, Nigel Hoy, receiving his award from DSA President, Major General Patrick Fagan.

Nigel Hoy

Mr Hoy leads a team of cartographers with the responsibility for maintaining the Nautical Chart series in a geographic region stretching from Egypt and Somalia in the west to Indonesia in the east. This area includes the Persian Gulf, Red Sea, northeast Africa and the crucial sea-lanes through Indonesia and Malaysia.

In the recent past, he has provided significant cartographic backup to the UKHO Gulf war efforts (for which he received universal praise from military sources in both the UK and US); personally visited numerous Gulf and Red Sea states where he has forged important links with key, high ranking personnel; provided bespoke Nautical Charts for the MOD and the Yemeni Ministry of Fisheries; provided a completely revised scheme of 33 new Nautical Charts as part of a wider package of cartographic and surveying support to the UAE and Kuwait and designed a new commercial product (the Admiralty Tough Chart), which is now in full production for the leisure market.

The significance of this list of achievements is that, in each case, they represent aspects of cartographic work normally assigned to higher grades. Nigel not only completed each task successfully but did so with a rare degree of infectious enthusiasm which has motivated all teams he has been involved with.

In addition to these special projects Nigel also ensured that the "business as usual" task of maintaining the 250 Nautical Charts in his portfolio in a safe and fit for purpose state has been achieved. This feat in itself should not be underestimated given the very volatile nature of the area in his charge and the difficulty of obtaining safety critical information.

Supplementary Awards

DEFENCE GEOGRAPHIC CENTRE

Mandy Warrington-Brown

Mrs Warrington-Brown is responsible for the development and management of the UK MOD's Geospatial Analyst professional group including management of both the recruitment and training (core and functional skills development) of Geospatial Analysts.

DGC supplementary prizewinner Mandy Warrington-Brown, receiving her award.

Mandy has made an unprecedented contribution to Geospatial Analyst professional development. She developed a functional competence and skills framework that set the standard for other professional groups to follow and transformed the management and methods of core training delivery. She also spearheaded the DGC's adoption and expansion of a novel behavioural-preference based assessment tool and workshop that has delivered a significant improvement in individual and team professional relationships and effectiveness.

Jim Clarke from the DGC, another worthy recipient.

Jim Clarke

Jim Clarke and his team are responsible for the rapid production of geographical products, principally in support of operations and exercises, for the Defence Geographic Centre. In directing his team he has been pivotal in delivering an impressive number of mapping and other products in support of both UK and US forces engaged in Op TELIC and similar products over Helmand Province, Afghanistan in support of UK and other NATO forces engaged in Op HERRICK.

Jim has trained a group of twelve mostly inexperienced junior staff and formed an effective team which has supported operations continuously since January 2005 with he and his team working consistently long hours to complete all tasks on time and to quality, which is an exceptional achievement. He has worked for the MOD for 26 years during which time he has developed innovative techniques culminating in reduced production times for Op HERRICK in the order of 30%. In particular he has pioneered the use of Shuttle Radar Topographic Mission (SRTM) data to generate contours for geographic products.

UK HYDROGRAPHIC OFFICE

Robert J Croft MBE

Bob Croft is responsible for the development and provision to the RN of Maritime Foundation Data (MFD), the encyclopaedic or quasi-static maritime component of the Recognised Environmental Picture (REP).

Bob's recent activity has demonstrated innovative application of technology to achieve an operational prototype Maritime Foundation Database (MFDB) that not only supports the REP in a network enabled environment but provides data products from the same source database to other users. This prototype not only supports the MOD aspirations to a REP and Network Enabled Capability (NEC) but also the UKHO future production System, which is conceived to support all UKHO products from a single Hydrographic Database (HDB).

Bob Croft was unable to attend the AGM and received his award from Rear Admiral Ian Moncrieff later at the UKHO.

The HDB aspiration is met by serving data from MFDB to a range of connected users with varying data manipulation capability through web technology from the same database as other digital and paper products are generated. In this way the usefulness and coherence of the data is maximised with the minimum data management overhead.

Mr Croft has demonstrated commendable drive, enthusiasm and innovative thinking in moving this work forward by delivering an operational prototype MFDB and resultant demonstration of capability, which is supportive of three initiatives (REP, NEC & HDB).

The Ernest Ramus Award for Outstanding Service

This year the Council have instigated a new award to be known as the Ernest Ramus Award for Outstanding Service to recognise those who have made an exceptional contribution in their field. It will only be awarded as and when an appropriate candidate is identified, usually following the winner's retirement from service. Ernest Ramus was a Royal Artillery Survey Officer who rose to command a Survey Regiment and later became the auditor of the Field Survey Association accounts. In this role he recommended the purchase of Charibonds, a decision that has served the Association extremely well and has provided the income to support the annual prizes.

The first recipient of the Ernest Ramus Award is John Sach, a former Senior Instructor at the Royal School of Military Survey. The Award was presented to John by Brigadier Fraser Scott who was FSA Treasurer at the time of the original investment in Charibonds. The Award comprised a framed certificate, a cheque for £500 and an engraved silver salver.

John Sach receiving the very first Ernest Ramus Award from Brigadier Fraser Scott.

John Sach

John Sach served 20 years as a soldier rising to the rank of Warrant Officer Class 2. He then filled a range of instructional posts in the Royal School of Military Survey (RSMS) before appointment in 2000 as the first Senior Burnham Lecturer at RSMS. He was responsible for establishing the new Imagery Department to reflect the growing importance of imagery in Defence applications and this Department is now internationally recognised as a centre of excellence. He was highly proactive in seeking out and meeting the imagery training requirements across defence and hence his department was one of the most dynamic in the school. He was very much a champion for the vital role of imagery training both within the Geographic Branch and the wider Defence community.

John with the award certificate and engraved silver salver.

In 2003 John was instrumental in the development of the Foundation Degree for Royal Engineer (Geographic) soldiers; he played a pivotal role in developing an innovative partnership with Sheffield Hallam University to the benefit of young soldiers. He devoted tremendous time and effort in his role of Course Leader and when he retired he left the programme in an excellent state. John Sach commanded the highest respect from staff and students alike for his knowledge, commitment and boundless enthusiasm and right up to his retirement he remained one of the most proactive and imaginative members of the School staff.

During his time in RSMS, he developed his own competency by achieving academic success in gaining an Open University degree and a Master's Degree, all through part time study while still directing his energy in support of departmental aims. For more than a decade he has been an influential committee member of the Photogrammetric and Remote Sensing Society. John's contribution to UK Defence over many years has been outstanding through dedication, professionalism, total commitment and selfless service. Despite a heavy teaching and management workload, he still found time to support the Territorial Army, gaining a commission in 135 Geographic Squadron (V).

John Sach has made a unique contribution to the Army, MOD and education that merits public recognition for his lifelong service. Without his contribution RSMS would not today be delivering the same high quality and innovative training to the wider Defence community.

Military Maps Among the Dreaming Spires

Michael Gowlett

On 3 May 2007 I was a one of a group of DSA members who assembled in the draughty doorway of the Clarendon Building of the University of Oxford, on Broad Street. During the morning we expected and got interesting talks and displays on wartime military mapping, but the afternoon visits to the Bodleian Library and the University Museum of the History of Science certainly exceeded my expectations, and I believe those of other members of the group as well. Nick Millea, of the Bodleian, provided a brief introduction to the day and the Bodleian map collection (of which more later).

Mike Nolan displayed and explained examples of the extraordinarily wide range of GSGS Miscellaneous maps produced during World War 2. He passed around the extensive catalogue of these maps he had researched.

Dr Ted Rose introduced us to WW2 specialist maps produced by the Geological Section of the Inter-Service Topographical Department (ISTD) which produced much of its work in the grounds of Oxford University. Although inter-service, for mainly historical reasons the ISTD worked under the auspices of the Royal Navy. Dr Rose displayed European, Asian and other geological maps important for military strategy, especially for selecting potential sea borne landing zones and sites for airfields. The accuracy of the mapping depended on the sources of compilation and it was not always reliable in remote places. The detailed geological information on the maps (presumably provided by the University) sometimes led users to overestimate the positional accuracy. Nevertheless, they were the best that could be provided at the time and doubtless they were invaluable to military planners.

After lunch Nick Millea met us at the entrance to the Bodleian Library for what turned out to be a fascinating tour. First, the statistics! There are 8 million items (of which 1 million are maps) on 117 miles of shelving. About 1.5 million of these items are held in a warehouse in Oxford and the remainder, bizarrely, in a Cheshire salt mine. Second in size only to the British Library, it is one of the six national 'copyright deposit' libraries that receive free copies of all material printed. The New Bodleian building was completed in 1940, pyramid shaped with 60% of the book storage below ground level, the smallest floors at the top and the largest at the bottom. It has an interesting mechanical book conveyor system, seemingly Heath Robinson in operation, but surviving presumably on the 'if it ain't broke, don't fix it' principle!

Nick Millea briefing the morning meeting on the day ahead. *Photo Mike Nolan*

Mike Gowlett and Alan Gordon recalling the tedium of using proportional compasses. *Photo Mike Nolan*

The map collection is stored on a floor of the New Bodleian and we were shown an interesting selection. Included was a German campaign map showing how Oxford was to be taken after the invasion! There was also a valuable old navigation map of Europe drawn by goose quill on vellum (calf skin), retaining the shape of the original pelt. The extent of the map collection was staggering.

Nick then led us in file through labyrinthine corridors to a narrow passage under Broad Street leading to the Old Bodleian. The comparison in architectural styles between the New and the medieval Old is about as wide as can be imagined. We were taken high up to a floor where a unique ceiling had recently been restored after leakage, and where priceless old volumes are stored. Finally, our tour ended with a brief visit to the top of Radcliffe Camera, and we were able to view the 'dreaming spires' from one of their own!

The delights were not over yet. We entered the Museum of the History of Science, just down the road in Broad Street, where Dr Stephen Johnston showed us historic surveying instruments. There were collections of instruments made for presentation to kings and emperors, working models but not intended for regular use. The later 'historic' instruments seemed eerily familiar to some of us! It was interesting to hear that the old instrument makers were regarded as academic equals of other scientists, and clearly they had an eye for the aesthetic as well as the practical. Finally Stuart took us to a basement where we had 'hands on' opportunity with old, but not quite yet historic (!), surveying and drawing instruments. Alan Gordon and I as air surveyors remembered well the pantograph, proportional compass and the drawing sets. We recoiled a little from the proportional compass as we shared a view that map revision using that method was the most tedious task ever devised for the surveyor!

The visit ended some time after 1600hrs. As I said at the start, the day exceeded expectations for me and perhaps for others as well.

Bereavements

It is with regret that the Association announces the deaths of Colin Wylie, William T Lowes and the 2006 DSA Royal Engineers (Geographic) Prizewinner Dave Pegg. Obituaries for Colin Wylie and Dave Pegg are in this issue of Ranger. Although never a member of the DSA , it is with regret that we announce the sudden death of Ed Furmston, the well known last Director of the Directorate of Overseas Surveys.

DSA Visit to the British Library

By Tony Keeley

Yo Hodson kindly organised a visit to the British Library on the 16th of May 2007 and a small but select group gathered there that afternoon. As luck would have it I was reading the Daily Telegraph on the train up to London and, as I always do, I turned to the obituaries and saw the obituary for the architect of the new British Library, Colin St John Wilson. It included comments, some attributed to Prince Charles, on this 'monstrosity' which was to involve demolition of the well loved domed reading room. I had never been to the British Library before and was prepared to be faced with a rather dull modern building, particularly after walking past the beautiful façade of St Pancras, but on turning the corner and seeing the piazza and the library itself all misgivings disappeared. The wonderful spacious atrium with its view of the King George III library left one in no doubt that this was indeed a library!

On being taken to the Map Room we were initially shown maps and bound volumes from the reign of King Henry VIII. The quality, particular in terms of colour, was exquisite. Obviously Henry had lots of money from the dissolution of the monasteries to indulge in his ambition to both delineate and provide information for the defence of his domains. It is of interest that the basic requirements for military mapping does not change that much, merely the technological means of supplying it.

Mike Nolan had arranged a whole range of products to be available including mapping for the short expeditionary foray of the Royal Navy and British Army post the First World War in support of the White Russians in Murmansk and Archangel in order to *'strangle at birth the Bolshevik movement'*. The small survey party from 19 Field Survey Company arrived with minimal equipment and consumables which explains why many of the products were so fragile having been printed on newsprint!

The finale of the visit was to have General Roy's map of Scotland laid out for viewing, a truly remarkable and unique product, definitely no touching! It is of interest that this will be produced in a bound facsimile edition in time for Christmas.

All in all this was a fascinating visit and much to be recommended. Through the good offices of Yo Hodson we gained an insight into the treasures held by the British Library the like of which the general public seldom experience.

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DSA 80th Anniversary Seminar "Maps and Survey 2007"

2 June 2007

By Robert Dobbie

The second of June was a beautiful day to take out from ones usual routine and join about 100 friends for the DSA's 80th Anniversay Seminar at, what is now titled, the Headquarters of the Joint Aeronautical & Geospatial Organisation (HQ JAGO) at Hermitage – a modern cantonement set close to the roar of the M4 motorway. For me the place will always be 'The SMS' – that collection of wartime huts and linking corridors that many of us remember with affection, set next to a lovely cricket ground with the sound of cawing rooks in the tops of the tall trees!

Brig Peter Walker OBE, Chairman of DSA welcomed us and John Knight introduced the speakers.

Three Centuries of Geographic Support to the British Army. Dr Yolande Hodson FSA, FBCartS

This was a fascinating talk as military mapping was put into its historical context alongside many technological developments. We flew along a three-century time line touching down at important moments picking up key 'Maps and Chaps' along the way. Yo started at 1661 when England first set up the standing army which has served the nation to the present day. Defence of the realm was the responsibility of the Royal Navy with the standing army providing expeditionary forces in support of English foreign policy. Yo pointed out that requirements and objectives have changed very little so it is the technical developments that have led us to the sort of instant provision of geographical information in support of today's military operations.

1680 saw the appointment of a Chief Engineer collecting plans of fortifications in the Tower of London Drawing Room. This was the geographical data and statistics from which maps could be created. Insurgency in the Scottish Highlands led to the Military Survey production of 1:36,000 scale mapping, from which the Ordnance Survey sprang with its remit to produce maps of Britain for defence against invasion. The Napoleonic Wars (1790-1815) brought in several new technical strands including the beginning of map printing using lithography. In the Crimea War, Russian maps were bought in and printed with additional information. The Boer War saw the introduction of coloured maps and the First World War saw early experiments with air survey. An explosion of

The presenters: Back row: Richard Perry, Peter Collier, Pat Fryer, John Peaty
Front row: Stephen Young, Alan Gordon, Yolande Hodson, Liz Manterfield

technical developments followed the Second World War and the introduction of electronic equipment and computers which continues apace.

Yo illustrated her presentation with many beautiful maps and pictures of the great chaps who had championed developments and insured the success of new technical development. These were all exceptional men of vision. The sad thing is that lessons learned from one campaign were seldom remembered for very long!

A Study in Innovation. The Battlefield Laboratory - Acoustic Weapon Locating in the Great War

Lieutenant Colonel (Retd) Stephen Young (Selex Sensors and Airborne Systems)

This provided useful scene setting and good background about the uncomfortable relationship between soldier and scientist. Both Germany and France had worked on the concept of sound ranging stations. Britain eventually took up the cause led by Major Winterbottom who in 1915 purchased an experimental set of scientific instruments. A Lieutenant W. L. Bragg RE (later Professor Sir Lawrence Bragg CH OBE MC FRS and President of the FSA from 1949-1973) was the father of British sound ranging as the team identified and solved the various problems of finding suitable instruments, the best layout patterns and positions for microphones, the effects of extraneous noise over the microphones, meteorological effects etc as well as the mathematics of calculating the positions from which shock waves and reports emanated. Their early success was to be able to detect artillery targets at 20,000 yards. The sad thing was that most of the lessons learned were forgotten by 1939 and had to be relearnt, particularly the need for colaboration between the military and scientific communities, the need for reliable equipment and interpersonal trust.

Military Geographic Support in Afghanistan 2006-2007

Lieutenant Colonel Pat Fryer RE, Chief Geographic Officer, Kabul.

Pat had only just returned from a long tour in Kabul. He spoke about the view of geographic support as seen from Kabul with its international flavour rather than what goes on in the field. He showed some fascinating material of Afghanistan with pictures that demonstrated the diverse range of rugged terrain, including the Hindu Kush, and its many peoples with the resulting cultural differences and problems. Afghanistan has key trading routes North to South and East to West and a great ring route of very variable quality.

He explained the many challenges because of the wide scope of the operations which covered more than just battle winning and the different approaches of contributing nations to mapping requirements all of which make it important to establish and maintain coherent geographic support for the theatre. He spoke of Afghanistan's economic instability, poverty, weak government and the insurgency. There is also the problem of dealing with a 2,430 km 'porous' border with Pakistan. Efforts were directed at extending the authority of the government so that international agencies and Non-Governmental Organisations (NGOs) could operate in gradually expanding areas. As always, geo soldiers were showing great flexibility and had built a Map Depot for 500,000 maps and managed distribution in a land which has no postal service. They had also found new ways of displaying financial information in GIS format.

The list of lessons learned and issues faced have a familiar ring to all the lists from all the previous campaigns. One hopes that we will learn the biggest lesson – that of remembering past lessons for the future!

Mapping for the Third Battle of Gaza 1917

Dr Peter Collier, Portsmouth University

This was a careful study of the maps interestingly presented. Peter presented a picture contrasting old and new technologies, including the last cavalry charge in a campaign which was decisive by World War 1 standards. There was novel use of aerial photographs for topographic mapping, radio interception with some turkish messages being read by the British before they reached their intended recipients, sound ranging and production of daily situation/position maps.

The existing mapping was not rigorous and of low quality based on the Symonds survey of 1841, Palestine Exploration Fund (PEF) maps of Jerusalem 1850-60, West Palestine 1870 and the 1914

Survey of Sinai. Uncontrolled mosaics were produced at 1:15,000 with regular mapping at 1:20K, 1:40K and 1:10K as per the Western Front standard maps. Printing was done locally and in UK. Peter said that the planimetry was good but the relief less well portrayed. He considered that the 1:40K mapping was more than adequate even though General Wavel had complained that the, "lack of accurate maps was much felt during the 3rd Battle of Gaza." It was interesting to note that the Germans were using PEF mapping enlarged to 1:50K.

Peter's conclusions were that the British had the best available mapping of either army which gave them an advantage; that it was adequate for artillery work; that the combination of air photographs and sound ranging allowed accurate weapon location; but that the position maps did not seem to help because the battle moved so fast that they were not as up to date as was necessary.

Military Survey's Cavemen
512 (Army) Field Survey Company RE 1939 – 1947

Major (Retd) Alan Gordon

This was a great tale of what was achieved under the tough conditions in the desert and caves of Tura. 512 Company was formed in 1939 and in due course made the journey across the Channel by ferry, then train across France and finally by boat to Egypt. In June 1940, the British army withdrew from Dunkirk, France fell and Italy entered the war. Units in Egypt felt very isolated. But soldiers, cut off from their home base did what soldiers do: they got on with their jobs as best they could using whatever equipment and materials were to hand. 512 lived in a camp in the desert and field survey continued with plane tabling etc. Map production was moved up into the enormous caves which had to be cleared and power supplies installed and the roof reinforced with supporting pillars. The unit's work included printing of standard topographic and going maps, air charts as well as false documents. Paralax bars were used with slotted templates and oblique photographs. They also had the interesting task of producing fake going maps to be captured by the Germans. Areas of 'Fair going' were marked as 'Cut up/soft/generally impassable' and areas of 'Firm gravel' were listed as 'Flat stony'. Whether the real and fake maps were mixed up is a question much discussed even today by those who had to use them! The caves were cool but infested with fleas and the rock groaned in an alarming manner; too much noise and vibration did tend to cause stones to fall from above. The soldiers preferred to live in the heat of the desert rather than the caves. It was from this unit that 42 Survey Engineer Regiment was formed which eventually moved to the Canal Zone, then to Zyyi Camp in Cyprus and back to Barton Stacey then finally to Hermitage to join up with the School of Military Survey.

Mapping for the Falkland Island War 1982

Dr John Peaty & Ms Liz Manterfield

This was the tale of the crisis that broke in 1982 on the Easter weekend when staff at the Mapping & Charting Establishment RE were dispersing for the holiday to catch up with end of leave year entitlements. Many thought that it was just an April Fool! At the start there were no maps, no plans, no reserves and no catalogue. Decisions being made at top level created an enormous demand for geographic products and information wanted no later than 'yesterday'.

Source material was gathered from DOS (ungridded!) and Universities. Like all good battle zones the Falklands fall across two Grid Zones and four Joint Operation Graphics sheets. The mapping plan was put together very quickly with production running in parallel. Because of the haste in which work was done there were various problems with Grid Zone errors and some positional errors etc which had to be corrected on-the-fly. Enormous amount of work was achieved to extremely tight time scales. Special mapping at 1:12,250 was required for the final assault on Stanley, for the bombing of the main runway as well as briefing maps and 410 products were produced for Special Forces.

This presentation really brought back memories to those of us who were involved at Feltham – the 'buzz' was fantastic. My own memory is of the Director of MCE, Denis Rushworth, patrolling around his Technical Control, the drawing offices and print shop ordering exhausted staff home and instructing them not to return for at least 8 hours.

HALO – Sound Ranging's Present-day Equivalent

Major Richard Perry RA, HQ DRA

Richard presented us with an excellent description of HALO 1 and its development into HALO 2 which is probably the best ranging system in the World today. HALO 1 was used operationally in Op TELIC and combined a digital processing system with three microphones, met sensors, batteries, radios and antenna. It was able to detect 155mm Iraqi guns capable of delivering chemical weapons at ranges of 54 kms.

Richard then brought us right up to the minute about the situation faced by our soldiers in Basra showing us screen prints of the system working at the Basra Palace spotting mortars, 107 mm rockets and Chinese Rockets as they fired into the British compound. Some quick response techniques were developed with counter strikes, and aircraft loitering overhead ready to drop precision munitions on insurgents positions etc. However it was not always possible to respond if civilians might be killed. Some successes were achieved as insurgents were killed and their weapons captured before they could escape. The audience felt right there as we focussed on actual screen shots of the HALO system as it located weapon positions being used by the insurgents. We all listened in concentrated silence.

Final Discussion and Concluding Remarks

Major General Patrick Fagan CB MBE, President of DSA

General Fagan summarised an excellent day which had included an enormous number of presentations. He thanked the people who had prepared such excellent presentations and those who had done the work to arrange a most memorable day.

From my viewpoint it would have been good to have had more time for questions and discussion. Of course we all enjoyed meeting friends and doing what old soldiers like to do – chat and swap tales over food and drink. I conclude with a comment made by Brig Fraser Scott who pointed out that for obvious security reasons trench maps used at the front in WWI only included detail of enemy trenches. His father had said, "If you wanted maps of your own lines, you had to get them from the enemy!"

New Members

Mark Kieras QCB. Mark joined the Army in November 1989 as a junior soldier and by 1997 had qualified as a Field Surveyor Class 1, gaining an HND in Surveying. During this period he carried out numerous field survey tasks throughout the UK, Bosnia, Cyprus, Norway, Oman, Northern Ireland, Senegal, Guinea-Bissau and Brunei. Three years at the Permanent Joint Headquarters followed where he was extensively involved in the Geographic Support to every major operation then to Hermitage where a tour in the Special Support Team (SST), 42 Engineer Regiment (Geographic) preceded a move to the RSMS, first in the Headquarters and now as an instructor.

David Watt. Having completed a postgraduate diploma in cartography at Glasgow University in 1985, David joined the Mapping & Charting Establishment in 1986 and become a Map Research Officer in the following year. His professional duties have included operational research in support of MOD activities, map librarianship and geospatial data collection over UK, Ireland and Eastern Europe. David has particular interest in 20th century UK cartography, fabric maps, relief models and Soviet mapping of the UK. In 1991 he became a fellow of the Royal Geographical Society. He is a Chartered Geographer (GIS) and on the Council of the British Cartographic Society.

Gerry Zierler. Gerry's career has been in media and film production. However his passion since a schoolboy has been maps. He is an avid collector and member of the British Cartographic Society and the Charles Close Society. He is also a fellow of the Royal Geographical Society.

Geo People

Captain R G Stewart BSc (Hons) Royal Navy
Captain Hydrography & Meteorology, Hydrographer of The Navy

Bob Stewart was born in 1958 and educated at Sutton Valence in Kent. From school he entered London University to study archaeology. Whilst at the Institute of Archaeology he founded the University's Underwater Research Group and worked on submerged historical sites around the UK and in the Mediterranean. After qualifying as a commercial diver he spent a very rewarding two years with the Mary Rose Trust surveying and excavating the wreck of Henry VIII's warship from the Solent. Harbouring a strong desire to develop his marine surveying skills, in 1980 he joined the Royal Navy as a Hydrographer.

From initial training he was appointed to *HMS Hydra*, which immediately deployed south during the Falklands War. Completing his training at the RN Hydrographic School, he returned to *Hydra* as Navigating Officer and then onto a series of appointments in HM Ships *Hydra, Bulldog, Hecate* and *Endurance*. Over this time he conducted military surveys in many diverse areas of the globe; from the inshore waters of the UK, to the coasts of Africa, South America, the Middle East and finally Antarctica. His most enjoyable challenge of the period was in charge of a detached boat camp in the wilds of the Falkland Islands.

Leaving the southern oceans behind, in 1988 he successfully completed the long hydrographic course and was appointed to *HMS Roebuck* as Operations Officer. Out of the Hydrographic branch he then saw appointments in the Dartmouth Training Squadron (HM Ships *Ariadne, Bristol* and *Fearless*) and as Staff Navigation Officer to the Commodore Minor War Vessels. In 1994 he took command of the Mine Countermeasures Vessel, *HMS Berkeley*, and over the next two busy years was involved in several major exercises and deployments as part of the Navy's on call mine-hunting force.

A short period ashore, to complete the Staff Course at the Royal Naval College Greenwich, was followed by command of the Coastal Survey Vessel, *HMS Roebuck*, and promotion to Commander in 1998. During this time the ship was at the forefront of the development of the Rapid Environmental Assessment concept and the integration of hydrographic surveying as a core front line operation for UK maritime forces.

For the last 8 years he has been in the Ministry of Defence in both single service and joint directorates. First within the Directorate of Naval Surveying Oceanography and Meteorology, then the Directorate of Equipment Plan in the Equipment Capability area, where he completed his appointment as the Assistant Director. Most recently, within Defence Intelligence, he has been responsible for the provision of maritime geospatial intelligence and meteorological products and services to Defence from the United Kingdom Hydrographic and Meteorological Offices. Whilst in London he commenced an MSc in Geographic Information Science at University College London and is continuing his studies as a part time student.

Married to Michele, they have one daughter and live in Biggin Hill, Kent.

Geoff Twentyman
Geospatial Intelligence Capability Advisor
Defence Science and Technology Laboratory

Geoff Twentyman has 19 years experience in Geospatial Intelligence domain. Having graduated from the Department of Geomatics at the University of Newcastle upon Tyne in 1991 with a BSc in Surveying Science, he embarked on his civilian career within the UK Ministry of Defence.

Geoff began his career in Geodesy Division of the Mapping and Charting Establishment RE (now Defence Geographic Centre) at Feltham undertaking geodetic transformations and providing advice to the broader MOD community as well as adapting and developing geodetic software running on old Hewlett Packard computers to enable compatibility with early 286 and 386 PCs.

In 1994 he transferred to undertaking aerial triangulation in Richmond Building. This involved the development of production procedures to enable the reliable and accurate triangulation of imagery that was used as the basis of map production.

In January 1996, Geoff transferred to the Joint Air Reconnaissance Intelligence Centre (JARIC) at RAF Brampton and became the Photogrammetric and Geodetic Advisor. This took forward many of the aspects of his previous roles and he provided advice for many of the bespoke operational imagery intelligence products that come from JARIC. In particular he introduced and developed training for the Ruler system, that allowed mensuration from imagery and the procurement and development of close-range photogrammetry production systems to support CAD modelling of military equipment.

Since 2001, Geoff has worked within MOD Research and Development at the Defence Science and Technology Laboratory (Dstl), initially at Malvern in Worcestershire but for the last year at Porton Down in Wiltshire. His role for the past few years has been Capability Advisor for Geospatial Intelligence (GEOINT). This role involves supporting the planning, management and future strategy of the UK Defence GEOINT research programme. GEOINT incorporates Geographic, Hydrographic, Oceanographic and Meteorological Information and the intelligence that can be derived from the analysis and exploitation of this information. This research programme has grown significantly over the past few years to the order of £5-10M, due to the growing recognition of GEOINT as a key underpinning Defence capability. Geoff works closely with the Directorate of Equipment Capability for Intelligence, Surveillance, Target Acquisition and Reconnaissance (DEC(ISTAR)), the Research Acquisition Organisation (RAO) and Defence Equipment and Support (DE&S), as well as GEOINT specialists throughout Defence to develop a coherent and exploitable research programme that is in line with user needs and fits in to broader Defence strategy. Current key research programmes include the development of an Integrated Reference Architecture and Service Model for GEOINT, the development of standardised geospatial software for UK Defence and the development of LiDAR to support 3D Urban Mapping.

Lieutenant Ian Austin MBE Royal Navy (Retired)
HM Training Developer

Ian Austin was born in Govan, Glasgow, in 1946. He joined the Royal Navy in 1961 and, following initial training at *HMS Ganges* and *HMS Dryad*, he served in HM Ships *Aisne* and *Tiger* as a Radar Plotter. In 1965 he was drafted to his first survey ship, *HMS Vidal* and, attracted to life and work in the hydrographic service, he then changed branches to the Surveying Recorder specialisation. As a Surveying Recorder he served in all classes of HM surveying ships, including *Echo, Hecla, Bulldog, Herald* and *Hydra*, surveying in UK waters, the Mediterranean, the West Indies, Africa, the Indian Ocean and the Persian Gulf. Sea appointments were interspersed with jobs ashore as the Port Surveyor at Rosyth and instructional duties at the Hydrographic School, *HMS Drake*. In 1984 he was promoted to Fleet Chief Petty Officer (later renamed Warrant officer) Surveyor, and served ashore on the staff of the Captain Hydrographic Surveying Squadron and at sea in Naval Party 1008.

In 1990 Ian joined the officer corps when he was commissioned on the Temporary Special Duties Officers List and advanced to Hydrographic Surveyor First Class. After staff course at the RNC Greenwich he was appointed to the Hydrographic School where he was involved in the Warfare Branch Development as it affected the Surveying Recorder branch. Two years later he was appointed as Executive Officer of Naval Party 1016, conducting routine surveys off the east coast of England. In 1994 Ian took up the North Sea High Commission post at the Hydrographic School, instructing the Officers Basic Hydrographic course and the Petty Officer Surveyors course. He returned to sea as the Operations Officer in *HMS Roebuck* in late 1996, transferring to *HMS Herald* in late 1997 and in the same year was awarded the Defence Surveyors' Association's Royal Navy Prize. He was advanced to Charge Hydrographic Surveyor on taking command of Naval Party 1016 in March 1999. He was appointed an MBE on leaving the Royal Navy in 2001.

Ian continued life as a hydrographer after leaving the Royal Navy, firstly as a Party Chief with Gardline Surveys Ltd, then later at the UK Hydrographic Office. In October 2003 he moved to his present job, working for Flagship Training Ltd in *HMS Drake* at the Hydrographic and Meteorological Training Group, where he is involved in developing training for the HM specialisation.

Ian and his wife Pat live in Plymouth, they have one grown up son. He devotes most of his spare time to his family, keeping fit and the demands of home and garden maintenance. He is an active member of the Survey Ships Association.

Mapping for the Falklands

By Mrs Liz Manterfield and Dr John Peaty, Defence Geographic Centre

Introduction

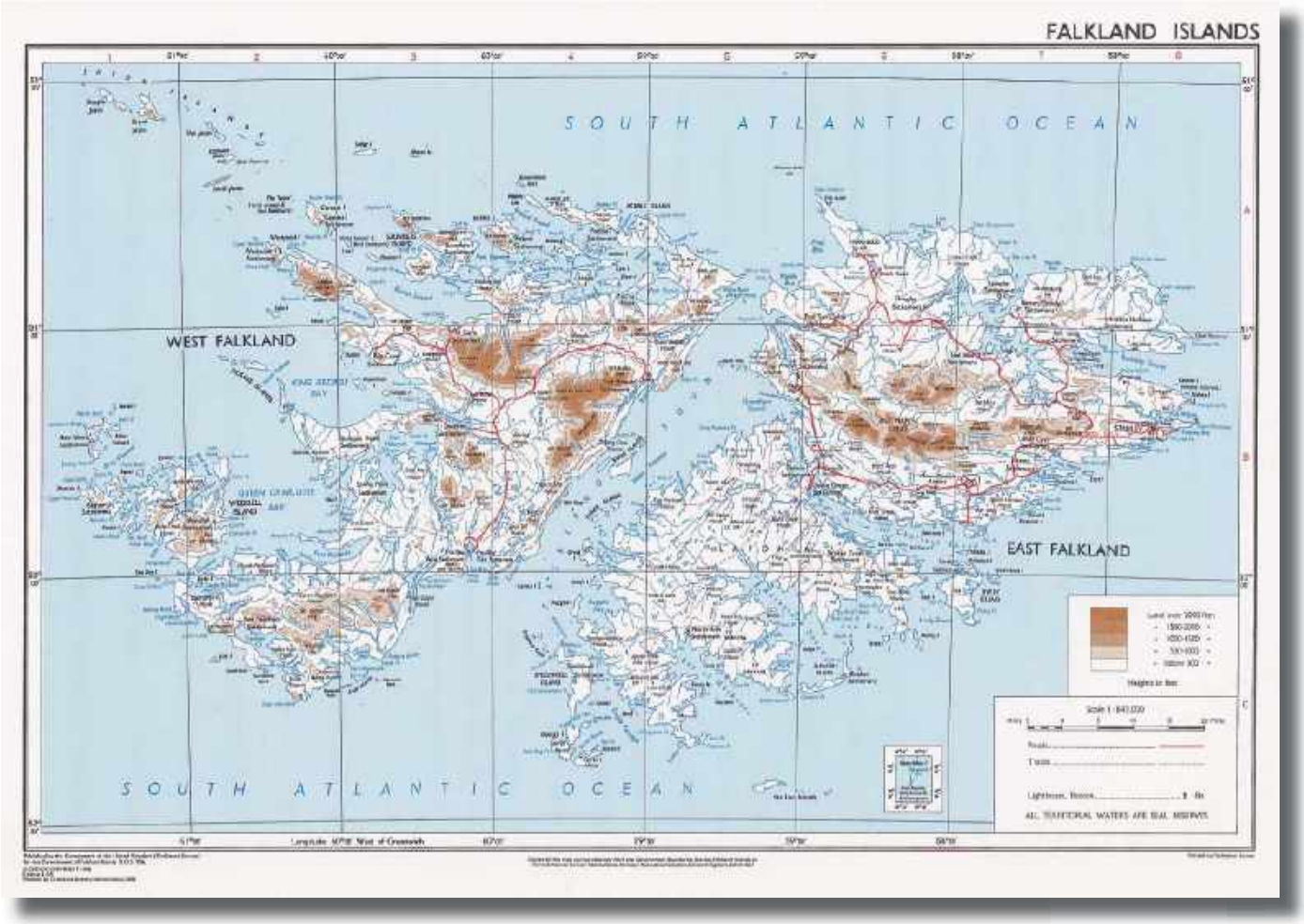
April 1st is a risky day for the gullible in Britain, where hoaxes are a national sport. In 1977 thousands were fooled when the Guardian announced the existence of Sans Serriffe, a pair of islands in the Indian Ocean, shaped like a semi colon and named Caissa Superiore and Caissa Inferiore. The normally sober MOD has been known to join in, with a proposal to reduce costs by replacing Regimental goats with rabbits.

Even Military Survey succumbed one year with a tasking for Exercise Nifty Ski that involved digitising all the contours on Swiss mapping to an impossibly tight time frame. Hence, when the Military Survey duty officer received a call in the early hours of 1 April1982 to say that Britain was going to send a Task Force to evict the Argentinean scrap metal dealers that had landed illegally on South Georgia, his first reaction was one of scepticism. Fortunately he investigated, for the attack by Argentinean amphibious forces on 2 April confirmed that this was no joke and Military Survey was thrown into a period of sustained geographic support.

This article describes the maps that were available at the time of the invasion and then details the products that were provided to support the Task Force and its reclamation of the islands. The authors are greatly indebted to Lieutenant Colonel John Himbury who wrote detailed accounts from the geographic perspective which together with his article in the Royal Engineers Journal (republished in the previous issue of Ranger), form the basis of this article.

Background

Responsibility for providing land maps, aeronautical charts and geographic services to the Armed Forces in 1982 was vested in the MOD's Directorate of Military Survey. The headquarters was



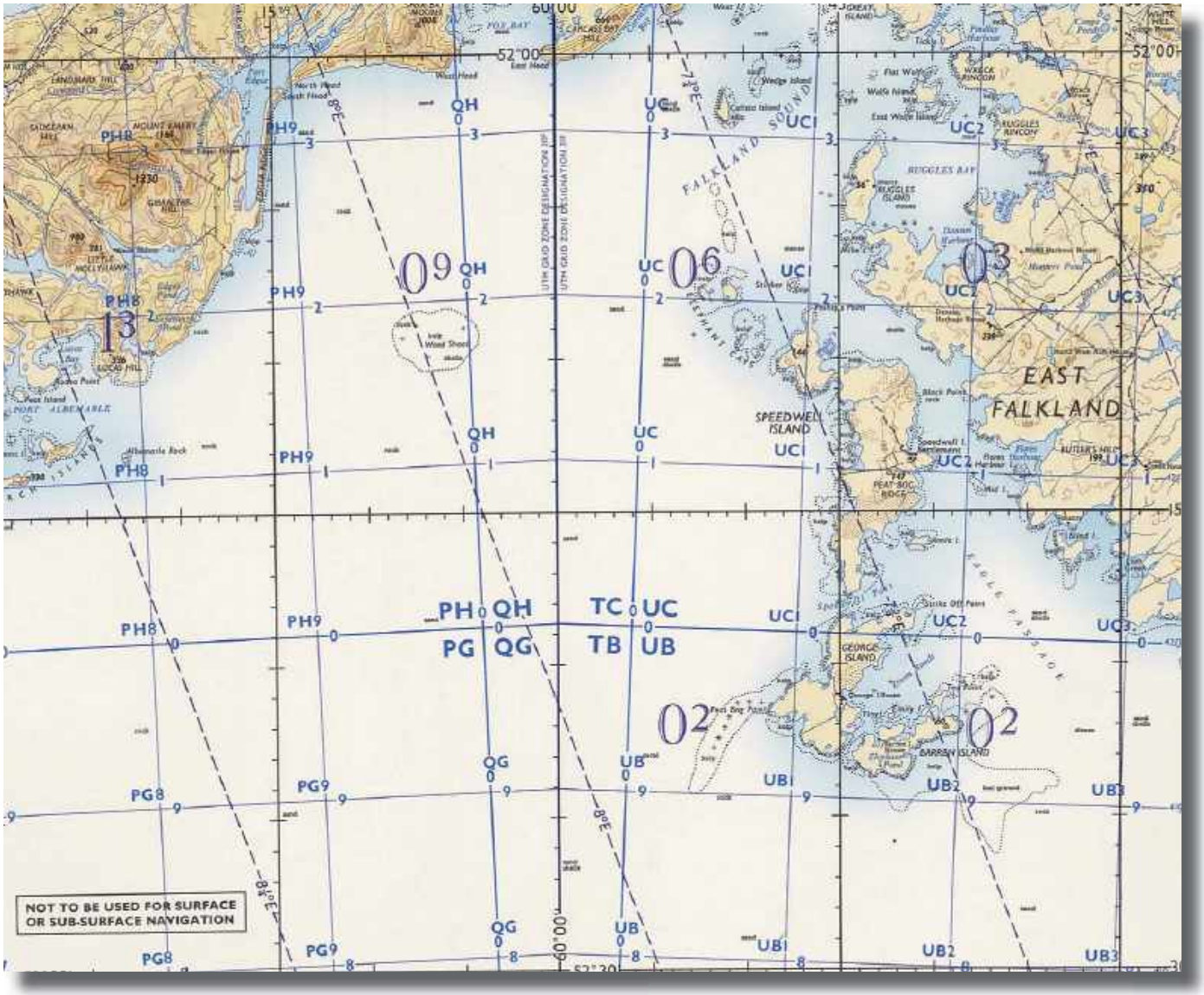
DOS 906 – the most useful general map at the start of the operation.

JOG cover of the Islands.

based at Feltham, alongside the production capability, the Mapping and Charting Establishment (MCE (RE)). The Map Library, a worldwide collection of maps and charts, was 11 miles away at Tolworth whilst 8 Map and Chart Depot RE at Guildford stored bulk stocks of mapping. The uniformed element of Military Survey, 42 Survey Engineer Regiment (which included the War Reserve Map Depot) was based at Barton Stacey and was able to provide additional production and printing resources, as well as survey and map supply detachments. Although not strictly correct, unless it is important to distinguish which part of the organisation had a key role, for the sake of simplicity this article refers to all the elements as 'Military Survey'.

Mapping in Existence at start of Operation CORPORATE

Military Survey had not planned for an invasion of the Falkland Islands by Argentina. It was a low priority area in terms of requirements and allocation of survey and map production resources had been minimal. There were no contingency plans stating the coverage and scales of maps required for the area, no maps in the War Reserve Depot, and no medium or large scale **military** maps. Even the Library, usually regarded as MOD's insurance policy for mapping, had a limited collection of maps of South America and the Falkland Islands and was considering relocating them to an off-site store so that the space could be utilised for mapping of more active areas.



The grid zone junction shown on the JOG series

DOS 1:50,000 series reproduced by Military Survey as series H791

During the Second World War there had been a Garrison on the Islands which had included Royal Engineers and, for a short time, a Topographic Section from 14 Field Survey Company RE. They established the Sapper Hill 1943 datum and produced some maps at 1:25,000 scale. An article on this task features elsewhere in the issue of Ranger.

At the start of any incident, the first request is for a general map of the country to establish its location and principal points. All that was available for the Falkland Islands was the Operational Navigation Chart at a scale of 1:1 million produced by the Americans in 1965. At this scale the Islands covered less than 2% of the sheet and showed little detail. The Directorate of Overseas Surveys (DOS) had produced a larger scale product at 1:643 000, DOS 906 in 1966 which was a more manageable size and showed more detail.

At the planning scale, Military Survey had produced a 1:250,000 Joint Operations Graphic as part of a joint production programme with America. Field Marshal Lord Slim famously said that in his experience every battle took place at the junction of map sheets. Well, the Falklands, despite their small size, were at the junction of 4 sheets and to complicate matters further - 2 grid zones! The islands fell across longitude 60W which was the junction of two zones of the Universal Transverse Mercator (UTM) grid referencing system. The significance of the grid junction is that a single location could have two different grid references depending on the grid zone being used. DOS had also produced a two sheet series at 1:250,000 in 1964-65 and revised in 1977 but the 1971 JOG with its standard specification and grid was preferred for military use.

There were two series of civil maps at larger scales. The 1:50,000 DOS 453 maps had been produced by the DOS as part of their responsibility to the Ministry of Overseas Development. This series was in 29 sheets and produced in 1961-2, based on 1956 aerial photography. Most sheets were ¼ degree by ½ degree in size though 7 were larger and would not fit onto NATO size printing presses. Although the information on the maps was 20 years old, there had been little development on the

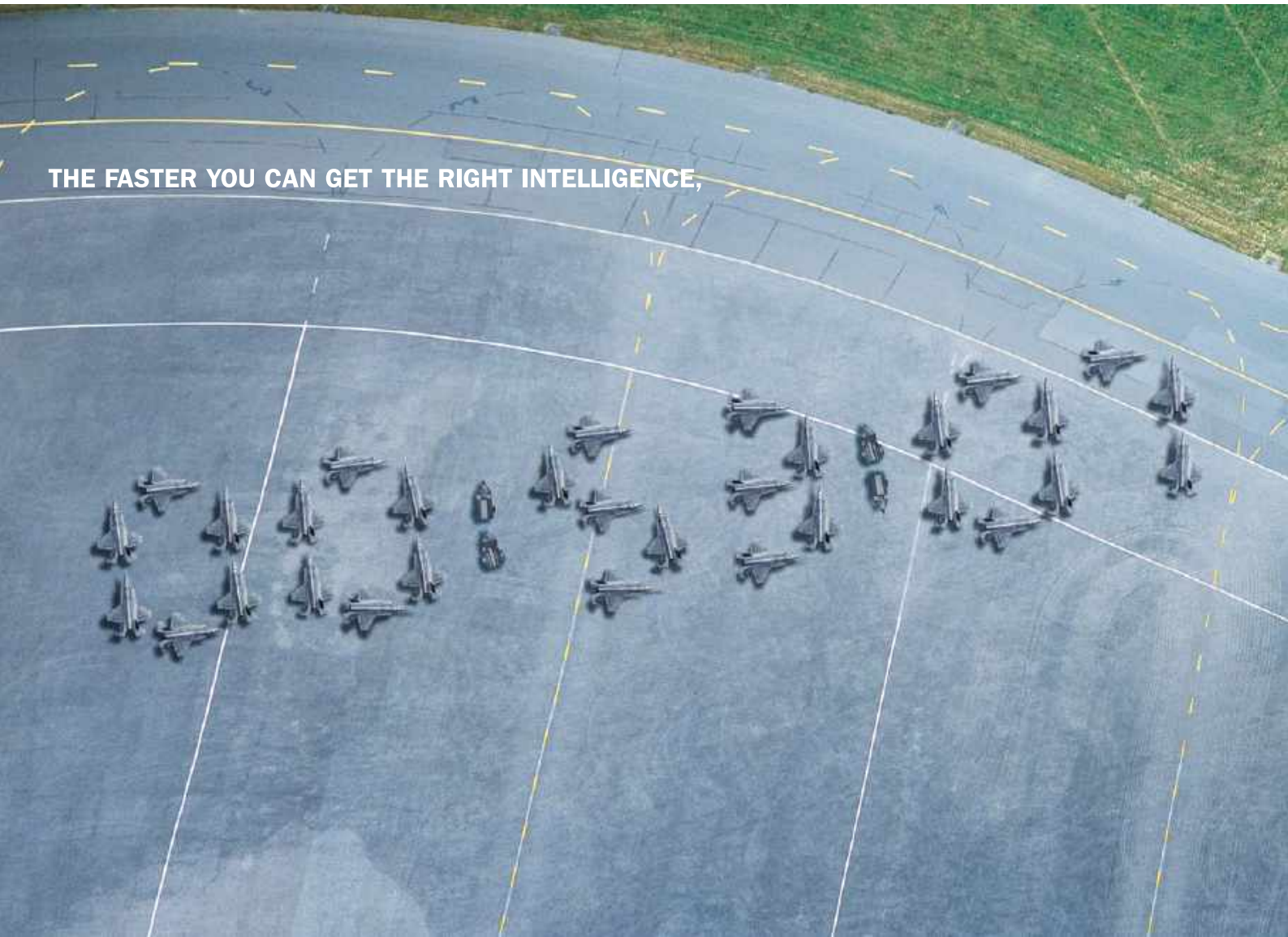
islands so they were still reasonably accurate. In 1979 a second edition of sheets 14 and 15 had been produced, the latter to show Stanley airfield. The series had been constructed on the Transverse Mercator projection and only had grid ticks in the neatlines of the map. DOS had extended the grid zone right across the islands to avoid the inconvenience of the grid junction mentioned earlier. This created the nightmare scenario of using two map series -1:50,000 and JOGs - across the same area with different grid zones and therefore different grid references.

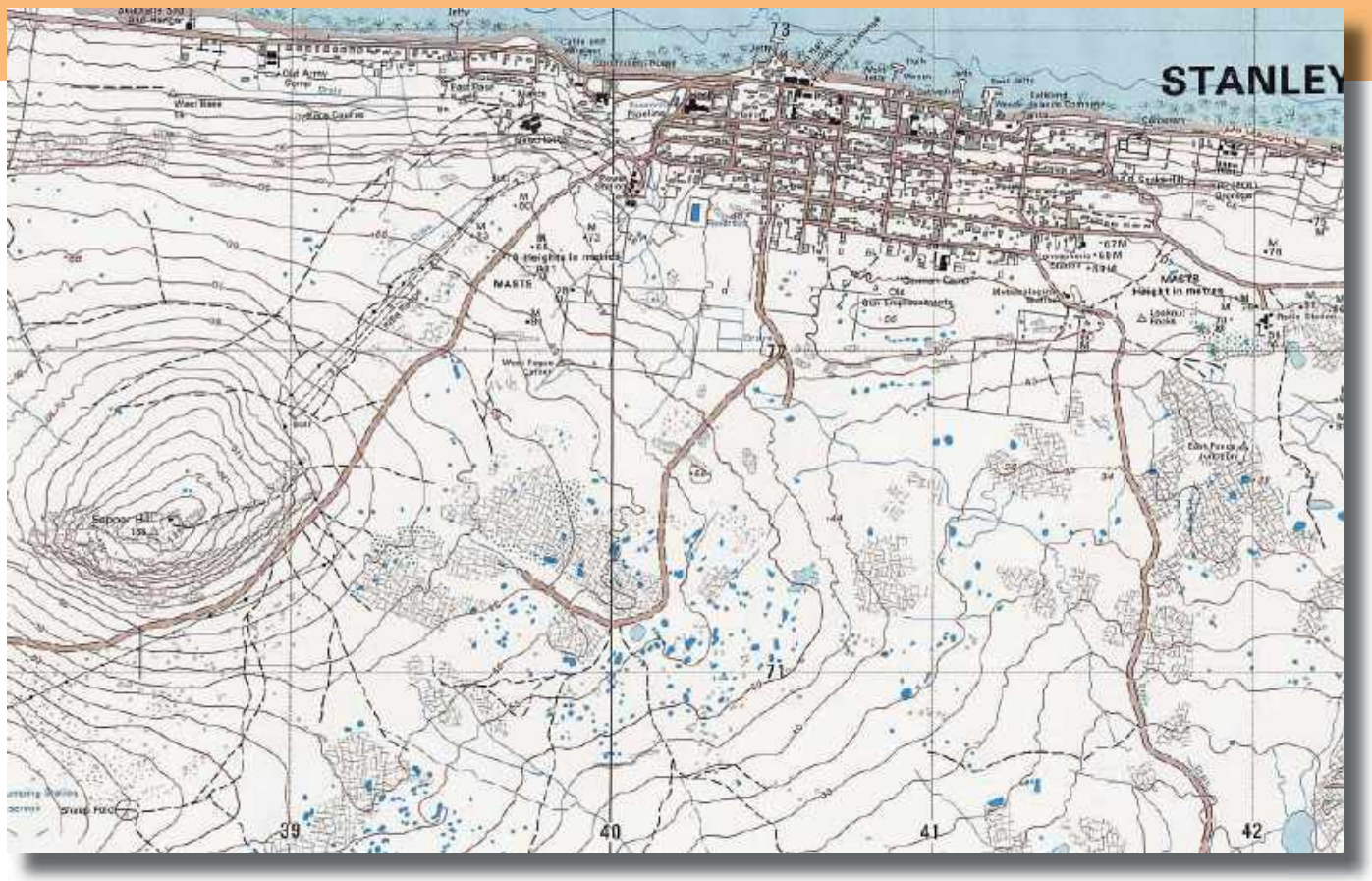
The other large scale series consisted of two sheets at 1:2,500 over Stanley, also produced by DOS in 1966. It lacked contours and only covered a small area.

Nautical charts were also required and these suffered similar problems with some of the bathymetry on the smaller scale charts dating back to Capt Cook's survey. Fortunately Brigadier Julian Thompson's HQ possessed detailed knowledge of the coastline of the Falklands in the person of Major Euan Southby-Taylour, who was specially attached. A keen single-handed yachtsman and distinguished artist, he had served in the Falklands for a year spending most of his time doing detailed beach and coastal surveys and charting every creek, inlet and bay (all 10,000 of them). He had written a manuscript which in December 1981 he had sent to various publishing houses. Sadly, as there were no yachts or inshore fishing boats in the area, there appeared to be no market for the book and it had been returned with regrets. Fourteen weeks later the MOD impounded the manuscript and classified it "Top Secret"! Southby-Taylour's manuscript and memory proved important planning tools for the retaking of the Islands.

The Crisis

The crisis occurred in a "normal" week for Military Survey. 3 out of the 5 officers in headquarters were in Brussels for a NATO meeting, with another international meeting scheduled for the following week. The majority of production managers in both MCE and 42 Regiment were at a meeting with Ordnance Survey in Southampton and many other staff were on holiday. There used





GSGS 5456 1:12,500 compiled by DOS to a standard specification using plots provided by the Hydrographic Office and air photography by HMS Endurance.

to be an old joke that if you wanted to invade Britain, do it on a Bank Holiday because everywhere was shut and it was particularly unfortunate that Easter 1982 coincided with the end of the MOD leave year, which meant that staff were using up their leave.

Initial requests for mapping were satisfied with existing stock of the JOGs and civil mapping. Fortunately, in 1981 Military Survey had reprinted the DOS 1:50,000 series as a routine stock topping exercise so there were enough copies to meet the initial demand but, these were rapidly exhausted.

However the grid junction mentioned earlier along longitude 60W was a problem with the 1:50,000 series. The grid lines, on both axes, were not parallel across the zone boundary. The bulk of the Falklands falls to the east of 60W (in Zone 21) but about one-third falls to the west (Zone 20). To overcome the inconvenience of the grid junction, DOS had constructed all 29 sheets of the series with Zone 21 grid ticks, which provided incorrect references on the 10 western sheets (for example, on sheet 23 Malacara Valley was located at grid ref TC 5327 on Zone 21 but PH 6431 on Zone 20). Military Survey decided to reproduce the 1: 50,000 series as a military product, H791, with the grid shown in full. Urgent talks were held about the grid problem with HQ Commando Forces at Plymouth. It was agreed to show both grids on the western sheets using different colours. A prominent warning note would direct users to give references using the red numbers for Zone 20 and the purple for Zone 21. Unfortunately the two grids seriously impaired the legibility of the western sheets and later reports indicated that the forces did not use the dual gridded sheets because they were too cluttered.

This series was the most used in combat and it has been reported that the “yomp” from San Carlos to Stanley could be traced by the piles of maps discarded as the advance progressed successfully. In view of the strong winds that sweep the island this may be apocryphal.

On 7 April DOS notified Military Survey of an error on sheet 25. Some of the islands in the north west were misplaced by 6mm (about 300m on the ground). DOS had corrected their reproduction material but the set that Mil Svy held had not been changed. Reprinting the 1:50,000 sheets had perpetuated the error and some work was necessary to correct the position on this sheet and the 1:250,000 scale mapping that had been derived from it. It is lucky that Bird Island did not feature in the operations as four years after the conflict the island was discovered to be 700 metres from where it was supposed to be!

Since it was clear that Stanley would become the focus of attention, Military Survey overprinted the DOS 1:2,500 sheets with more recent information and a UTM grid to create series GSGS 5451. Since it was clear that maps of Stanley airport would be required, various plans, engineering drawings and diagrams were obtained from the Civil Aviation Authority and by the 6 April four sheets had been printed at 1:500 to 1:50,000 to supplement the meagre information held previously.

The Map Library

Requests were coming in for a wide variety of geographic products. One unforeseen difficulty was that the collection over this area was in a small number of map presses in the Library, and if somebody was using a drawer, those above and below could not be opened. A major refiling exercise had to be undertaken so that more than one person at a time could get access to the mapping. Much of the material needed didn't exist even as library copies and a major collection effort started. Staff were asked to contact universities and commercial companies who might have useful material and then despatched to collect it, an exercise not always without risk. Military Survey's library was on the opposite side of a busy dual carriageway to the DOS offices and during this period staff frequently risked life and limb running between the two offices. The risk was not only from the traffic. The Antarctic collection in DOS was managed by a formidable lady of the old school, who had several members of Military Survey quaking in their boots. On one occasion a young girl required to carry a particularly large and fragile sheet across the busy 'A' road was told: *"Be careful! I don't care about you but don't lose the map!"*

Rationalisation of Products

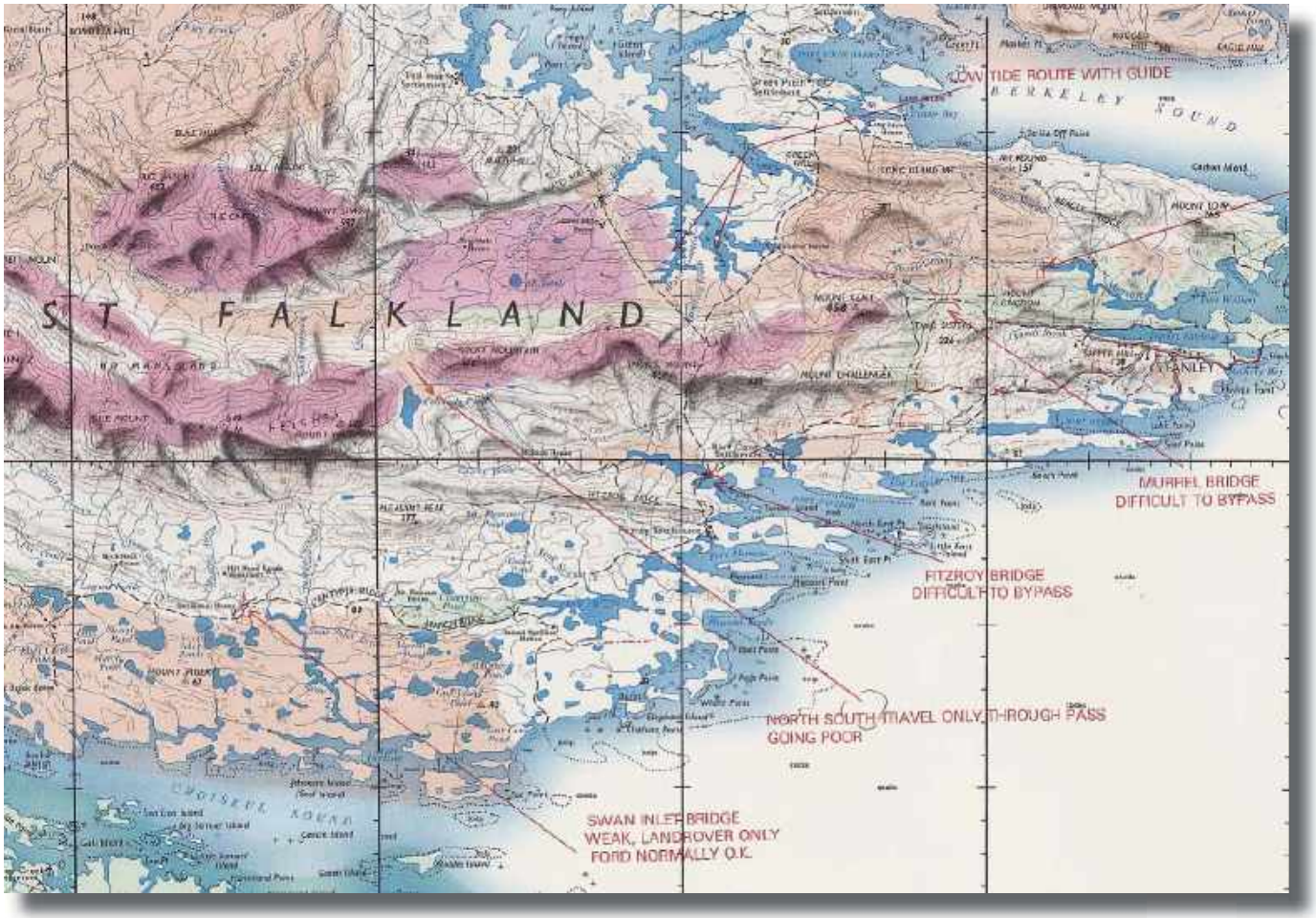
Towards the end of April it became necessary to rationalise the variety of products over Stanley and to ensure that a suitable map for planning the final assault was available. DOS was requested to compile a 1:12,500 map of Stanley to a standard specification using plots provided by the Hydrographic Office and additional air photography obtained between 1976 and 1982 by *HMS*

Endurance. Initially two sheets over Stanley were produced and then four more sheets further west were completed in May. The Hydrographic plots did not cover the whole area required and some of the 1:50,000 series was enlarged to fill in the gap. This led to a very apparent join of the two sources. This product reached units in time for the final assault and proved invaluable for subsequent explosive clearing work.

Trying to operate off four JOG sheets was very difficult so the sheets were joined to produce a single sheet over the area (GSGS 5455). This made for an impressively big map, beloved of senior officers. As Major Chris Keeble (acting CO of 2 Para) recalled :*"Brig Wilson arrived in my HQ carrying the biggest map I had ever seen, covered in large Chinagraph arrows. He outlined a plan…!"*

The map served as the base for creating an updated topographic map on which roads, tracks, bridges and installations identified from *HMS Endurance* helicopter photography could be printed in magenta. A second version was also produced with terrain assessments for cross country movement, based on information from the Royal Marines and Falkland Islanders. This became known as the RE Briefing Map and was one of the most useful and sought after products provided.

The need for scales larger than 1:50,000 was identified early on. Defence Intelligence wanted a 1:25,000 product for assessing the Argentinean deployment around Stanley. A new survey was impossible, so the 1:50,000 mapping was enlarged and reproduced on new sheet lines over the required areas and overprinted with updated information. CINCFLEET also liked the product and on the 27 April requested sheets over Fox Bay, Port Howard, Port San Carlos, Darwin/Goose Green - two days later Pebble Island was requested. This sheet had a dynamic history. A first edition was produced by enlarging the 1:50,000, then it was overprinted to include new information to produce edition 2. However, it was discovered that a peat cutting had been mistaken on the air photography as an airstrip. Users were warned by signal and edition 3 was produced to correct it. By this time,



The RE Briefing Map - one of the most useful and sought after products.

Mapping the Falklands' was first given as a presentation at the DSA's 80th Anniversary Seminar held at Hermitage on 2 June 2007.

further new information was available which was incorporated into Edition 4 issued on the 6 May. Fortunately this rapid succession of editions was unusual. By the end of Operation CORPORATE this series had been extended to cover most of north east Falklands between San Carlos, Darwin and Stanley. It is not standard cartographic practice to enlarge 1:50,000 to 1:25,000 but in this case the original had been produced at the larger scale.

A requirement for a 1:100,000 scale product was also identified. The 29 sheets of H791 were found to take up to much room in Operations Rooms, were difficult to join together and were not suitable for detailed planning. The JOG was too small for plotting on detail and did not carry a full 1km grid so 6-figure grid references could not be identified immediately. The JOG was enlarged to make a five sheet 1:100,000 series, GSGS 5460, omitting the hill shading to save time, adding a warning note to alert users to the possible lack of accuracy and overprinting it with updated information. The resulting product was not pretty but met the requirement exactly.

For the first time in an operation, computer graphics were used to assist in topographic assessments. They were needed to support radar location and radio wave propagation studies. Digital Terrain Elevation Data was created based on the 1:250,000 contours and was used in the Vulcan cockpit during Operation BLACK BUCK, the bombing of Stanley airfield. In addition the terrain model around Stanley was later refined using the new contours from the 1:12,500 maps. Computer Terrain Views were also produced showing the ground shape as seen from any selected viewpoint.

A rendezvous point was required for regrouping and replenishing the first wave of the Task Force. Ascension Island was selected as having adequate anchorages and communication facilities. DOS had published a 1:25,000 map of the island which had been adopted for military use. A senior Warrant Officer, Duncan Jacobs, was recalled from his honeymoon and despatched to Ascension to manage the withdrawal of superseded maps from stock and replace them with the latest editions.

Other Products

On 7 April it was confirmed that artillery units would be included in the Task Force, so trig lists for Falklands and South Georgia were produced. A 1:100,000 series was also produced over South Georgia.

In order to keep commands, formations and units up to date on the availability of geographic products a special Op CORPORATE map catalogue was compiled on the 23 April. Without Military Survey staff in the Task Force it was essential to disseminate information on the status of geographic products as widely as possible. The succession of new editions and the introduction of new products necessitated regular amendments to the catalogue and a second edition had to be produced in May.

There was also an urgent requirement for gazetteers of the Falklands and Argentina. In 1943 a Naming Committee had been established by the Governor to assist the Royal Engineers in their systematic survey of the Islands. At the time of the Argentine invasion a gazetteer of almost 3,000 place names compiled from DOS 453 maps and published by British Antarctic Survey in 1972 was in use. In the week following the invasion Military Survey hurriedly produced an updated gazetteer (GSGS 5442) with over 3,000 entries for the Falklands (including variants) and 830 for South Georgia and the South Sandwich Islands. Sources used were the 453 series maps (including second editions of sheets 14 and 15 from 1979), Admiralty hydrographic charts, manuscript additions on the series 453 sheets made in the 60s and 70s by administrators in the Islands and Argentine 1:500,000 sheets from 1968 and 1974. Given the hurry with which it was produced, not surprisingly the gazetteer contained several deficiencies. A second edition, revised and expanded, was produced three weeks later on 28 April. Unnecessary duplications were removed and coverage of the Dependencies expanded to over 1,000 entries.

The gazetteer contained variant names (mostly those found in Argentine sources) and these were cross-referenced to the main entries. This was crucial because the Argentineans had different names for over 200 major geographical features of the Islands and frequently these were not simple translations of the English name that could be easily deduced. For example, when the Argentines reported on 1 May that a Mirage had hit a destroyer near Puerta Enriqueta, the gazetteer told you that this was the Argentine version of Port Harriet. During the conflict the Argentines employed five different names for Stanley, settling on Puerto Argentina only on the 21 April. In early June the Plaza of the English in Buenos Aires was renamed the Plaza of the Air Force!

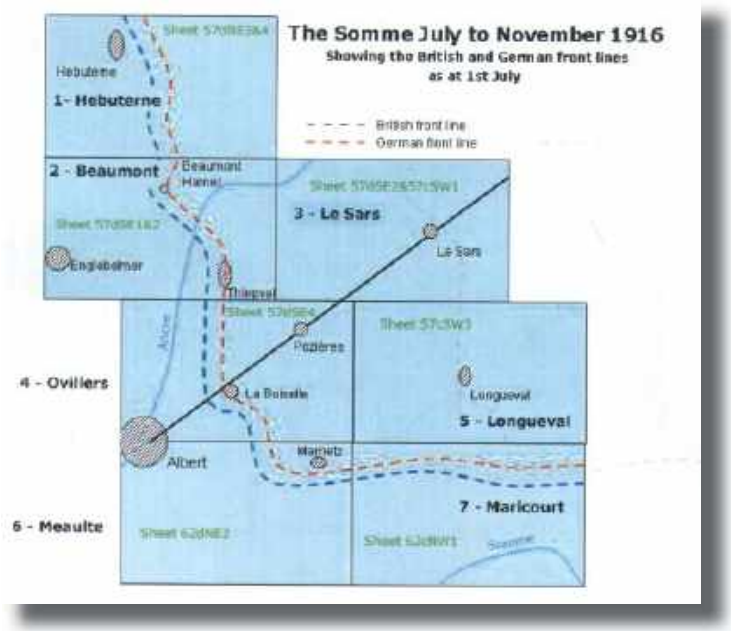
The Other Side Of The Hill: The Argentines

DOS maps of the Falklands were on public sale and carried a note *"Agents for the sale of this map are Edward Stanford 12/14 Longacre London"*, advice that the Argentineans followed, as they spent £2,000 buying up stocks of these maps from Stanfords prior to the invasion: apparently without anyone in Britain attaching any significance to the fact. They also captured DOS maps during the invasion and reprinted them in Argentina. On his surrender, the Argentine commander General Menendez had a DOS 1:50,000 map with him – ungridded. Clearly, the Argentineans did not use a ruler and a pencil to join up the grid ticks - which is precisely what the Commandos under Thompson did in the early days before the gridded versions reached them. Not only was mapping inferior on the Argentine side it was also scarce. One conscript afterwards lamented: *"I hadn't the slightest idea…where I was…As soon as they had landed they had had an idea of where they were, they knew which hill was which. I, on the other hand, had no idea…We didn't even have basic geography…. You want to see a map, at least to find out where you are"*.

Conclusion

The feedback on the mapping was that it was well received. However, the 50ft contour on the larger scale maps gave an over generalised impression of the ground - a 30ft cliff could be a serious hazard in the dark. Also the conventional sign for rock outcrops was not really well suited for depicting stone runs which formed important tactical features and obstructions to movement.

Op CORPORATE was very much a UK Defence operation. By its conclusion 410 different products had been made available over an area stretching from the Antarctic across the South American Mainland and back 3,300 miles to Ascension in case the operation should expand. Military Survey had supplied material to a range of customers from the Special Forces through to the BBC for reporting progress of the war. Throughout the operation the deadline for information seemed to be "NOW". In this article we have provided just a taster. The Falklands crisis highlighted areas in need of improvement, for example the physical separation of activities could cause delays and communication. It also reinforced the need for ready access to source material world-wide. It also demonstrated that Military Survey was capable of producing what was needed in an emergency. Enthusiasm, skill and diligence were matched by initiative, ingenuity and loyalty among all those involved. Civilian staff cheerfully gave up their Easter leave, weekends and even night's sleep to get the work done on time and - the local fish and chip shop did a roaring trade as runners were sent to bring in lunch and supper for staff!



Somme Commemorative Mapping

The Defence Geographic Centre reprinted 7 maps of the Somme area to commemorate the 90th anniversary of the First World War battle. Copies are £3 each or £20 for all seven sheets plus £2.50 postage and packing per order. Sheet numbers and names for this commemorative series are shown in **bold** on the cover diagram.

Cheques should be made payable to **The MOD Accounting Officer** and orders sent to:

Somme Commemorative Mapping
MOD Map and Air Chart Depot
Defence Geographic Centre
Elmwood Avenue
Feltham TW13 7AH

14 Field Survey Company RE In The Falkland Islands

By Mike Nolan

There are now few areas of conflict around the world where the British Army has not served before, the present cases of Iraq and Afghanistan being pertinent examples, and, where the army has campaigned military survey almost invariably has also been at work in one way or another either before, during or after operations. The 25th anniversary of the Falkland Islands War of 1982 brings to mind a small episode of military survey history which may not be well known even by the serving members of 14 Squadron, the unit which was involved.

Before the first World War Admiralty charts sufficed to meet the limited needs for maps of the islands but in April 1905 the Topographical Section of the General Staff (TSGS) produced Series TSGS 2029, itself based on an Admiralty chart, to illustrate the Defence Scheme. At that time defence schemes for most of the colonies were reviewed by the Committee for Imperial Defence on a periodic, sometimes annual, basis depending upon the importance of the Colony concerned and the TSGS produced the graphics used to illustrate the reports. These graphics commonly showed the arcs of fire of the various coastal defence batteries and often included a Table of Armaments. These graphics were often amended for each defence review even if only the arcs of fire and table of defence components was changed to reflect the updated batteries. TSGS 2029 was revised to February 1913 and again reprinted at the War Office. A new edition was produced in 1914 when the designation was changed to GSGS 2029. GSGS 2029 was routinely reprinted in 1933. With the advent of World War 2 it was again reprinted in 1941 and this must have been the only War Office map available for use in the islands. On this edition the admiralty hachures were supplemented by approximate form lines. In June 1943 an American Army Map Service edition of this map was produced.

Because it was thought advisable to ensure that no unfriendly power should establish bases in Antarctic waters, in April 1942, a force, including 727th General Construction Company R.E. under Major J.D. Beresford, was formed for service in the Falkland Islands. An advanced party of four officers and 180 other ranks of the company, embarked on the 19th of May, to be followed a month later by the rest of the unit and the other troops destined as the garrison of the islands. The advanced party worked on the inadequate maps of the islands, which were all that could be provided, and placed on them a 500 kilometre grid square to facilitate planning of the defences. This grid was of great value till, with the arrival of a small Survey Section, six months later, it was replaced by maps on the world grid. (Corps History Volume IX page 538).

With Japan the unfriendliest power at that time, it must have meant that the concern was about a possible, if unlikely, Japanese foray around the Cape. However, although Argentina was not unfriendly, the Corps History also records a visit to Deception Island by a reconnaissance party where the Argentinean flag was found flying together with a steel cylinder claiming Argentinean sovereignty to the island, both of which were removed.

A version of GSGS 2029 overdrawn in green with a one-inch grid survives in the Force war diary in the National Archives at Kew. On this example the hachured relief of the chart has been enhanced by form lines in blue ink and various hill feature and other names have been added in blue ink including Evans Ridge, Mt McCloughlin, O'Sullivans Ridge, Tumbledown Mt, Mt Harrier, Benders Ridge, Murrell River, Dicks Ridge, Long Island Ridge, Twelve o' Clock Ridge. Whether these names were in local usage or assigned during the detachment is not known.

By 23 April 1943 considerable progress had been made: -

The survey party (No. 2 Topographical Section 14 Corps Field Survey Coy R.E.) have made considerable progress since their arrival on 19 Mar 43. The weather has been better than is usual at this time of year and as a result they are ahead of schedule. The task given to the Section was to make a map on a scale of 1/25000 of the land, east of a line drawn north and south from Long Island in Berkeley Sound to the south coast of the east island and south of the south coast of Berkeley Sound. This involved starting from scratch with a new primary triangulation of the area. 1/50000 maps are also being prepared for the use of the coast defences. It is impossible to give any forecast of when this work will be completed as everything depends on the weather. O.C. Topo Section forwards technical progress reports direct to G.S.G.S. at frequent intervals.

The garrison report dated 30 July 1943 stated included: -

No complete map exists of the Islands. The only ones available are reproductions of Admiralty charts on which the land detail is very sketchy and inaccurate. No land survey of the islands has ever been carried out, but it is in the process of being done by the Public Works Department. It will be some time before even the area round Stanley will be completely surveyed. No gridded map exists but the Admiralty charts supplied to the Force have been gridded by the Royal Engineers on the modified British system, and the features inserted by rough surveys.

In a further report to the War Office, dated 6 August 1943, the Force Commander stated: -

I attach a sketch (Appendix D) showing that portion of the East Island which is now being surveyed. The officer carrying out the survey expects, subject to weather conditions, to complete by the end of September. I consider that the area, which is being mapped on the 1/25,000 scale, is sufficient for operational purposes in the Port Stanley area. Apart from the Port Stanley area there is no one part of the islands which calls for attention more than another, and I assume that it was not the intention to have the whole of the islands surveyed. That being the case I suggest that the Section be made available for more urgent work elsewhere, when the operational map for the Port Stanley area (as shown on sketch) is complete.

A dense triangulation network of about 40 stations in the limited area of the survey was observed by conventional triangulation and the topography was surveyed by plane table. An astronomical fix by position-lines was also carried out, a 1944 edition of Admiralty Chart 1614 includes in its marginalia: -

According to recent determinations the new Obsn Spot at Stanley is Lat 51-41-30S Long 57-52-29W therefore all latitudes read from this plan should be decreased by 17 seconds and all longitudes decreased by 19 seconds (1943).

The result of this survey by 14 Company was GSGS 4465, a tricolour series of three sheets at 1:25,000 scale of the area of south east Falkland Islands east of Mount Kent. These maps had a 1,000 yard grid and a 50 foot contour interval and were *" Surveyed and Drawn by No. 2 Topographical Section 14th (Corps Fd. Svy.) Coy., Royal Engineers, 1943"* and *"Photolithographed by O.S. 1943"* and *"Published by the War Office in March 1944"*.

In addition to the 1:25,000 survey, a survey of Falkland Camp was executed, possibly by tacheometry or even chain survey which resulted in the production of GSGS 4466 at 1:2,500 scale in January 1944 with similar marginalia to that on the 1:25,000 map. The marginalia on this sheet also shows that it was based on the US War Department Polyconic Projection (Southern Hemisphere) Band V (South), Zone H.

And so things probably remained until the Directorate of Overseas Surveys (D.O.S.) mapped the islands in the 1960's.

How the D.O.S. maps with the Standard Series Designation H791 were utilised in 1982 has already been told by Lieutenant Colonel John Himbury in the RE Journal immediately after the 1982 campaign and as re-published in the last issue of Ranger.

Call for Papers

Potential participants are invited to submit proposals for papers for an International Symposium on Cartography in the 19th and 20th centuries, organised by the ICA Commission on the History of Cartography. The symposium, to be held from 10-12 September 2008 in the University of Portsmouth, will address three main themes: the impact of new technologies, colonial cartography, and military cartography, but contributions on other topics are also welcome. Abstracts of proposals for papers should not exceed 200 words and should be submitted before 30 January 2008.

Full particulars about the e-mail address abstracts should be sent to will be made public on the Commission's website www.icahistcarto.org. This website is at the moment under construction, but should be up and running before the end of November 2007.

Leica, Infoterra and the UK MOD

By Dr Andy Wells, Sales Director, Infoterra Ltd

Introduction

It is strange how the world turns. I last wrote an article on ERDAS Imagine (as it was then called) some 6-7 years ago as head for sales for ERDAS UK. Since then much has changed. ERDAS was acquired by Leica Geosystems, the UK Office of ERDAS was disbanded and the rights to sell the software to UK MoD and others transferred to ESRI UK. As from 1st November of this year, things will change again as Infoterra becomes the distributor for the entire software suite and once again I find myself delving into the murky world of software provision.

However, some things do not change. Imagine and Leica Photogrammetric Suite (LPS) remain at the very heart of a number of key programmes within MoD. It still provides a broad range of technologies for the rapid handling of imagery (satellite and airborne). Its capabilities in rapid 3D visualisation of the environment remain unsurpassed and its complementary approach to standard geographic information systems offers the interoperability required of today's IT systems.

However, the world will keep on turning and the future offers a wide range of developments and opportunities that will further enhance the deployment capability of the technology. Leica Geosystems have embarked on a major acquisition programme within the geospatial community, acquiring ERMapper (once the devil incarnate to ERDAS as they were the main competitor for some years), Ionic and Acquis. Furthermore, with the strategic agreement now signed between Leica and Infoterra, one company now provides:

- ✓ UK MoD-wide sole source provision of commercial satellite imagery
- ✓ UK MoD-wide provision of aerial photography for the UK
- ✓ The tools required to exploit geospatial imagery, integrate it with other intelligence and mapping information.

However, I get ahead of myself – first a little bit of history.

Background and Historic Context

The Leica suite of technologies have been used within MoD since the 90's. The turning point came with the Bosnia conflict. The level of standard mapping (vector) available for the area was not sufficient and imagery/scanned mapping came to the fore. After assessment of US technology, the Field Support Office based at Hermitage developed and delivered TACISYS (a vehicle-deployed mobile mapping system) based on a range of software packages including ERDAS Imagine. This allowed local mapping obtained on the ground to be scanned, corrected and merged with imagery acquired by the Canberra PR9 and provided to the troops - all within theatre. This was backed up by support from the Royal School of Military Survey for training and development purposes. The initial systems required the use of UNIX platforms (specifically Silicon Graphics which had the best 3D rendering system at the time). More recently this has been replaced by DGLS (or Diggles as it is pronounced) – a PC-based solution benefiting from the huge memory and graphics improvements brought on by the gaming industry.

Additional capabilities were delivered through to Kosovo including basic terrain categorisation, terrain visualisation and cross-country mobility modelling.

At the same time and towards the end of the '90's, the application of the technology spread to inclusion in and use by the:

- Tornado Air Mission Planning Aid (TAMPA) and then extended to No 1 AIDU
- Target materials workstation based out of JARIC
- Front-end processing environment at Feltham
- After action reviews undertaken at the battle group training unit on Salisbury Plain
- Stormshadow through MatraBAE

- 24 Air Mobile Brigade, PJHQ, General Staff Map Branch at MoD Main Building, 15 Signals Regiment – Northern Ireland, JSPI

Current Development of the Technologies

This is where it gets complicated. In 2005, Leica was approached for takeover by the Hexagon Group. A company focussed on engineering, polymers and metrology, Hexagon viewed Leica as a strategic purchase further developing its measurement systems capability. However, this did not lead to the geospatial imaging division (which covers the software elements) being sidelined. On the contrary, in 2007, Leica acquired ERMapper, Ionic and Acquis bringing:

ERMapper – access to the image web server technology – a technology capable of quickly and efficiently distributing large volumes of geospatial data to thousands of concurrent users. This includes data compression – a must if the community is to manage an ever-increasing amount of data.

Ionic – the Red Spider technology now available to Leica offers immediate access to an OGC/ISO compatibility which for the MoD and its focus on interoperability is key. Furthermore, the Leica suite of tools has always been seen as information provider components to some form of spatial data infrastructure. This may well be no longer the case as the Ionic technology offers capability in the sphere. It is fair to say that the military and intelligence community are increasingly challenged by the proliferation of:

Structured databases – information on individuals, organisations, targets, sensor records etc
Unstructured databases– intelligence, diplomatic, WWW, email etc
Spatial databases– maps, features and coverages.

These three have traditionally been held and managed separately. Leica intend to develop the Ionic capability to cross exploit these areas in near-real-time and across a large enterprise such as the MoD.

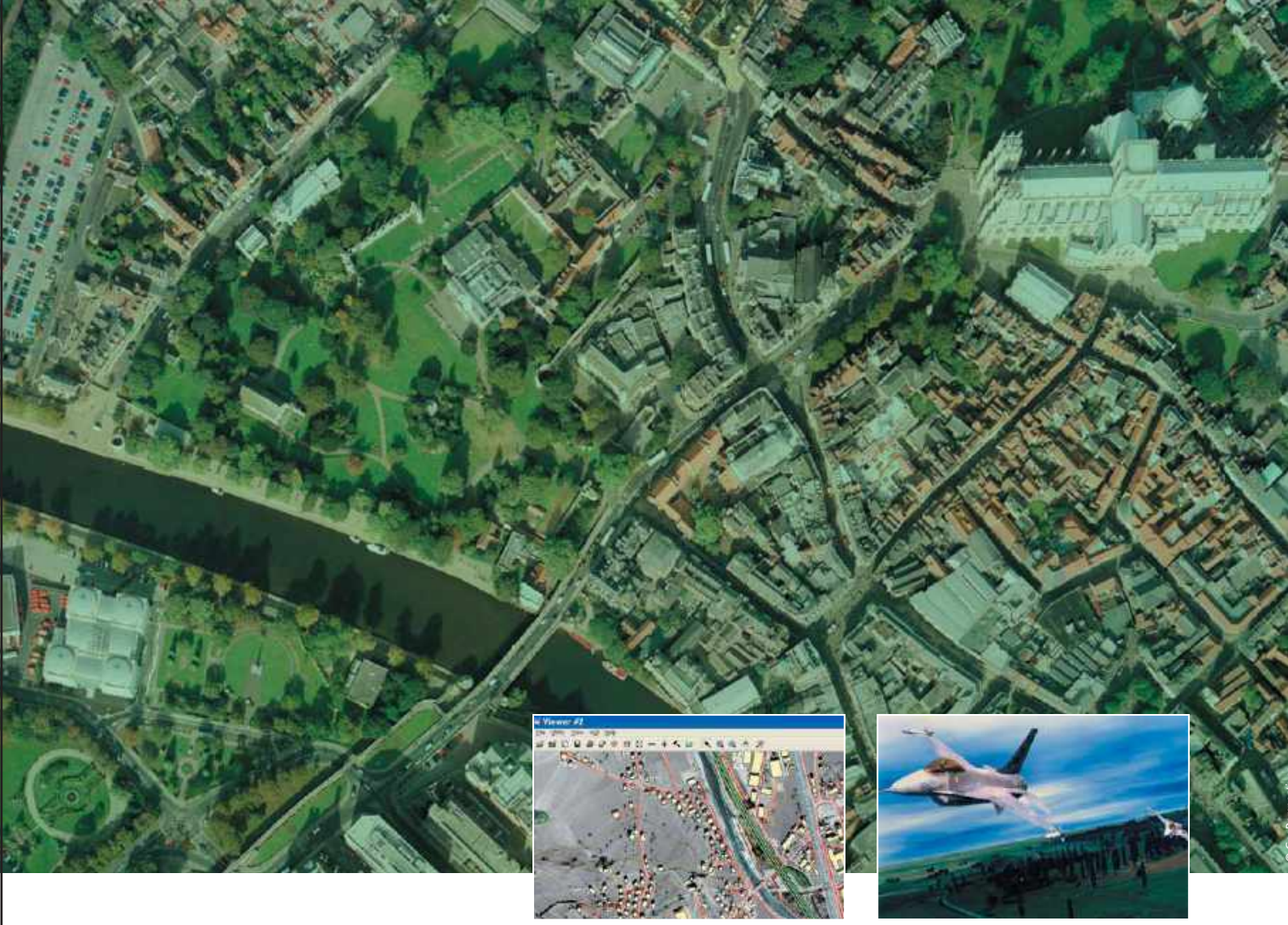
Acquis - the acquisition of this niche player in the GIS market will allow Leica a ready connection to Oracle 10g (and developments forward) further enhancing the interoperability of its core products (Imagine and LPS) in the near future.

It is fair to say that the future development of capability within the Leica range is no longer simply focussed on better and more rapid extraction of information from imagery and other sources. Whilst this remains a core foundation of their ethos, the acquisitions above are aimed more at how such data interacts with other data and information, how all sources of data can be combined and how this can then be transferred to the operational environment as fast as possible. Whilst overused, the term “watch this space” really does apply.

I should not just concentrate on developments outside of the core packages of Imagine and Leica Photogrammetric Suite. Recent developments such as Imagine autosynch have already been deployed by the MoD at Feltham. Able to take two or more images from different sources, automatically generate thousands of tie points and deliver automatic registration has cut down an 8 hour job to just 30 minutes, whilst improving the accuracy of the output. Further developments on the automatic feature extraction are expected out in the next 12 months, some of which are directly aligned to the needs of the military. For LPS, capability continues to develop since the break from Socet Set in 2001. Further improvements in its processing speed and enhancement of the workflow management system are due soon.

Providing the Total Solution

Part of the attraction for Leica was the total solutions approach that will be provided by Infoterra as the prime point of contact for the MOD. Having one company providing the source material (such as Quickbird, SPOT, Radarsat satellite imagery) and the technologies for its exploitation offers expertise from cradle to grave regarding the use of commercial satellite imagery for imagery intelligence, mapping and operational deployment, not previously available. This will come to the fore when operational needs raise new requirements. Rather than providing a single service, such as data availability, Infoterra will now be able to provide support on what data is available, what format it will be available in, what tools are required and how the analysis can be undertaken, all from a single point of contact.



Infoterra to distribute Leica Geosystems Software

Infoterra Ltd announces sole distribution rights for Leica Photogrammetry Suite (LPS) and ERDAS IMAGINE® software products, across the UK & Ireland.

Infoterra & Leica Geosystems recognise the importance of advanced tools for processing & analysing imagery. Leica Geosystems' experience in developing imagery software continues to set new standards.

- **Leica Photogrammetry Suite (LPS)**
  A system providing accurate & production oriented photogrammetric tools for a broad range of geospatial imaging applications.
- **ERDAS IMAGINE®**
  A suite of easy-to-use software tools designed to extract the inherent wealth of information found within geospatial imagery.

- when it has to be **right**

Leica Geosystems

infoterra
an EADS Astrium company

+44 (0)116 273 2300 info@infoterra-global.com **www.infoterra.co.uk**

As an example, from 1st January, 2008, a new satellite will become fully operational – TerrasarX. This new commercial radar satellite is capable of:

- ✓ Cloud penetration
- ✓ Acquisition at night
- ✓ Acquiring the target at 1m resolution
- ✓ Delivering data to the desktop within 72 hours of tasking
- ✓ Revisit time 2-4 days (depending on latitude)

Traditionally, radar data has been the preserve of the technical community. However, recent developments in the software and the quality of the data now offers this as a core capability across a much wider spectrum of users within the geospatial community. By offering support on the data, potential extraction capabilities and the software support in one package we believe this will maximise the benefits that MoD will access from this new technology.

TerrasarX is not the only new sensor to become available. WorldView-1 was launched successfully last month. It is a high-capacity, panchromatic imaging system featuring half-meter resolution imagery. With an average revisit time of 1.7 days, WorldView-1 is capable of collecting up to 750,000 square kilometres (290,000 square miles) per day of half-meter imagery. Frequent revisits will increase image collection opportunities, enhance change detection applications and enable accurate map updates. Whilst it does not have the cloud penetrating capability of TerrasarX, it will offer additional capability above and beyond the existing sensors available to MoD commercially. Other examples of where this is pertinent will include access to specialists in imagery interpretation, additional benefits to the Topsat programme.

For the past 4 years the Leica suite of technologies has perhaps not had the focus it had in the early years of 2000 and 2001. This is about to change with a ramp up within the support and development arena. The return of user groups, especially ones focussed on the defence environment, provision of support people whose background is imagery, photogrammetry and raster data and the tie to data provision all offer the extra benefit required by MoD.

Conclusions

Interesting times area ahead for Leica in the UK and especially for its use within the military environment. The new distribution channel with Infoterra should bring a whole new approach to support and development, tying applications specialists on imagery and data integration with the technology used. This, coupled with the current data provision service, will allow Infoterra to support the entire flow line rather than one single component. The acquisitions by Leica in recent months further strengthen the move from purely data analysis to delivery; integration and interoperability should allow information created by the Geo-specialist to enhance additional areas of MoD activity.

Interesting times.

"Maps & Surveys 2008"

Following the success of the 80th Anniversary Seminar in June 2007, the Defence Surveyors' Association has decided to run another, similar, seminar on 21 June 2008 at Denison Barracks, Hermitage. The 2007 seminar resulted in a small profit as a result of which, in accordance with its tri-service nature and its charitable aims, the DSA is making a donation of £200 to the Royal British Legion. Accordingly it has been decided that the attendance charge for this year's seminar should be reduced to £12. Details of the theme and the presentations will be promulgated later but remember to book the 21st of June.

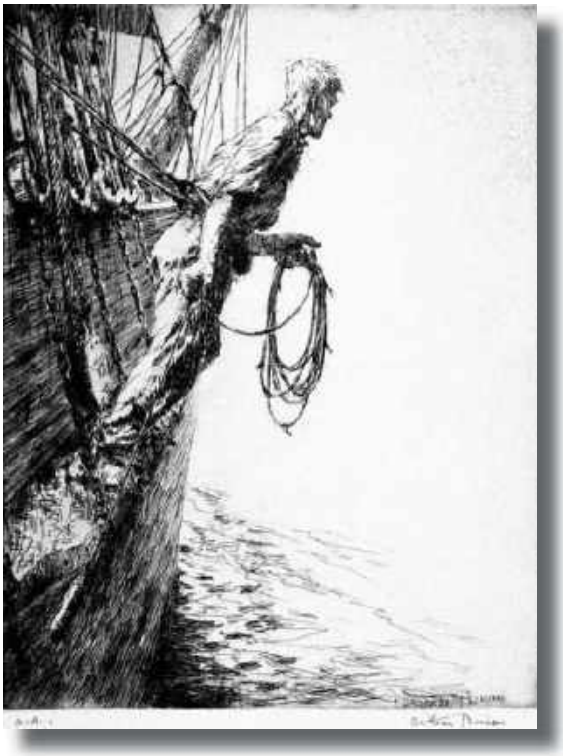
Surveying Recorder Centenary 1907 - 2007
(No day too long…)

By Ian Austin

Surveying Recorder, the oldest specialisation in the Royal Navy, celebrates its centenary in 2007. During its 100 years existence it is estimated that about 1,500 ratings have served as Surveying Recorders. There is very little documented information about the branch. This short article has been compiled to record a little of the branch's history, its people and associated information.

The Hydrographic Department

Although hydrographic surveys had been conducted for centuries, it wasn't until 1795 that the Hydrographic Department was established with Alexander Dalrymple appointed as the first Hydrographer of the Navy. Up to this time about 20,000 charts and reports had been left unexamined at the Admiralty and Dalrymple was tasked with selecting and compiling all information for the purpose of improving navigation and for the guidance and direction of ships' Captains.



'The Leadsman' by Arthur Briscoe

The Royal Naval Surveying Service

Alexander Dalrymple, the only civilian Hydrographer of the Navy, was succeeded in 1808 by Captain Thomas Hurd RN, the first of twenty-seven naval officers to hold the post of Hydrographer of the Navy to the present day. With hydrographic surveys being carried out world-wide, a corps of naval officers selected for their mathematical and navigation skills and abilities was gradually built up by Captain Hurd. The founding date of what has become known as 'The Royal Naval Surveying Service' may be taken as 7 January 1817, when an Admiralty Board Minute established special rates of pay for officers employed in hydrography.

Introduction of Survey Specialisation for Ratings

Ratings assisted officers during the conduct of hydrographic surveys but it wasn't until 1904 that the ninth Hydrographer of the Navy, Rear Admiral Sir Arthur Mostyn Field KCB FRS, proposed the introduction of a survey specialisation for ratings. However, it wasn't until three years later in 1907 that the specialisation for ratings was introduced. Field was a highly experienced surveyor who had conducted surveys around the world; a fitting founder of the ratings' surveying specialisation.

Surveying Pay

Although the specialisation was introduced in 1907, the earliest available recorded document relating to the specialisation refers to the introduction of Surveying Pay for ratings in 1908, by means of an Addenda to King's Regulations:

> **King's Regulations. Addenda (1908): Appendix XVA-Part 3; Non-Substantive Ratings, Allowances, &c. para 86a Surveying Pay.**
>
> In surveying ships to Petty Officers and seamen employed on certain surveying duties an allowance at the rate of 6d, 1s and 1s 6d a day according to ability. The special sanction of the Admiralty is to be obtained in each case.

When the addenda was inserted into King's Regulations the marginal note giving the Office number and date of insertion reads only 'N.837/1907'; there is no corresponding Admiralty Circular Letter (the predecessor of Admiralty Fleet Monthly Orders and Defence Council Instructions) within the bound copies which would give a precise date of issue and thereby the branch's inception date. Perhaps it was the 3rd of July 1907; July 3rd is the Saint's Day of St Thomas the Apostle, Patron Saint of Surveyors, an event that would not have gone amiss by Their Lordships at the time.

Surveying Recorders – Establishment of Roster

Despite the creation of the survey specialisation in 1907 and regardless of the payment of an allowance when employed on certain surveying duties from 1908 onwards, the specialisation went without a name until the 14th of July 1920 when Admiralty Monthly Order 2126/20 announced 'Surveying Recorders – Establishment of Roster…'. The Establishment of Roster formally recorded the name of the specialisation, stating that: *"In future ratings qualified to perform surveying duties will be referred to in connection with these duties as* ***'Surveying Recorders'****"*. AMO 2126/20 also confirmed the payment of an allowance for qualified personnel while performing surveying duties. Interestingly, the allowance rates introduced in 1908 remained the same in 1920.

The first mention of the branch badge was also made in AMO 2126/20 – *"A distinctive badge, consisting of a 'quadrant' device, will be introduced for "Surveying Recorders", and is now being prepared.'* Although the quadrant is more properly, but less commonly, called an octant, the badge device has always been referred to as an octant by its members, and is often called a 'hambone' due to its resemblance to a ham bone when carried in its box.

Surveying Recorder Badge – Basic Device

Surveying Recorders

Before the creation of the Surveying Recorder specialisation, ratings and marines serving on board surveying vessels would be employed in surveying duties as required. Training was conducted locally, and once trained, ratings could move to other vessels taking their skills and experience with them. If they moved on to non surveying ships their expertise would be lost.

Admiral Field's initial proposal in October 1904 to introduce the Surveying Recorder specialisation was rejected. He successfully resubmitted the proposal in May 1906, and Treasury approval followed in January 1907. The case was made by pointing out, firstly that a boat needed two observers and that if one officer was released the output would be greater; and secondly, that as the conditions of exposure and long hours made the service unpopular, some inducement was necessary to encourage keenness in volunteers. There would be three recorders in larger ships and two in smaller, making a total of twenty-two; and extra pay according to proficiency. In 1908 Field obtained approval for chief petty officers to continue as recorders without increase in complement; and later that year the drafting regulations were amended so that on a ship paying off recorders would be drafted to another surveying ship, not without some Admiralty Board misgivings that it meant 'a closed service'.

Warrant Officer Cuff Badge

Employment and drafting of Surveying Recorders has continued in much the same way since introduced by Field, varying and changing over the decades as ships and equipment have come and gone. The highest rate to which most SRs could aspire to was Chief Petty Officer.

Until 1975 ratings joining the specialisation were sideway entrants from other branches. Rates of SRs were frequently out of kilter with professional qualifications and it was not unusual to see ABs, LHs and even POs as SR3s (one star badges). Similarly, ABs, LHs, POs, and exceptionally CPOs could be SR2s (two star badges). LHs, POs and CPOs could be SR1s (crown badges). CPOSRs with 3 years' seniority were given the title 'SR1 (Advanced)', in recognition of their experience. In 1975 the first Direct Entry SRs joined the RN, and in line with the rest of the Operations Branch, rates and professional qualifications were aligned. ABSRs wore the SR star badge, LSSRs the two-star badge and POs and CPOs the crown badges. The title SR1 (Advanced) was dropped.

In 1970 the rate of Fleet Chief Petty Officer (FCPO) was introduced (DCI(RN) 923/70 dated 7 Aug 70: 'Ratings: Introduction of the Rate of Fleet Chief Petty Officer into the Rating Structure of the Royal Navy'). The FCPO title changed to Warrant Officer on 30 August 1985 (DCI (RN) 339/85 'Warrant Officers - Abolition of FCPO as individual title, Redefinition of Functions; Review of Badges'), to align the title with Army and RAF ranks. The rate was changed again in 2004 to Warrant Officer Class 1 (DCI(RN) 146 2003 - Implementation of the Warrant Officer Class 2 (WO2) Rate for Royal Navy Artificers and Technicians. (This DCI also announced that 'All existing RN Warrant Officers will be re-titled Warrant Officer Class 1… with effect from 1 April 2004).

Being such a small specialisation there was only two FCPO(SR)s, WO(SR)s or WO1 (SR)s at any one time, both employed in branch. This remained the case until 2000 when, for the first time, a

third was promoted under a 'pool' system for employment out of branch. The complement remains for two Warrant Officer SRs, with a third one selected to 'pool' requirements.

Since the rate's introduction ten Surveying Recorders have reached Fleet Chief Petty Officer, Warrant Officer or Warrant Officer Class 1 (Surveyor) status, they are:

Years Served	YearPromoted	Name	Rate
c1951 - 1979	1970	P J Burt	FCPO
c1951 - 1981	1970	D J Veevers	FCPO
1959 - 1993	1981	R F H Scrivens	FCPO/WO
1960 - 1985	1979	D Carey	FCPO
1961 - 2001	1984	I Austin MBE	FCPO/WO
1961 - 1996	1993	R Woodhouse	WO
1970 - 1998	1990	S Peters	WO
1975 -	1998	M J Slater	WO/WO1
1975 - 2007	1996	SW Hawes	WO/WO1
1977 -	2000	P J Roberts	WO/WO1

Warrant Officer Slater leaves the service in early 2008 and CPO(SR) D Wake has been selected for promotion in late 2007 as his relief.

Female Surveying Recorders

LSSR N Eastwood on HMS Scott 2007

During World War II it was decided to man harbour craft by women. This became the most popular WRNS category, so much so that WRNS Petty Officers requested to relinquish their rates to start again as unspecialised boats' crews, and everywhere was the wish to transfer from duties, however responsible, to become a real sailor. Among boat duties for WRNS was the launch employed on surveying duties at Plymouth. A WRNS, blue on black, Surveying Recorder badge is held by the Dockyard Museum at Devonport.

The Hydrographer (Vice Admiral Sir John Edgell KBE CB) sent a special commendation to the Director of WRNS at the time, Dame Vera Laughton Mathews DBE, saying the high standard of work was 'fully comparable with what would have been expected from a regular naval crew'. The report particularly mentioned the boat's coxswain, Leading Wren Florence Hayes, for her exceptional ability in handling the boat and all-round intelligence, coolness and leadership.

Florence Hayes maintained her links with the surveying service after WWII. When ships from the Falklands' Conflict returned home in 1982 she noticed that the main focus of attention was on the warships and little heed was paid to the survey vessels that had acted as ambulance ships. She generously sent a donation to be shared between the *Hecla*, *Herald* and *Hydra* Welfare Funds.

The category of Wren boats' crew was abolished on 31 December 1945. Forty-seven years later, in 1992 the first female SRs joined the specialisation, after the WRNS was incorporated fully into the Royal Navy. Women in the Royal Navy today work alongside and carry out the same duties and responsibilities as men.

Surveying Recorders become Surveyors

Since training ashore was introduced in 1948, the depth of experienced gained as a junior rate and the knowledge acquired during the SR1/POSR course has been recognised in a change of title, with the SR in senior rate abbreviated titles standing for Surveyor instead of Surveying Recorder, eg POSR stands for Petty Officer Surveyor.

Promotion to the Officer Corps

The Surveying Recorder specialisation has had many members who have enjoyed very successful Royal Navy careers. If young enough, many furthered their careers by taking up commissions in the

Lieutenant Dusty Miller in HMS Hecate on 31 July 1970, kindly helping with the last routine rum issue in the Navy.

officer corps where they could enhance their surveying skills and knowledge or transfer to other branches. However, there was a lack of career outlet for those Surveying Recorders who were too old when their potential was recognised to become 'upper yardmen' and go through for a general service commission. The only opportunity for such men was to abandon their surveying trade and become Commission Boatswains, or later Sub Lieutenants (Special Duties) (Boatswain).

Special Duties Officers

In recognition of this shortcoming, and to reduce the loss of talent, a category of Special Duties Hydrographic specialists was created. The first SR to be commissioned as a Sub Lieutenant SD(H) was G Boorman in May 1958. Since then a steady trickle of SD officers have been promoted. Once commissioned a significant number of SD officers successfully transferred to the officers' general list, with a few reaching the rank of commander. Others remained on the SD list, with only one former SR, Dusty Miller, reaching the rank of Commander SD(H).

Temporary SD List

Until recent changes to promotion regulations, the minimum age to be promoted to Warrant Officer was 34, which was also the upper age limit to become an officer. This prevented Warrant Officers from being commissioned. To alleviate shortages of junior officers during the mid 1980s to the mid 1990s, the Temporary SD List was activated. This enabled selected WOs to be commissioned and hold rank up to lieutenant. Up to a dozen Warrant Officers from various branches were commissioned during each year that the scheme was in place. Warrant Officer Surveyor Ian Austin was commissioned in this way in 1990, and to date is the only Warrant Officer Surveyor to have been commissioned. He completed several appointments as an officer, the final one as Commanding Officer and Charge Hydrographic Surveyor of Naval Party 1016. He is the only lieutenant to be awarded substantive H Charge status. Austin served in the Royal Navy from 1961 to 2001, becoming the Surveying Recorder who served longest in the RN.

The Ritchie Sword

When Admiral Ritchie retired from active service in 1971, he presented his sword to the most newly promoted SD officer. The sword was to be handed back when the officer retired, and then presented to the next SD officer commissioned. Since the demise of the SD List, former SRs commissioned as a Senior Upper Yardmen have been presented with Admiral Ritchie's sword; the current holder is Lieutenant JJ 'Jez' Grove.

Arrival of the HMs

Despite celebrating its centenary in 2007, the specialisation is in decline. Its fate was sealed when the introduction of a new Warfare Branch specialisation was formally announced on 16 January 2004 with the issue of DCI RN 10/04 Introduction of the New Warfare Branch specialisation - OM(HM) (U).

The new specialisation, namely the Operator Mechanic (Hydrographic, Meteorological and Oceanographic) (OM(HM)), will eventually subsume the capabilities of the current Surveying Recorder and Naval Airman Meteorological & Oceanographic specialisations. The source specialisations will coexist alongside the OM(HM) for some time to come, maintaining individuals' present career patterns and conditions of service.

The first HM specialisation ratings joined the Royal Navy at *HMS Raleigh* on 1 March 2004. On completion of training they joined their first sea drafts in September 2004. Since being introduced the OM(HM) specialisation's name has changed with the implementation of the Navy Board's Personnel Change programme on 30 march 2007. The new name is AB(HM).

The Last SRs

As HMs replace SRs, numbers are dwindling. As of 6 July 2007 there will be just 64 SRs left: 2 WO1(SR)s, 7 CPO(SR)s, 17 PO(SR)s, 24 LS(SR)s and 14 AB(SR)s. The last Surveying Recorders joined the Navy on 23 June 2003 and qualified as Surveying Recorders on 5 December 2003. The youngest SR in the RN is AB(SR) Goldsworthy-Trapp, currently serving in HMSML Gleaner. Goldsworthy-Trapp was born on 2 May 1986. If he serves in the RN until he is aged 55, he would be the last SR to leave, on 1 May 2041.

AB(HM) Badge

Acknowledgements

This short history of the Surveying Recorder specialisation has been produced by Lieutenant Ian Austin MBE Royal Navy (Retired).

Some of the details contained within the pamphlet have been extracted from the following publications:

> 'The Admiralty Hydrographic Service 1795-1919' by Vice-Admiral Sir Archibald Day KBE CB DSO, Hydrographer of the Navy 1950-1955.
>
> 'Blue Tapestry' by Dame Vera Laughton Mathews DBE, Director, Women's Royal Naval Service 1939-1946.
>
> 'No Day Too Long - An Hydrographer's Tale' by Rear Admiral G S Ritchie CB DSC. Hydrographer of the Navy 1966-1971.
>
> 'Charts and Surveys in Peace and War' (The History of the RN Hydrographic Service 1919-1970' by Rear-Admiral RO Morris, Hydrographer of the Navy 1985-1990.

Photographs have been taken either from the publications above, are from the Hydrographic, Meteorological and Oceanographic Training Group collection or are acknowledged with individual pictures.

Particular thanks are extended to Mr Iain MacKenzie, the Curatorial Officer at the Admiralty Library, Naval Historical Branch (Naval Staff), who researched for documents detailing the origins of the Surveying Recorder specialisation, and who provided copies of the Admiralty Monthly Orders 224/20 and 2126/20.

HMS Dalrymple beacon laying

Current Meter Observations - HMS Sharpshooter

Setting up a mark for observing – North Minch 1952

Life after Military Survey

By Ken Hall

When, as it did for me, life in Military Survey accounts for only a decade of your life it is very much a development phase. An exciting, fun-filled, challenging, stimulating and magnificent time of on-the-job learning about relationships, leadership, nations and cultures other than your own which, following hard on the heels of your school days, prepares you, if you choose to allow it, for what is to follow.

Perhaps it was a short attention-span which drove my decision to leave the Army after a relatively brief period. Make no mistake, I greatly enjoyed being a military surveyor, and was seen by many as a "model" soldier. Reaching the level of Tech 1 SNCO by the age of twenty four seemed to suggest that I had been doing something right. After leaving boys' service at Chepstow, where I had done quite well, I was fortunate, indeed, and envied by many of my peers, to spend more time abroad than I did in the United Kingdom. Never, somewhat surprisingly, posted to Germany it was 84 Squadron in Singapore, 512 Specialist Team (in South Georgia, Australia and the New Hebrides) and detachments to Libya, Australia and Kenya from 42 Survey Engineer Regiment which were to comprise my itinerary, interspersed with visits to the School. And yet my mind was made up; a search for new challenges, etc. And so I joined "Civilian Survey".

My anxieties about how my skills would stand up alongside the other staff, at the firm I joined – none of whom shared my background – were dashed by about coffee-break on the first day! Having done the full round of job-interviews at the end of my service, I had opted for a small organisation based in the West Country. More opportunities would exist, I surmised, to play a real part in their development, than would be the case in one of the larger and well-known companies.

512 STRE in South Georgia – Ken Hall with brolly in case of inclement weather!

Engaged as their chief surveyor, the previous incumbent having just moved on to teach surveying at North East London Polytechnic (now UEL), it became clear that there was a strong need to set about improving the level of training that junior staff received, and ensuring that people recruited to more senior levels held formal qualifications. Military survey methods helped greatly in my preparation of the whole range of "standard operating procedures", as none had existed previously. Suddenly – well, actually, it was probably over about three years – the size and quality of projects which were being undertaken had improved greatly. No longer was work limited to the south-west, taking staff, instead, to all corners of Great Britain. It was only a matter of time, of course, before the opportunity to become involved with overseas work, also, arose. Forays into Iran, Saudi Arabia, Libya, UAE, Sudan and Oman were to follow in quick succession. It was during this period of expansion that some company restructuring took place, and I found myself wearing the additional title of Company Director.

When a government contract was obtained for work in the Sultanate of Oman it provided the opportunity to establish an office there, from which to expand our activities in that part of the world and so, for two years, I lived in Muscat and worked across the deserts and mountains of the area. It was strangely reassuring to occasionally encounter control stations established by Royal Engineer survey units, and quite surreal to stumble across a mark emplaced by my friend and former troop commander Phillip Robinson during his almost legendary Musandam expedition of the 1970s.

Interestingly, if a little perversely, the knowledge which I had gained from a "Helicopter Handling and Unit Air Transportation Officer" course in the dying days of my military service, and which was not put to any real use by the Army, was to prove very valuable during my time in Oman, where the government office for whom we were providing surveying services were engaged in an extensive construction programme of mountain-top telecommunication stations, which relied very heavily on helicopters to move men and materials. The operations manager decided to take a spell of unauthorised – and, as it

The Humber Bridge – a recent survey task for KJ Hall Surveyors – including Ken.

was to turn out, unsurprisingly, terminal – leave which left three helicopters and their crews in need of some direction, which I was able to provide until the end of that phase of the task, some weeks later.

Unfortunately, near the end of my period in the Sultanate, a "board room" split led to my resignation from the company which I had, at the very least, guided through a transition period from small town setting-out agency to internationally recognised surveying company. The reason? Fellow directors' belief that they, from the comfort of the UK office were better able to work out prices in the Middle East than I, who had been living and breathing the region for two years. Shades of military/politico history over time, perhaps?

So, what does a former military surveyor, now also a former company director, do next? Bring the two together, and start all over again, of course. I remember, clearly, that as I sat in his sun-filled office, facing him across a desk which held nothing more than a computer terminal and a blank pad of paper, I couldn't understand why the bank manager, when we went through my business plan, thought I was brave to be setting up my own firm. I wish that he had told me that he knew, as I and most other souls did not, that an almighty recession was just around the corner. Somehow, despite a far too large commitment to the bank for the purchase of computers and other surveying essentials like EDM, and certainly with no thanks due to them for their attitude in facing the adversity of the recession - quite the reverse, in truth – the business managed to survive, although it was several years after the apparent end of the recession that the accrued financial effects were to be finally overcome!

So, from small and very difficult beginnings, almost inevitably based around surveys for local architects, we have moved, gradually, on to more inspiring and testing projects. Nuclear power stations, main line railway stations, bridges - including, most notably, a recent project at the Humber suspension bridge which required measurements to be taken at twenty metre intervals along the main cables (yes you do have to walk along them), and vast amounts of railway infrastructure now seem to be the mainstay of our working days. With the acquisition of all that experience – and somewhat less happily, the passage of the years required to gain it – the opportunity to act as an expert witness also often presents itself. Importantly, I believe, I have tried to hold on to those early, smaller, local clients, too, and it is pleasing that some of them have converted to friends along the way.

Has surveying, both Military and after, been good to me? Well, there have been some downsides; getting dysentery in the Kenyan bush (there's not a diet on the market to come close to that for rapid weight loss), being stung by a scorpion in Saudi Arabia, and breaking an ankle, were memorable experiences which I would forego if doing it all over again. The places I've been, the people I've met, the friends I've made, lessons about life which I've learned are some of the upsides.

Along the way, and obviously seen by others as more capable than I see myself, I've been privileged to have been elected President of the Society of Surveying Technicians (later amalgamated with RICS) and am, currently, Chairman of the Geomatics Faculty (formerly the Land and Hydrographic Division) of the RICS, a position which I hold with immense pride. My predecessor in the role, David Powell, also started life as a boy soldier in Military Survey, which seems to demonstrate what an enormous change there has been in attitudes since he, and I, embarked upon our careers, when to prophesy such an ascent would have had them rolling in the aisles at Great George Street, rather like the civilian careers adviser who interviewed me at Barton Stacey, immediately prior to my departure from the Army, and laughed out loud when I said that I intended to continue surveying in civilian life! Some advisor he turned out to be!!

Proof of the Field Surveyor's need a head for height

The Model Leyland Hippo Print Vehicle

By Tony Keeley

Bob Kime's interest in model building started 45 years when he returned from Oman on leave in 1961. He started on plastic kits and progressed to the production of the Hippo Print vehicle as used by Military Survey during the Forties and Fifties.

Bob was called up for National Service and trained as a driver in the Royal Engineers, he then signed on as a regular soldier and completed a full 22-year career happily spending most of his time with Military Survey units. His first posting was to 13 Field Survey Squadron at Fernhurst, a busy time for Bob as he delivered maps and charts to various airports during the Suez Crisis. This was followed by a posting to 42 Survey Engineer Regiment at Zyyi Camp in Cyprus during which time he deployed with 19 Topographic Squadron to Nizwa, Oman. He served several more tours with Military Survey and, in his words, "to my joy, a posting back to 13 Squadron for my final tour". Bob completed his 22 years in 1977 and then served on the Long Service List as a recruiter in Belfast until 1992.

The 22-inch long Hippo print wagon model is at 1/24th scale and was built from scratch which involved intricate work such as a wheel being produced on the lathe followed by a mould and castings for the rest. Bob is now embarking on a model of one of the next generation of survey vehicles, the print train of the 1960s.

Front and Rear Views of Bob Kime's model

The real thing at the Survey Training Centre Longleat in the late 1940s

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'The Great Map'

THE MILITARY SURVEY of SCOTLAND: 1747 - 1755

In December 2006 the Scottish-based publisher Birlinn Ltd launched a 'Limited Editions' imprint to make available high-quality facsimiles of works of outstanding historical, cultural and aesthetic interest. This winter Birlinn are proving even more ambitious with the Limited Editions imprint as they will produce an edition of *'The Great Map'*, the name contemporaries gave to The Military Survey of Scotland, 1747 – 1755.

Immediately after the battle of Culloden in 1746 when the King's forces, led by the Duke of Cumberland, defeated the Jacobites, Cumberland remained in Scotland, near Fort George, to determine a military strategy for enforcing rule of law. It was an important consideration too that the country should be explored and made accessible with military posts. As a result an extraordinary exercise took place: a most detailed military survey of the Highlands began which, over the next nine years, was extended the length and breadth of mainland Scotland. Although, not planned as such at the time, this exercise was to have a great influence and significance on the future of mapping and of recording the land.

The survey was initially organised under the auspices of Lieutenant-Colonel David Watson, deputy quartermaster-general in North Britain. He assigned much of the work to a 21-year old assistant, William Roy. Roy, a civilian working in a military environment, began the work at Fort Augustus and moved around with a 22-year-old colleague Paul Sandby and some soldiers assigned to each area they covered. Later, when Cumberland agreed to extend the survey, more surveyors and draughtsmen were employed. The result of this extraordinary exercise became known as 'The Great Map' or 'Roy's Map' and was to have a greater influence on the future of mapping than any of the participants could ever have imagined.

Now this work, which has never before been reproduced in the two and a half centuries since it was originally produced, will be available in a limited, numbered edition. In addition to the cartography, Birlinn's limited edition of The Great Map contains three essays by academic specialists. Dr Yolande Hodson focuses on the life of William Roy and the cartography of the map; Professor Charles Withers writes about the broader context of mapping in 18th-century Scotland and Britain and mapping in the Enlightenment, while Chris Tabraham supplies the detail of the historical and military background.

As Charles Withers writes, *"... the Military Survey is a magnificent achievement, a formative influence upon the Ordnance Survey and provides an important view of a country in the throes of agrarian improvement and Enlightenment."*

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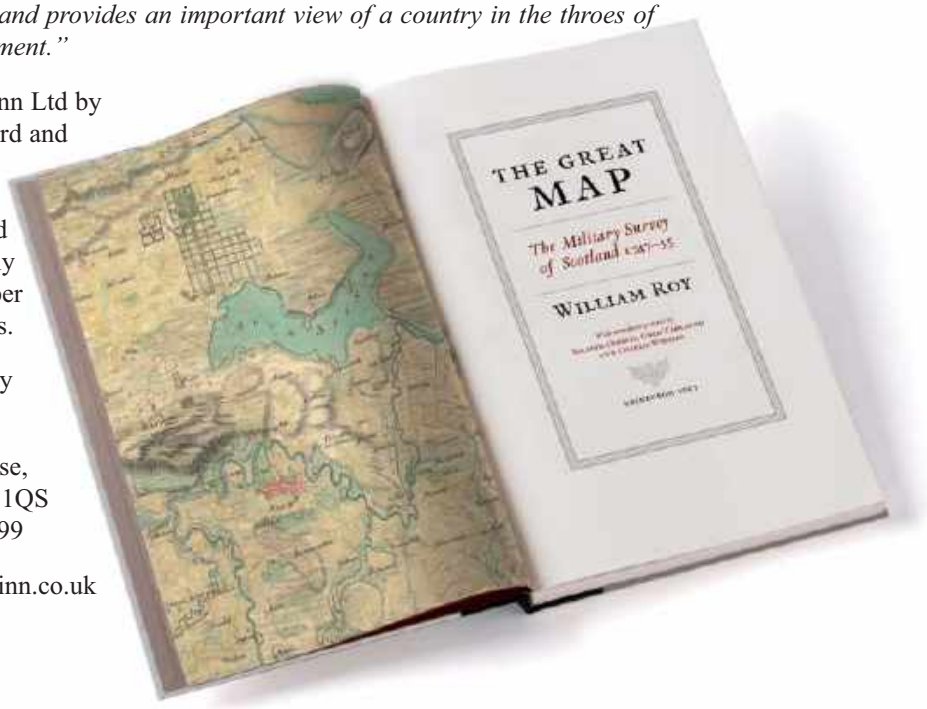

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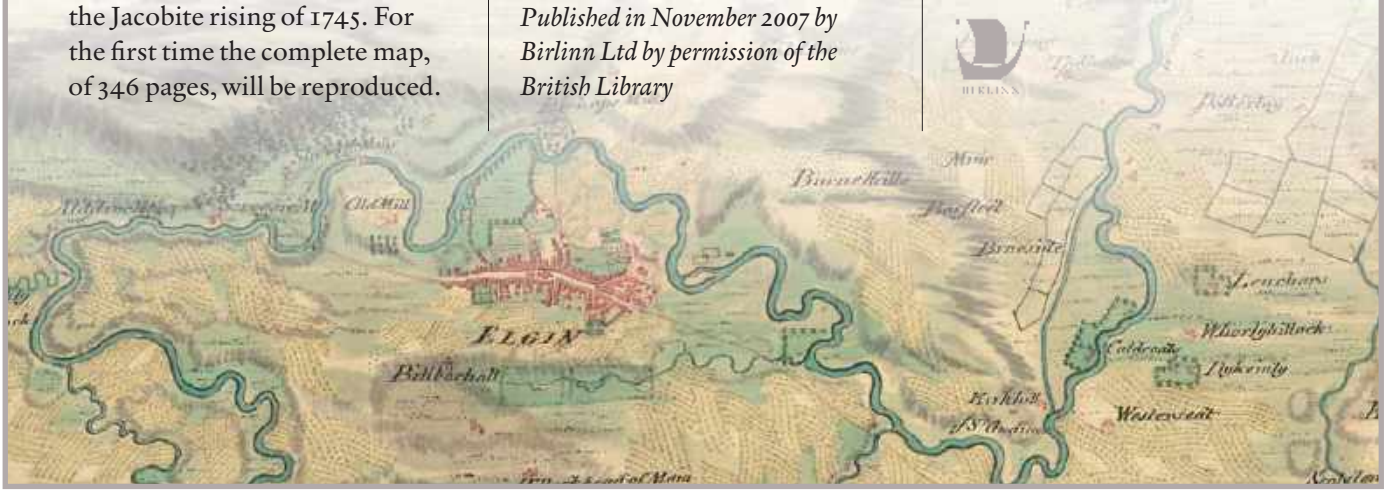


Soundings from the Devonport Flotilla

By Lieutenant Commander Karen Fyfe RN

Since the last update, the HM Division of the Devonport Flotilla has been extremely busy supporting operations and gathering data across the Globe. The last 12 months have seen deployments in the North Atlantic, Indian Ocean, Arabian Gulf, Far East and Western Pacific. Captain Ian Turner RN OBE, Captain HM, Hydrographer of the Navy has moved on to pastures new and been replaced by Captain Bob Stewart RN and I have taken over for Lieutenant Commander Phil Payne as Staff Officer HM.

Scott's old friend USS Anzio

HMS Scott has had a particularly busy 12 months, gathering massive amounts of survey data in the Indian Ocean and North Atlantic, producing some spectacular results. In one month the ship achieved a new record of 92.4% productivity and is significantly closer to the momentous 500,000 miles steamed in the 10 years of her life. Just to put this in context, the Type 22 Frigate *HMS Chatham* has just achieved this milestone and she is 20 years old. Whilst as sea surveying in the Indian Ocean *Scott* demonstrated the benefits of international interaction when she came across an old friend in the shape of *USS Anzio*, a Ticonderoga class destroyer who just happened to be *Scott's* host ship during the New York Fleet Week last summer. The meeting allowed the two ship's companies to re-establish friendships and strengthen operational ties. As chance would have it, the crew of *Anzio* was celebrating the "hump" or mid-deployment day with a barbecue and fireworks, *Scott* was cordially invited to join in with their celebration. How could they refuse? Now back in her well established Survey ground of the North Atlantic, she is due to return to the UK at the end of the month for some much needed maintenance, before she deploys again in November heading for the Cape of Good Hope and the Indian Ocean for 2008.

HMS Echo has completed another 12 month deployment including work in the Northern Arabian Gulf and the Far East. She has had high profile visits to the Vietnamese port of Ho Chi Minh City which included a wreath laying ceremony for the People's Committee of Ho Chi Minh City. The visit provided an ideal opportunity for a group of Vietnamese officers from the Hydrographic Survey Regiment and some representatives from the United Kingdom Hydrographic Office in Taunton, to openly discuss the development of a future professional relationship between the two organisations for training and the sharing of hydrographic information.

HMS Echo's officers at the wreath laying in Ho Chi Minh City

This was a truly ground-breaking occasion in which all involved came away with positive aspirations for the future relationship between the two countries.

Commander Jeremy Churcher banging a Japanese drum

The highlights of the trip continued with Christmas in Hong Kong at a buoy in the spectacular Victoria Harbour under the shadow of the former *HMS Tamar* site. Sailing through frozen seas as she departed the city of Vladivostok in Russia, where she met up with the Russian Pacific Fleet and was the first true test of the SVHOs' cold weather capabilities. Seven days in Yokosuka, Japan, berthed in a US military area before spending another two days at the town pier as part of a good will visit during Yokosuka's centenary celebrations, not far from the Dreadnought Class Battleship, *JS Mikasa*, bequeathed to Japan at the start of the last century, a fitting indication of our long-term naval connections. Finally, visits to Port Klang, an overnight stop at Lumut, the Royal Malaysian Navy's largest naval base and a high profile visit to Monaco, the home of the International Hydrographic Office can't be forgotten as she surveyed her way home to the UK.

HMS Enterprise was the 2007 recipient of the Hope Trophy, awarded in recognition of her varied and challenging deployment to West Africa. Here she provided Rapid Environmental Assessment (REA) and conducted Advanced Force operations in support of the VELA Task Force, remaining on station to conduct oceanographic and bathymetric surveys, shaping the maritime battlespace and improving charted access to Cameroon, Gambia, Ghana and Gabon Guinea, Sierra Leone and Nigeria when the rest of the Task Group returned to UK in time for Christmas. *Enterprise* rose to the challenge in the face of variable riverine conditions, congested port approaches, busy shipping lanes and large areas of "white space" on the chart which had never been surveyed to any standard. In addition to her programme of Military Data Gathering duties she took part in Maritime Security Operations in the oil fields off Nigeria, the approaches to Port Harcourt, and along the coast of south west Africa. Now operating in the Arabian Gulf she is not due to return to the UK until April next year, when she will have been deployed from the UK for 22 months.

After returning from West Africa almost 12 months ago, *HMS Roebuck* has been busy surveying the South Coast Exercise Areas, with a little time taken out of normal operations to act as the MCMTA (Mine Counter Measure Tasking Authority) and to conduct REA for Exercise Noble Mariner in the Baltic. In just 12 days she gathered 75 square nautical miles of tactically useful survey data, including one harbour survey and six beach reconnaissances, proving her versatility and preparing her for her next challenge, providing MCM support to the Standing NATO MCM Group for all of 2008, only to return to survey operations in 2009.

Winching operation from HMS Enterprise

The Fleet Mobile HM Teams continue to provide Hydrographic, Meteorological and Oceanographic support across Defence. In the past year the teams have contributed to RN operations in the Arabian Gulf, the Atlantic and the Mediterranean, as well as exercises and trials closer to home. In many cases the presence of a HM team on a Frigate or Destroyer will represent the first time the Ship's Company have met or worked with a HM. The opportunity to make a positive impression cannot be understated and once embarked it is often hard to persuade the ship to let them go! With the introduction of the HM junior rate survey operations are beginning to represent a wider remit within the teams, allowing for surveys within the Sovereign Base Areas of Cyprus and training army units based at Marchwood in how to use the Portable Survey System. By early 2008 we expect to have HM Teams on ships deploying to the South Atlantic, Arabian Gulf, Mediterranean, West Indies and the Far East.

Army Survey Course Reflections

By Tony Keeley

I have long thought that an overview of the Army Survey Course, as it reflects British and Defence interests, could make a suitable article for the Ranger Magazine. In an idle, and perhaps unwise, moment I suggested as much to the editor of Ranger, Alan Gordon, and unfortunately he took me at my word. The following article is therefore a personal view of the various changes that have occurred over the 60 years of the course, the anniversary being in 2008, particularly as the course will undergo a significant review next year, broadening its customer base and perhaps losing its current title of the 'Army Survey Course' as it expands its scope to cater for the wider needs of Defence. I speak from the perspective of a student (No 60 ASC), a Senior Instructor and finally in that somewhat paternal role of the Training Adjutant and now Training Coordinator at RSMS. I will also draw on the excellent article written by James Prain to celebrate the 50th anniversary of the course.

An early course. Though the dress changed the essential ethos remained the same for many years.

The course was born at the Commonwealth Surveyors Cambridge Conference of 1947 initially as the Long Survey Course later to become the Army Survey Course in 1957. There was a recognised need to provide professional and technical skills for military surveyors, government surveyors of the Joint Survey Service who would work for the MOD, the Ordnance Survey, the Directorate of Overseas Surveys (DOS) and Commonwealth surveyors sponsored by their respective governments. Certainly the first course reflected this spread, students being RE, DOS and from Nigeria and Malaya. I cannot trace a course photograph and there does seem to be some conjecture as to whether this ran as a formal course. The course was designed to turn out competent surveyors for geodetic survey, topographic mapping and cadastral application and in fact this continued certainly to my course, No 60 ASC, the Large Scale Survey, or Trial Survey, phase including Land Law and Registration which gave us a break from computations though not from the risks of falling asleep. I would say that we were turned out as very competent observers though not quite up to that of Tech 1 Field Surveyors! My course also marked a break in attendance of Corps of Engineers from the USA. The report back to the USA from the American student was that the course was not suitable for attendance by Officers but more applicable to the Warrant Officer stream, which then tended to be the font of hands-on technical expertise.

My course which still produced surveyors destined for DOS and the like.

James Prain, in his article, mentioned the link between the ASC

and the creation of the Land Surveyors Division of the Royal Institution of Chartered Surveyors (RICS). Trial Survey formed an essential element of the course, somewhat mirroring the then Test of Professional Competence for the RICS. For many years membership of RICS was mandatory for the many Royal Engineer officers who would have early postings to DOS and careers in the Ordnance Survey. A significant change in the course occurred for No 72 ASC when, in 1986, Trial Survey was replaced by the Survey Project with an increased emphasis on professional management and less on technical prowess. Attendance by military or civilian students destined for service with DOS had long ceased in 1981 hence the likelihood of ASC students actually undertaking hands-on technical work was slight unless they had the opportunity to have a tour with 512 STRE. Officers' careers were now firmly within Military Survey, the last serving officer departing from the Ordnance Survey in the early eighties. It is interesting to note that a certain RE officer considered that he was not necessarily destined for the highest ranks as he did not receive a posting to the Ordnance Survey however, he did retire as a Major General! 1982 also saw the last ASC, No 67, who routinely attended the course in civilian clothes, another indication of the shift in emphasis to the military, though knowing some of the students it may have been their standard of dress!

A fairly typical course showing the strong legacy from Commonwealth days.

The composition of the Army Survey Course has always been a great indicator of the interests of the United Kingdom both on a National and Defence level. The early courses firmly reflected the Commonwealth interest and this legacy continued for many years. Some 150 students attended from Nigeria alone. Though there was early attendance by students from Saudi Arabia, 37 ASC (Capt al Sharani rose to be head of the National Survey agency of Saudi Arabia), it is quite significant that increased attendance occurred in the 80s and 90s mirroring significant UK defence sales with their associated geo elements. The end of the Cold War saw students from the former Soviet Bloc attending, UK Defence funded, though not necessarily with any geo spin off in mind. The use of the ASC as a tool in Defence diplomacy continues to the present with the ASC being a convenient and unclassified course to offer to those countries with which UK Defence is seeking to form stronger links.

Mr Nchamukong went on head up the national survey department of Cameroon.

Of vital significance is the part the ASC plays in the Defence Geographic Centre's (DGC) acquisition process. Places on the ASC can form part of a formal MOU as is the case of the

USA or it can be a means of balancing the exchange agreements. Also former international ASC students now occupy many senior positions in their own survey organisations, both military and civilian, enabling relationships to be developed, not requiring governmental top down approaches. Major Asif Ali attended No 71 ASC and is now the Surveyor General of Pakistan. In 1984, whilst on a 512 STRE tour I had the great pleasure of conducting a Doppler survey in Cameroon. The director of the survey department was a Mr Nchamukong, a graduate of No 28 ASC. It was probably only because of this connection that Military Survey was able to trespass on what the French considered to be their domain. Similarly, with the increased emphasis on operations, links forged through the ASC enable much easier cooperation in operational theatres. Major Feroze from Pakistan of No 75 ASC is now the Defence Attaché in Afghanistan, a useful contact in an important arena of operations.

The first ASC accredited with the MSc in Defence Geographic Information.

There have been various structural changes in the course and inevitable changes in content with technical developments. In 1963 the course was split into three parts with Part III being the final three weeks attended by only UK, US and Canadian students. The accreditation of the Army Survey Course as an MSc in Defence Geographic Information through Cranfield University saw significant changes in the structure of the course. The course had been of 16 months duration. It was shortened to a standard one year MSc with an introductory 5-week module and followed by a 3-week module, the duration of the complete ASC now being 14 months. The structure of the ASC also changed radically as it had to accommodate a 4-month individual research project. This inevitably meant that there was no longer the time for quite extensive technical exercises, so useful for the reinforcement of the theory delivered in the lectures. The structure is now that of a standard MSc with a taught phase of 10 modules, a group project and the 4-month individual research project. The first course awarded the MSc was No 80 ASC who graduated in July 1996 at Shrivenham. The partnership with Cranfield University has been a strong and enduring one, the MSc passing its rigorous three yearly periodic reviews with flying colours, so much so that the interval has now been increased to five years.

The course is now unique in offering the complete range of geo topics in the military context and the advent of the MSc has reinforced the international reputation of the ASC and we still see very strong overseas attendance. It is of interest to note that the USA attendance that lapsed between 60 and 82 ASC is now going strong with the current course having four American students. The MSc is also recognised as being extremely academically demanding as are all Cranfield University MScs.

But nothing stands still. After an initiative from the Joint Air Reconnaissance Intelligence Centre (JARIC) to gain MSc accreditation for training delivered on site it was decided that, because of the extensive experience the RSMS has with Cranfield University, the existing MSc in Defence Geographic Information should be the vehicle for exploring the possibilities. There has been an initial meeting with interested parties to discuss the possibility at which the scope was broadened to cover training within CDI's bailiwick. In essence the idea would be to use the model of the existing course but with parallel modules to suit other customer requirements, almost certainly some of these alternative modules not delivered by RSMS on site. It should be noted that the content of the current course designed for professional geographic officers, both UK and overseas would not necessarily change. With the next MSc Periodic Review due in 2009 the intention is to have the broad structure in place during 2008, including module descriptors even though delivery arrangements would not be mature enough for the parallel modules to be offered at that stage.

With these significant changes ahead it is highly appropriate that the Army Survey Course celebrates its 60th Anniversary next year and I would urge former ASC students to attend.

No.8 Long Survey Course, School of Military Survey, Hermitage, Berkshire (1951-52)

Back Row: Tom Labey (RE), Phil Bonsell, Alan Marsden (RE), Haydn Littlewood, Sgt Kelleher (Instructor), Unidentified Instructor, Bob Hodgson (RE).
Middle Row: Robin Auld, Ian Palframan, Ernie Harrison, George Mackay (RE), Anthony "Tiny" Ayers (RE).
Front Row: Hugh Peake, Harry Green, Ron Atkey (RE), Alan Minchell, Eric Downer, Archie Hamilton (Colonial Office Supervisor) and his hound.

Contrast the course make up and style of 50 years ago to 93 ASC, the latest course at Hermitage.

The current course reflects the strong overseas attendance and enduring links with the USA.

Not a Routine Wreck Investigation

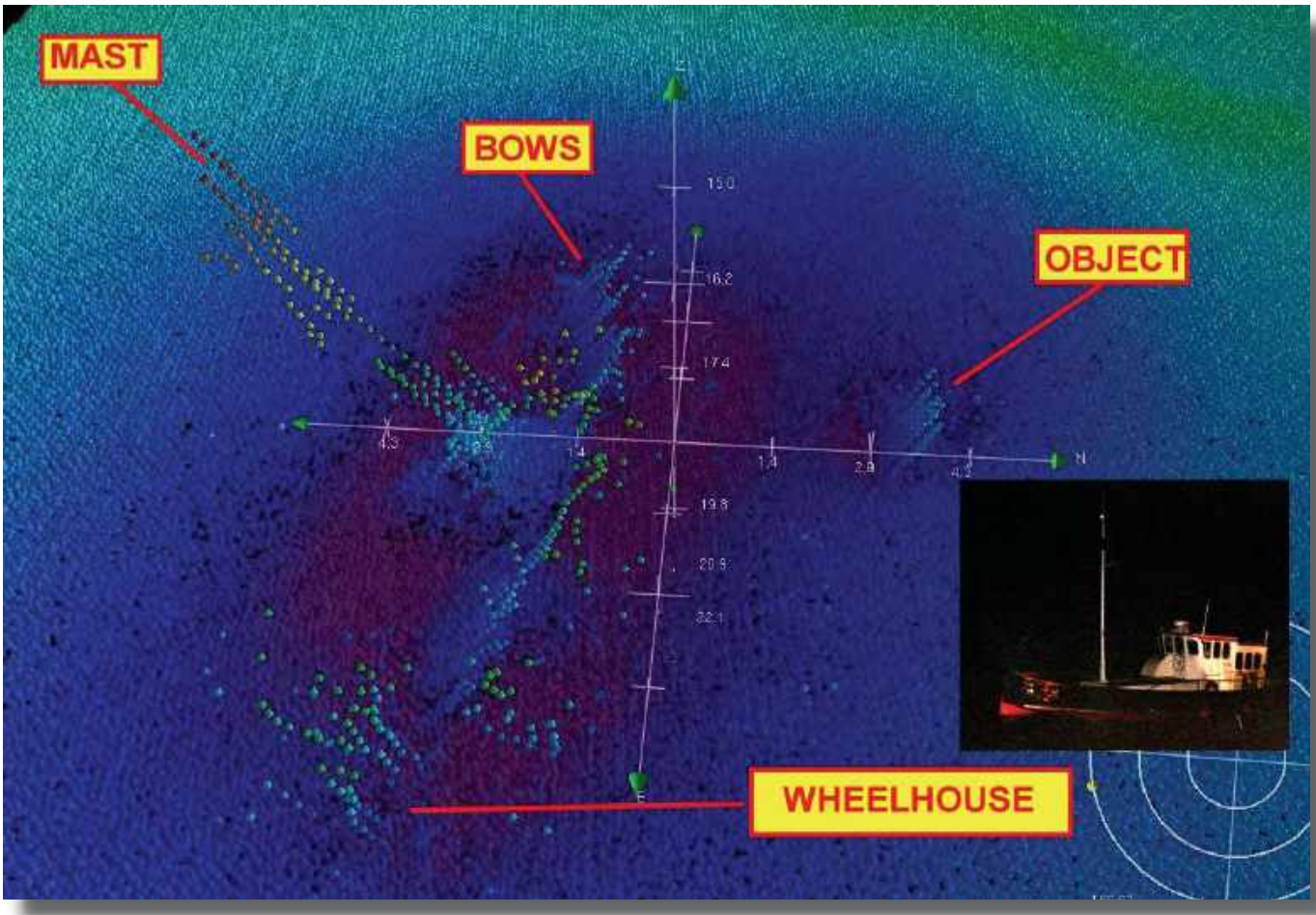
Lieutenant Commander Trefor Fox RN, Commanding Officer HMS Gleaner

There is nothing unusual in a Survey vessel conducting a wreck search, we conduct them whenever a wreck is located in our survey area. After all they are often more interesting than looking at endless swathes of sand waves. There is often an air of excitement onboard when we approach a wreck area waiting for the wreckage to appear on the screen. This excitement is even greater when the wreck is not charted (there's plenty around the UK Coastline) and appears out of the blue. During her deployment around the UK (now over two years) *HMS Gleaner* has investigated hundreds of wrecks (over 50 in one single survey). Along with this normal operational tasking Gleaner has conducted two slightly unusual wreck searches.

The first took place in Filey Bay in support of the Filey Bay initiative to search for the historic wreck of the *Bonhomme Richard*. The ship sank during the American Civil War (surprised me as well) and was the ship of John Paul Jones so has major historical significance to the United States as well as the local area.

Gleaner spent two days in the area searching one nautical mile around the reported wreck site. Previously the area had been predominantly surveyed by single beam and sidescan surveys, although *HMS Echo* conducted a search of the area two years ago. The data gathered was processed and combined with the data gathered by *Echo* using CARIS and FLEDERMAUS processing programmes to produce a comprehensive seabed map of the area surrounding the presumed wreck site. Although there was no hard and fast evidence as to the nature of the wreck and the jury remains out as to whether it is the resting place of the *Bonhomme Richard, Gleaner* was, however, able to catalogue several significant contacts in the area so as to guide dive teams in the future.

The second wreck search was tasked to *Gleaner* whilst conducting a routine survey in the river Humber in April of this year. This tasking in itself was not unusual, however, the circumstances surrounding the wreck were. The initial request had come from North Yorkshire Police and was part of an ongoing investigation into the activities of the *MV Illdyeu*. They had been monitoring the vessel, which had been running to and from the continent and had intended to intercept it on her



return. Unfortunately the *Illdyeu* was involved in collision during the final stages of her passage back to the UK and sank near Whitby. The crew were rescued by the local lifeboat but the police seemed to have lost their prime source of evidence as police divers are trained specifically for river work. However, earlier in the year the Police Dive Team in the Tyne had met and worked with *HMS Gleaner* whilst she conducted a survey of the Tyne and Approaches. Thus the plan was hatched to request assistance from the RN.

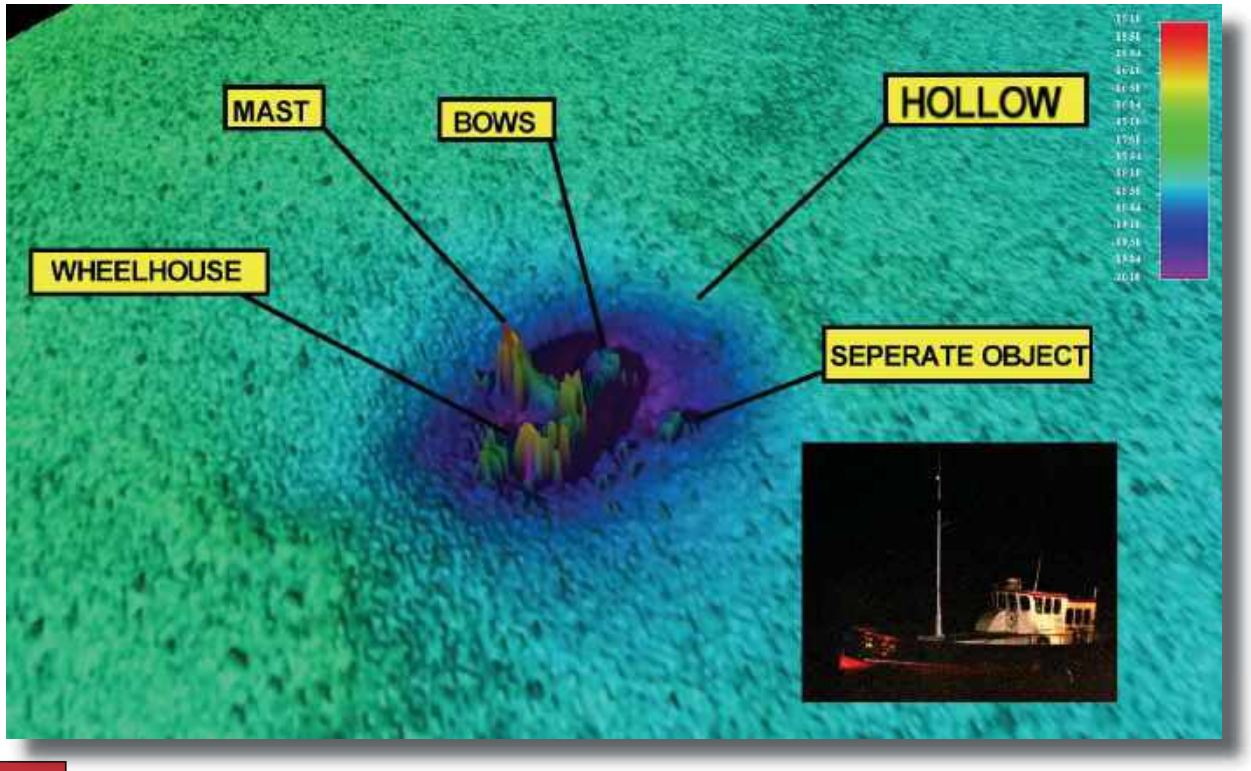
The request was granted and *Gleaner* was tasked to conduct a five-day search of Whitby to locate the wreck, ascertain her condition and suitability for further investigation by Divers/ROV. *Gleaner* left her survey area in the Humber armed with the last reported position and a digital photograph of the vessel in question.

Gleaner is fitted with Kongsberg EM3002 Multi Beam Echo Sounder with positional data coming from C-Nav Wide Area GPS and POSMV motion sensor. By adjusting the beamwidth to ensure sufficient data density *Gleaner* is able to conduct surveys to IHO Special Order standard without the use of sidescan sonar. During her current deployment she has proved that she is able to locate small objects (<1/2m^3) in up 50m of water with better than 20cm vertical and horizontal position.

After consulting local publications and tidal stream atlases it was decided to start the search in the last reported position and work in towards that shore Approximately 45 minutes after starting the search the wreck was found. It was clear from the image gained that this was the vessel in question. The wreck was close sounded to ensure as much detail as possible was gained. The search was expanded inshore to see if any further debris had been thrown from the ship as she sank. Other than an object adjacent to the wreck, nothing further was found so *Gleaner* returned to Whitby to process that data. A couple of hours after returning alongside the ship was visited by one of the investigating officers to see how the search was progressing. The speed at which *Gleaner* had located the wreck and produced an image was a complete surprise to him. Discussions revealed that a salvage company and the police themselves had searched for a couple weeks for the wreck and had found nothing. To say that they were pleased with the results is an understatement.

The following day *Gleaner* returned to her previous tasking, reporting her full findings back to CINCFLEET, the Police and UKHO. All told, the task was completed in four days (two were on passage), including processing and reporting. Whether the data gained by *Gleaner* lead to a conviction is not known, however, it did provide significant evidence to the Police Taskforce.

These wreck searches, conducted outside her normal tasking and with little interruption to this tasking prove the capabilities and flexibility of the RN's smallest vessel, to both her traditional audience and to parties that may have never have heard of her.



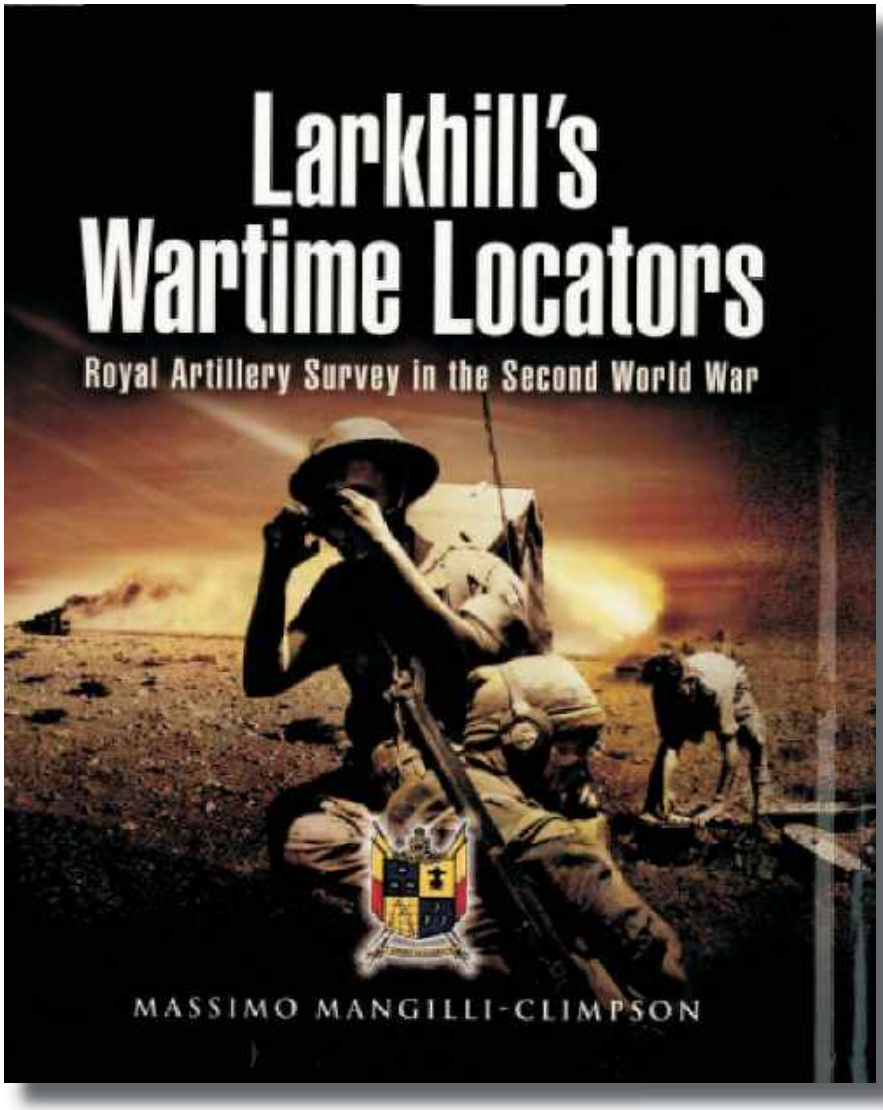
Larkhill's Wartime Locators

The History of Twelve Artillery Survey Regiments
(RA and IA) in the Second World War

By Massimo Mangilli-Climpson

Published by Pen and Sword 2007, price £45 ISBN: 1-84415-514-5

This book is a monumental work. It is monumental in the volume of historical material that it extracts or summarizes and that it collates, monumental in the scholarship and industry with which this has been done and, at 1.7kg, rather monumental in sheer weight. Its 698 pages set in 10 pt Baskerville are crammed with snippets and extracts from War Office letters, memoranda, reports and records, and from reports and other papers of the RA School of Survey, the Survey Wing School of Artillery, and other establishments, and from War Diaries of units and formations, and unit monthly Returns of Officers, and especially from letters and recorded interviews of individuals. The author appears to have interviewed every surviving officer and a considerable number of the surviving other ranks who served in the British Army Survey Regiments RA in World War II. Since all these survivors must have been over 80, this alone has been a most praiseworthy feat of preserving recollections while it was still possible to do so. The book generally gives references to the original authorities for statements made. This will be of immense help to future researchers.



At first sight it might seem surprising that a treatise of this magnitude and detail on the British Army's artillery survey regiments should be researched and written by a lecturer in history at a university in Italy, resident in Italy and having two Italian names and an Italian noble title. The explanation is that the author was born and educated in England and his father was a greatly respected and popular officer in the 3rd Survey Regiment RA throughout the Italian campaign. His mother brought the Italian links and so the author evidently grew up in a household where life in and exploits of the Survey Regiments in Italy were no doubt a topic of ordinary domestic conversation.

The reminiscences of veterans tend to be collections of anecdotes retold repeatedly since 1945. In regard to commanding and senior officers, these recall eccentricities, peculiarities and foibles, since extolling good solid worth or merit does not even raise a smile at parties. Similarly, any apparently irrational or futile action or decision by the War Office or higher command is recounted but not

the mundane or unexciting directive or policy however wise. Moreover in repeated reminiscence, eccentricities, illogicalities, and foibles tend to be accentuated and sharpened. The author himself also seems, probably unwittingly, to have spiced up some reminiscences in the course of editing them. A similar "spicing up" could affect war diaries since these were seldom written by officers who carried out operations described, they being still heavily engaged in prosecuting the war. In consequence, the reader unfamiliar with the subject matter might be forgiven in drawing the conclusion from the book that the Survey Regiments in WWII were a clutch of private armies out of control and with senior officers who were clowns. Two examples follow where the circumstances are within my own personal direct knowledge.

At page 16, the author describes my being ordered in September 1939 to take lorries to Cambridge and collect the equipment of the artillery survey unit of the University's Officers Training Corps, and to deliver this equipment to 40 Survey Training Regiment, then forming at Larkhill. Bill Offley, then the regular Sergeant who was the Permanent Staff Instructor of the artillery survey unit handed the equipment over to me. The author asserts that it was Bill Offley and I "who were the perpetrators of the ending of the [artillery survey unit] at the University". This is way over the top since Bill Offley first sought and obtained confirmation and elaboration of the orders for transfer of equipment. The further instructions, like the original, seemed to have emanated from the Staff Duties branch at the War Office responsible for provision of equipment and personnel. Both instructions reflected Government policy and thinking of the time which were that the role of the University's Corps in training artillery survey officers was to be taken over by 40 Survey Training Regiment and that there would be no requirement for artillery survey officers drawn from the University's wartime students, who would be foreign nationals or not medically fit – by contrast, officers fit for home service only trained by the gunnery unit of the Corps could be posted to new anti-aircraft and coast defence batteries.

Lt Col. Hilary Clegg, the commanding officer of the 7th Survey Regiment RA from the end of 1942 until August 1945 appears at pages 344-5 and elsewhere to be an eccentric, his foibles overwhelming his innovative nature, his technical and military knowledge and his capacity for thoughtful appraisal of courses to be followed in organization, methods and equipment of artillery survey. But, to outsiders with an overview of all survey regiments, there was no commanding officer of these regiments more competent, as such a commanding officer, than Hilary Clegg.

To the historical researcher the qualities of anecdotal material will be familiar and will not detract from the sterling value of this book. To the ordinary reader these qualities will serve to enliven the text.

Bill Taylor

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Book Review

"NORMAN COLE IN WORLD II"

By Norman Cole

This is a book which the Western Morning News review described as *"An extraordinary story of an ordinary man"*.

Norman Cole was born and brought up in Torquay. When war was declared he was working for Vanstones, a local contractor and was sent to work as a surveyor on a "War Cabinet Priority" project at the Royal Naval oil fuel depot, Thankes, Torpoint.

In 1942 he was called to commence his military service at the Royal Artillery School of Survey at Larkhill. After months of training he was posted to the 9th Survey Regiment of the Royal Artillery, took part in the Normandy D-Day landings and was involved in front line action through France, Belgium, Holland and into Germany.

Norman says *"There was a race against time to get the book published because my two sons pressurised me into getting the memories into print with a sense of urgency because one of my sons had been diagnosed as having the aggressive form of Motor Neuron Disease. When we were able to put a copy on to his hands (he can no longer grip anything) his eyes filled with tears of joy at having it."*

The book has had a great deal of publicity because the Ministry of Defence refused permission for the use of the regiment's coat-of-arms without payment for a copyright licence fee. Following articles in the press and a BBC 'Spotlight' interview, several people offered to pay the £50 demanded by the Ministry. A friend, in disgust, donated the money and the book has now been published.

In addition to the narrative, the book is probably unique in that it contains copies of every letter written home from the battlefront by an individual soldier. The Western Morning News summarised it as being *"A book peppered with letters from home, extracts from maps, leaflets dropped on the enemy and no shortage of romantic entanglements with young girls". Peter Hart of the Imperial War Museum in his foreword states that ...."Norman would fight his war using his brain, not brawn - although as he was later trained in 'silent killing methods' such a distinction can be over-stated. . . They may have been technicians, but for the next year he and the observation parties were frequently right at the sharp end carrying out their vital role of pin-pointing German artillery and anti-aircraft batteries prior to their destruction by the British guns. When you hear all he has experienced you will see why I find the word 'ordinary' a little inadequate in describing a man like Norman Cole. I am proud to have met him and I commend his book to you all."*

All profits from the sale of this book are being donated to the Motor Neuron Society.

The book is priced at £9.95 + £1 p&p and can be obtained from: Geoff Cole, Geoff Cole Construction Ltd., Unit 12, Woods Browning Industrial Estate, Respryn Road, Bodmin, Cornwall, PL31 1DQ.

Follow The Sapper

An Illustrated History of the Corps of Royal Engineers

The Institution of Royal Engineers has just published a superb "coffee table" book telling the story of the Corps from its early origins through to today. Written by Gerald Napier, former Director of the Royal Engineers' Museum and author of Sapper VCs, it is lavishly illustrated and includes many of the Corps' paintings and photographs of items from messes, the museum and library including one showing the Military Survey 250th Anniversary Silver Centrepiece that was presented to Military Survey jointly by the DSA and the Corps. The text tells the story in a simple, clear and very readable fashion, this is the book for those who would probably not consider reading the official Corps History but who, nevertheless, have an interest in the Sappers.

Survey and 'Geo' get a very fair representation appearing both in the chronological chapters, as fits the story, as well as having two dedicated chapters. Among the many maps included is the one drawn by Ranger designer, David Johnson, to commemorate the end of the Gulf War. This book should be on every Ranger reader's Christmas list. Details for purchasing it are included in the advert elsewhere in this issue.

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The Royal Artillery Operation for Locating V2 Launch-Sites in World War II, 1943 – 1945

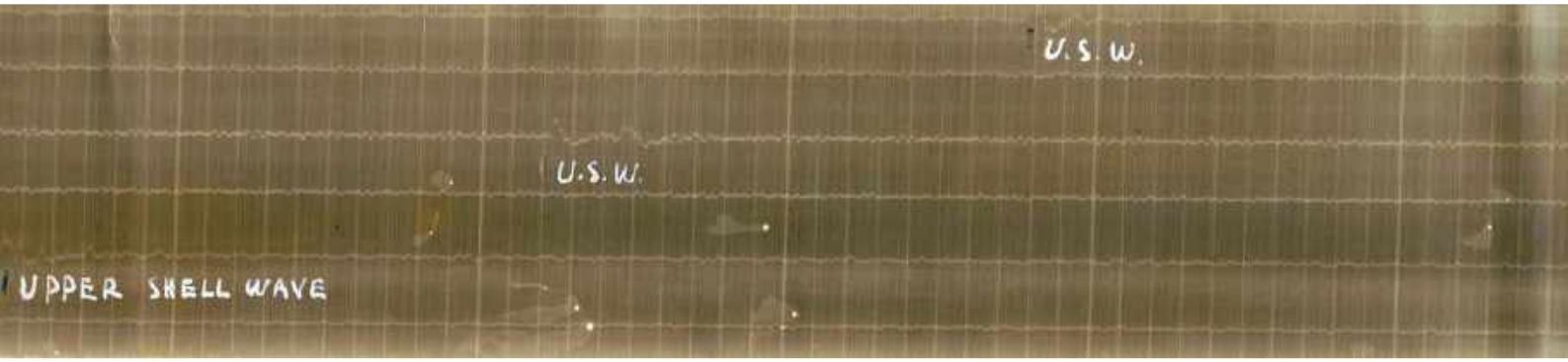
By PWE (Bill) Taylor

Late in 1943 the Government became strongly alerted to the possible effects of the use of supposed "V" weapons under development by the German forces, and decided that the British Army should produce and operate a means of locating long-range rocket launching sites in order to provide another locating system as an alternative to the large coastal radar stations operated by the RAF. Not unnaturally this task was turned over to the gunner surveyors and the Air Defence Research and Development Establishment (ADRDE, the Army's research and development establishment located at Malvern - with the RAF's known as TRE). As the RAF had concluded then that tracking V2's by radar was likely to be impracticable, the Army was invited to produce a method not using radar. It was decided to use sound ranging. After the 7th Survey Regiment, when instructed to operate a lattice of 12 sound ranging microphones in squares proposed by ADRDE, had pointed out that there was no known way of using sound ranging to track a rocket or locate its launch site, I was appointed in December 1943 to command the operation and allowed a small headquarters to plan how to do it and to control the troops employed. This headquarters was to provide, when operations began, the requisite technical reinforcement of the sound ranging troops placed under my command. A sound ranging troop of the 7th and a sound ranging troop of the 11th were designated as to come under my command when firing V2's started or was imminent. The headquarters was called "Headquarters, Royal Artillery (Sound Ranging"). It had one other officer – Captain Keith Dowell – who ran the routine administration as a battery captain or adjutant. But it also had, attached, two civilian scientific officers from the Army Operational Research Group (AORG), which had been instructed to give assistance in working out a method of operation. Lastly, it had an RAF Meteorological Officer – Flight Lieutenant R.J. (Bob) Murgatroyd – and about eight RAF meteorological other ranks.

As the civilian scientific officers of the sound ranging group at ADRDE were unable immediately to provide any system of locating, it was agreed with Dr Cockcroft, the head of ADRDE, that they would take no further part in devising a system but would leave it entirely to my headquarters and AORG. The two AORG civilian scientific officers involved were Dr (afterwards Professor) "John" Clews and Norman Bunten. John Clews was a very able scientific administrator who had earlier in the War been in the Scientific Advisor's office in the War Office and was thus well versed in getting things done by the War Office and the Ministry of Supply, an ability which proved of immense value in the operations.

The ADRDE's proposal of a lattice of 12 microphones laid out at the corners of five adjacent 10km squares was based on the idea that the rocket would be propelled by a series of explosive charges let off in succession in flight. They thought these explosions could be separately located in three dimensions using time intervals of arrival of the sound at different microphones of a lattice strung out over Kent. I had experience of locating long-range artillery in the last month of the campaign

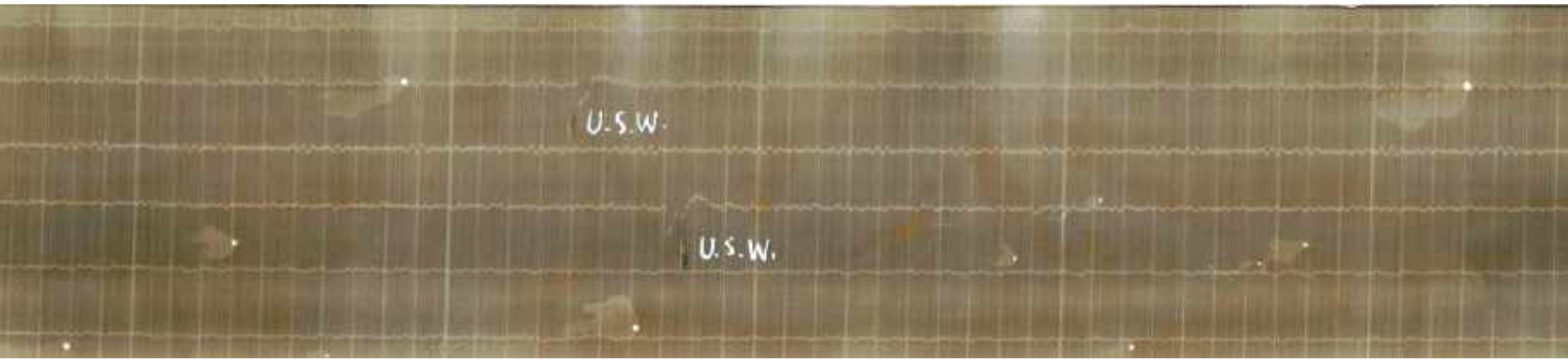
Over the next few pages are sections of (faded) sound ranging film recording sound at five most north-easterly microphones of the continental lattice – the sixth microphone of this group was temporarily out of action – during flight of a V2 at 6.30 pm on 26 December 1944. This V2 was launched near Enschede, targeted on Antwerp. It was a cold clear still night during a continuous month-long frost. This recording shows (i) the supersonic boom from the upper part of the trajectory (the "Upper Shell Wave"), but also, uniquely, (ii) the roar of rocketing containing and obscuring the rim of the supersonic boom travelling almost horizontally near ground level (the "Lower Shell Wave") and (iii) the burst of the V2 in Antwerp.



in North Africa, where I commanded a sound ranging battery in the 5th Survey Regiment and then was a 5th Corps Counter-Battery Officer. The German Army in Tunisia used 17cm guns of long range in the final stages of the campaign. Despite the ADRDE ideas, I knew from this experience that the dominant, and most probably the only usable, sound from the rocket was going to be the supersonic boom it could not avoid making if it was to travel 150 miles or more without wings. I therefore proposed that the supersonic boom, called by sound rangers the "shell wave", should be used to track the rocket. I was able to propound the principles given below of a system of locating a part of the track, and thus by extrapolation determining the position of the source, of a long range rocket, from recording the supersonic boom with a lattice of microphones, and all the planning was directed to operating this system. My calculations, based on the known laws of air resistance to projectiles, showed that, despite the thin air through which the rocket would pass at a height of 200,000 feet or so, the supersonic boom would be as powerful at the microphone as that from a 5.5 inch shell recorded across the artillery ranges on Salisbury Plain, and so would be of adequate strength. Unlike the report of a gun, recording of which was completely dependent on favourable meteorological conditions – this usually meant that the wind had to be blowing from the gun to the microphones – recording the supersonic boom from a rocket was always going to be possible whatever the meteorological conditions. It was fortunate that planning was thus aimed at locating from the supersonic boom, since in practice nothing else was recorded from a V2 – apart from its own explosion on impact – except on one occasion during the Winter's frost in Holland when the noise of the roar of rocketing in the early part of the trajectory, mixed with the horizontally-moving shock wave generated at a low altitude and projected forward horizontally when the rocket passed through a speed of 1,000 mph or so, could be seen on the recording film. The magnitude of the sound also proved in practice to be in accordance with my calculations.

Although I myself had hoped we might devise a method of computing the trajectory from the time recordings with calculating machines, or might reduce the process to a two-dimensional graphical means, no one was able to devise such a method, and a three-dimensional graphical plotting equipment was designed and made in order to produce the result. This original plotter was devised by John Clews and Bob Murgatroyd and made in the ADRDE workshop under arrangements made by John Clews with Dr Cockcroft, the Director of ADRDE. To achieve three-dimensional plotting it ingeniously used miniature searchlights each casting a narrow parallel beam of light that could be set at the bearing and elevation at which the supersonic boom had reached a particular group of microphones. The appropriate time intervals could be converted into a corresponding bearing and elevation by arithmetical computation coupled with a simple graphic converting apparatus suggested by Norman Bunten.

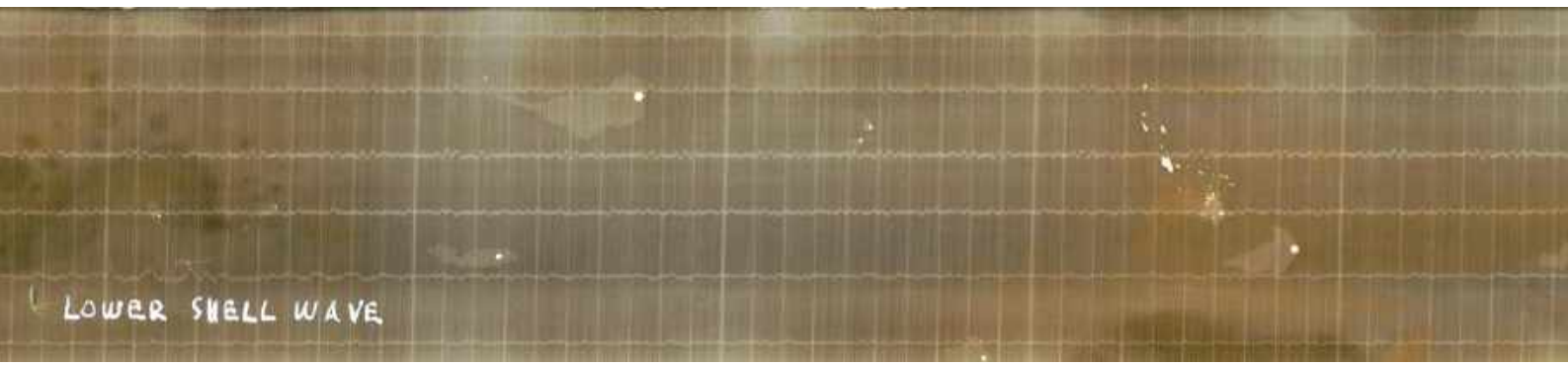
The basic principle behind the locating system was that each element of the supersonic boom would, in calm air at a uniform temperature, travel outward from its source in a straight line. Since it originated from the rocket, the straight line, represented by the miniature searchlight beam directed backwards from a recording group of microphones, must pass through the trajectory. In practice, the air is neither still nor at a uniform temperature. The effect of wind is to displace the entire sound wave constituting the supersonic boom at the speed and in the direction of flow of the wind. More importantly, variation of the wind velocity and of temperature with height causes the path of the sound to curve upwards or downwards to a certain extent. Its direction of arrival at the ground is therefore slightly less or slightly more elevated that the straight direction from the same point on the ground to the point on the trajectory from which the sound emanated. Wind and temperature corrections must be applied to the measured time intervals to allow for this as well as allowing for the general



Operations room in England. Four films are laid out for reading on the tables, each film looped in a stretched "S" with two hairpin bends. The films were fed up from the recorder room below through slots in the floor and the wooden shafts seen at the far end of the tables. The bearings and elevations computed from the film readings were passed through the hatches in the wall on the left to the dark room housing the plotter.

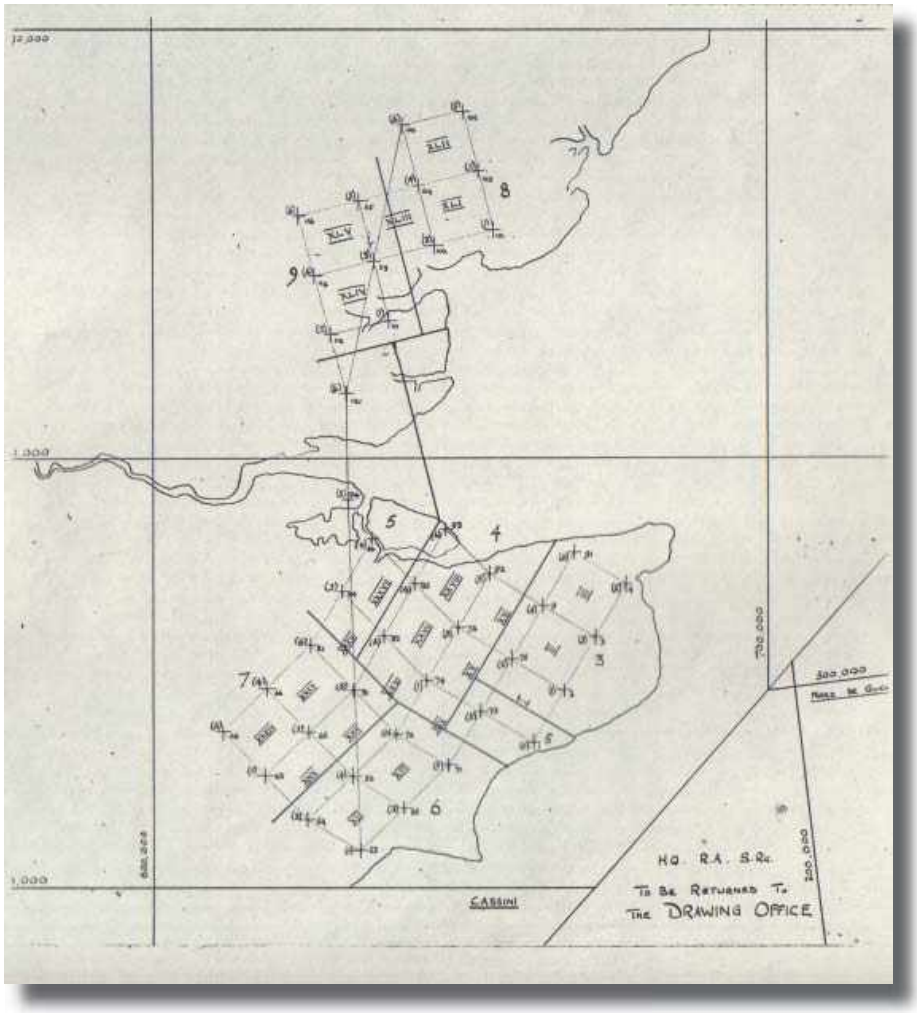
drift on the wind and the change in speed of sound with temperature at the different heights encountered. The mathematical formulae for these corrections needed to be determined and methods of evaluating them speedily needed to be devised. I devoted Christmas Day and Boxing Day 1943 to this, staying in a hotel in London. The formulae and method for correcting sound coming down to the ground from above at a substantial elevation did not present any great difficulty, but the corrections for sound travelling nearer the horizontal such as we hoped we might get from the 1,000 mph point mentioned above presented much greater difficulty. This was the problem I had looked at and been unable to solve neatly in 1940 when engaged on cross-channel sound ranging of German guns mounted on the French coast near Calais. Its neat solution had also baffled the Professors of Mathematics and Physics who had then been asked to consider the problem. I was fortunately now able to hit on a solution of it. The key to solving the problem was not to attempt to correct the total time of travel from source to microphone but to produce a formula for correcting the time interval between any two microphones, a relatively small distance apart, according to the direction of the displacement between the two microphones. For any given wind and temperature measurements, graphs could then be quickly prepared from which the necessary corrections could be speedily read.

Correcting for wind and temperature required knowledge of the wind velocities and temperatures at heights up to the height of the part of the trajectory from which the recorded sound came. Meteorological radio sonde balloons could be put up to 70,000 feet. But the part of the trajectory in question was likely to be 200,000 feet up. We were given the use of a long-range gun in a land mounting sited near Dover that was manned by the Royal Marine Siege Regiment. It could burst shell over Dungeness at a height of 100,000 feet, the highest capable of being reached by any British piece of artillery. We had meteorological shoots at about one month's interval when the sky was clear of cloud so that the drift of the smoke puff could be followed by widely spaced observers with flash spotting instruments. An anti-aircraft radar set was stationed at Dungeness. It was specially adapted, and coupled with a sound ranging microphone there, by two REME officers permanently attached to my headquarters. This equipment enabled them to time accurately the descent of the sound of the burst and measure accurately the distance up to it. From these quantities



the temperature at 100,000 feet could be deduced. Fortunately the wind seemed to be fairly steady though very strong at 100,000 feet, but to exhibit a seasonal variation, Westerly for about two-thirds of the year and Easterly for the remaining third.

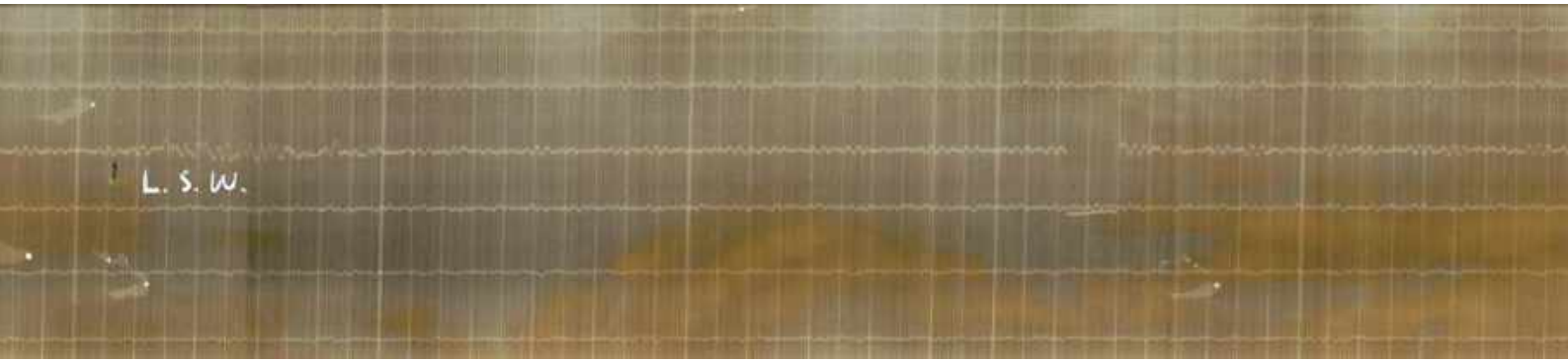
For winds and temperatures above 100,000 feet, timings of anomalous sound propagation were made. Sound does not usually travel very far along or near the ground since the falling off of temperature with increasing height curves the path of sound upwards. But about 200,000 feet up the temperature is again at or above the ground air temperature. Sound from a loud explosion can therefore travel at this height for very long distances and then return to the ground. Guncotton charges were exploded on Trawsfynydd artillery range in North-West Wales and recorded in Kent and, after November 1944, in Belgium, the time of the original explosion being also recorded on the same sound ranging film. The North of Norfolk to Kent and vice-versa were also used. Sufficient information about the relevant winds and temperatures was obtained by this means.



Lattice in England as finally developed with 42 microphones

In addition to meteorological corrections, adjustments had also to be made to the time intervals for differences between microphones in height above sea level. A correction had also to be made for the bowing of the V2 trajectory as seen in plan, relative to the ground, owing to the rotation of the earth during the V2's flight.

About February 1944 it was decided that the troop of the 7th needed to be completely released so that it could take part in the "D" Day invasion later that year, and that the 11th, which was not destined for 21 Army Group, should be wholly devoted to V2 locating. The 11th was moved to Canterbury where HQRA (SRg) was already installed in buildings abandoned for the duration of the War by King's School, Canterbury. Both sound ranging troops



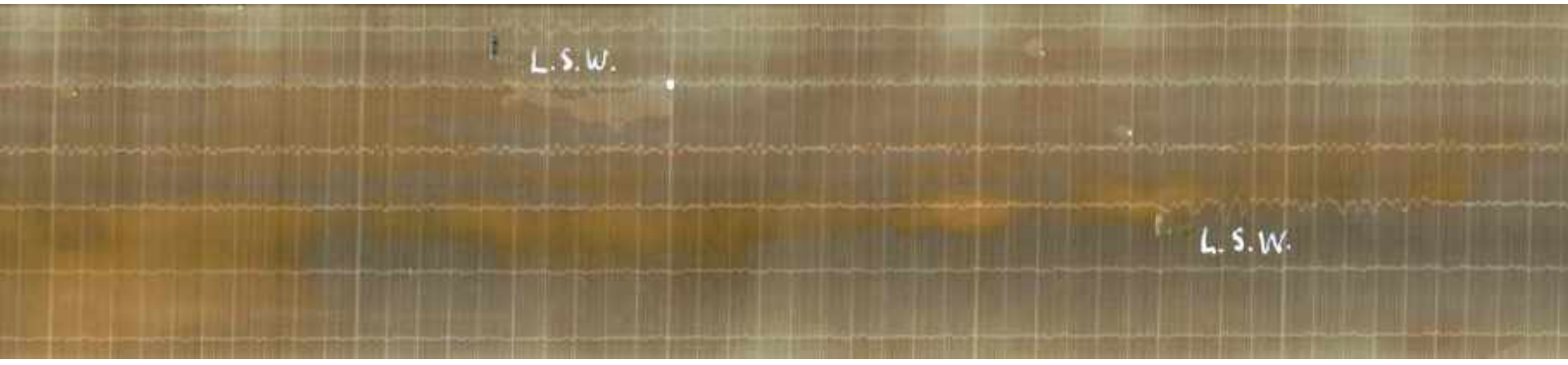
of the 11th thus became immediately and exclusively allocated to the V2 sound ranging operation and the survey troops of the 11th were available for surveying in additional microphones. In addition, observation posts of the 11th were deployed on four or five high points in London to locate fall of V2's. This provided a final point, on the trajectory, that was an anchor in the plotting process. The posts were a central one at the top of the Victoria Tower of the Houses of Parliament, a Western on a gasholder in Chiswick, an Eastern on the water tower at Shooters' Hill, a Northern on Hampstead Heath and a Southern on the Crystal Palace ridge. A plotting centre for these posts was established on a section of the disused platform of the Brompton underground station on the Piccadilly line at Brompton Square, South Kensington. This station had been closed for some years.

To begin with, it was intended that two naval ships should be deployed in or near the Straits of Dover to provide a sufficient early warning of the launch of a V2 to enable the recorders to be started before the sound reached the microphone. But it was soon appreciated that the V2 itself would burst in London sufficiently before the sound arrived to enable the recorders to be started on a telephoned warning from the London observation posts. The naval vessels were therefore released and in practice warning by the posts observing fall of V2's was alone employed.

In early 1944 the lattice was enlarged by adding twelve further squares or diamonds, the latter where the coastline did not admit of squares or the space between existing squares could only be filled by diamonds. The lattice then consisted of 28 microphones all connected to Canterbury using civilian telephone lines. The large microphones in service with Survey Regiments from before World War II were satisfactory for this purpose and freely available since they were being replaced in other sound ranging units by the new linear microphones. Similarly, "Mark II" recorders (as they were generally called, although officially designated "No. 2, Mark I") were used at Canterbury. Most of these recorders were withdrawn from Survey Regiments that had been equipped with the smaller and lighter Mark III model.

Lieutenant Colonel Brooke, when commanding the flash spotting battery of the 2nd in 1940, had deployed flash spotting posts to observe German cross-channel guns installed near Calais: he arranged in early 1944 to deploy a similar flash-spotting base to gather V2 information. Because of doubts whether three or more widely separated posts could be got to observe the bearing and elevation of the moving rocket, or the same point in its smoke trail, at the same instant of time, and whether low cloud would prevent optical observation from the ground, a detachment of ATS kine-theodolite operators and a number of RAF WW1 "dugout" "balunatics" were added to the troops employed. These were intended to deploy a base of kine-theodolite posts and another of captive balloons carrying observers with prismatic compasses. Once the V2 bombardment started, it was found that simple ground-based flash spotting instruments could locate points on the rocket trails with sufficient frequency and good accuracy so that the additional support of kine-theodolites and captive balloons was not really needed.

With the extra locating facilities available in 1944, a Counter-Battery Officers Staff commanded by Major Sam Attenborough was also moved to Canterbury to join the organization. About mid-August 1944, Basil Brooke was promoted to the rank of Colonel and made overall commander of the entire group of different army units then engaged in V2-site location. Owing to the secrecy of the work this formation was just called "Special Defence". Colonel Brooke, as Commander, Special Defence, was provided with a small headquarters staff and set up his headquarters at Egerton Crescent, South Kensington, London. Dr Clews joined his staff, though later remaining generally at Canterbury.

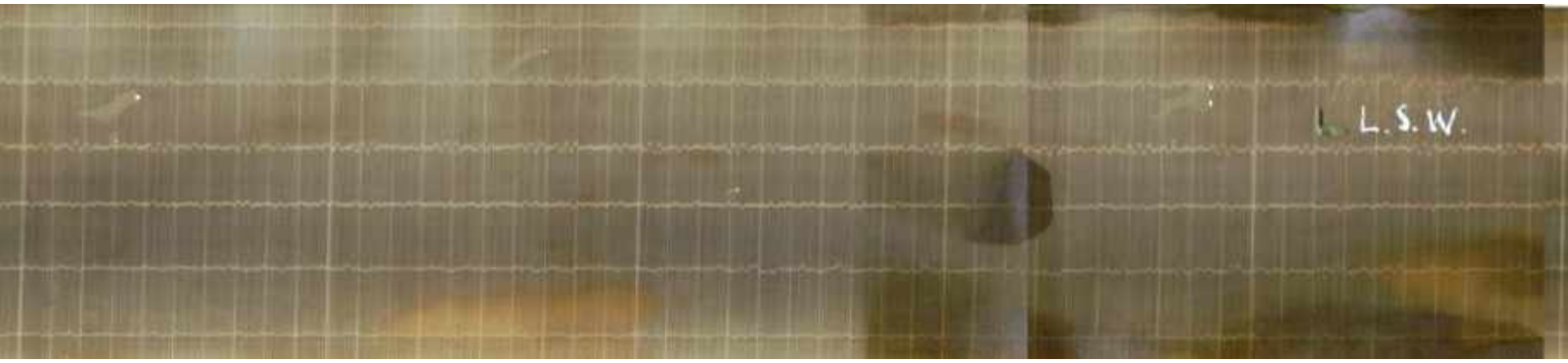


By the beginning of September 1944 the allied troops had advanced through North Eastern France without any V2's having been fired. Two scientists engaged in advising the Government on V weapons visited Canterbury early in September to see the sound ranging installation while it was still in existence. They conveyed the information that, in view of the allied advances, the danger from V2's was officially over and that we could stand down. However, as no orders had arrived through the proper channels to do so, the watch for fall of shot and the manning of the recorders and operation room fortunately continued.

Two or three days later in the early evening of the 8th September the first two V2's fired at London were launched together from a street in Wassenaar, North of The Hague. One landed at Chiswick and the observation post there, still alert, gave the signal to start the recorders, a message we had been expecting any time over the past six months. The films showed that there was another V2 that had been lower in its trajectory and had landed a few seconds ahead of the Chiswick one. Both had come from the East on trajectories well to the North of all the microphones, the Chiswick one to the South of the other though with a bursting point further West. Shortly after, a message arrived that the police had reported an explosion in Epping Forest. They gave it the time when it was heard and recorded at the police station: this was slightly later than the time of the Chiswick explosion. In the official records, Chiswick is therefore credited with the first V2 explosion, although the sound ranging film proves that the Epping Forest one must have been earlier. A location in Southern Holland for the launching sites was given by the sound ranging plotting process within an hour. This could not be done with much accuracy since the trajectories were wide of the lattice of microphones intended for V2's launched from the coastal area of North-Eastern France and Western Belgium.

Three-dimensional plotter set with bearings and elevations of rays pointing to origins of supersonic boom reaching microphones of lattice in England. The vertical screen was pivoted on a vertical spindle placed on the map grid location of the point of burst obtained by cross-observation by flash-spotting posts. In this instance the burst was in north-east London. The screen was rotated until a trajectory descending to the point of burst was formed by the faint points of light seen on the tracing paper at the intersections of the rays with the screen. The "searchlights" not set were spares not currently in use.

Steps were taken immediately to establish further squares of microphones in Essex so that the lattice spanned the probable trajectories of future rockets. Another 13 microphones were put there and one



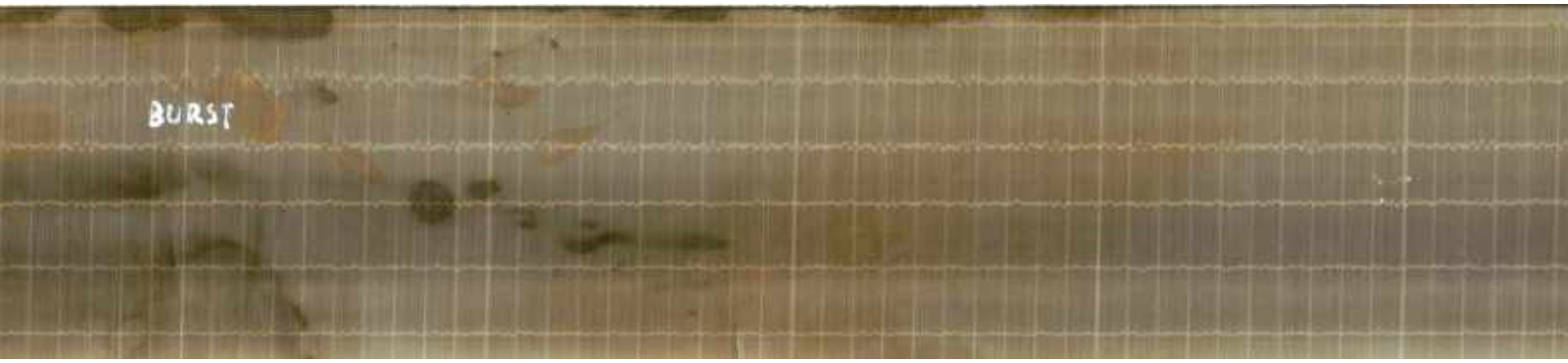
more South of the Thames. These were connected with Post Office telephone lines to Canterbury and terminated in two further recorders and two spare channels on an existing recorder. The entire lattice then consisted of 42 microphones operating seven recorders. An eighth recorder had to be used to allow for maintenance. All of these were the Mark II type recently withdrawn from other survey units as the Mark III smaller and lighter recorder became available.

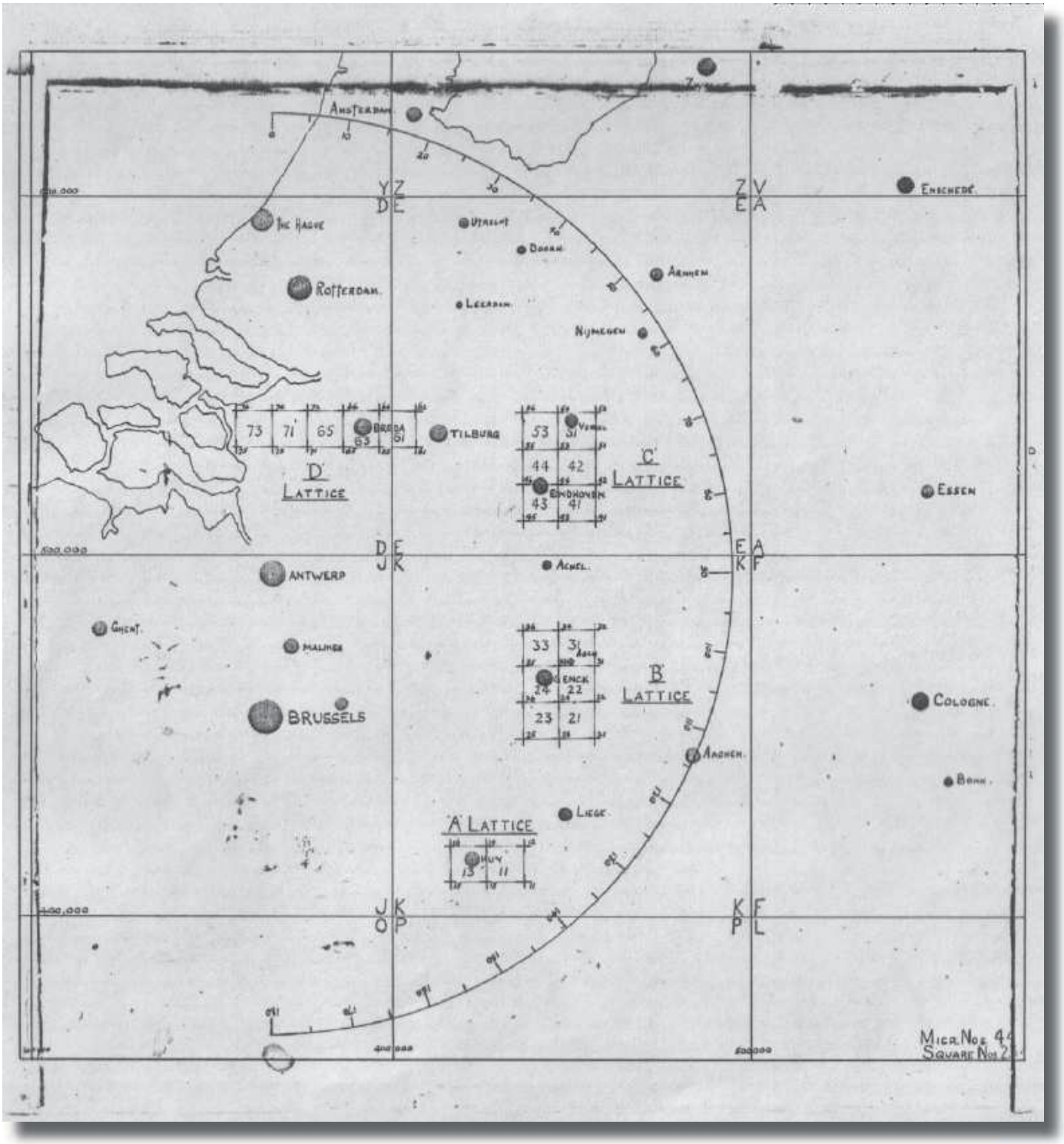
The Essex microphones enabled a considerable increase in accuracy to be obtained but sound ranging could never do much better than locate within a 5km by 20km box. However, in view of the mobility of the launching equipment, counter-measures had to aim at intercepting the railways to the launching area from the place of manufacture. For this purpose the sound ranging locations were sufficiently accurate. As expected, the sound ranging system always produced readable films provided that the recorders were started. For V2's landing in or near London, the observation posts were invariably able to do this. But of course V2's that fell much short of London, or were directed elsewhere were necessarily missed.

By early November 1944 it had become evident that more V2's were being fired at Antwerp than at London and, because of the shorter range, Antwerp V2's were more concentrated in and around the target than the London ones. Moreover, the RAF coastal radar stations were found to be able to track the London V2's with sufficient accuracy and certainty. In consequence, the entire Special Defence organization, apart from the RAF balloons and the kine-theodolite unit, was put under SHAEF and deployed in Belgium and Holland, with the exception of a detachment left at Canterbury to deal with the sound ranging meteorological observations in England. This detachment was called HQRA (SRg) and had most of the administrative staff of HQRA (SRg) but its surveying other ranks were drawn mainly from 11th Survey, the surveyors of HQRA(SRg), and myself as its commander and in charge of the sound ranging operation generally, going to Belgium. The meteorological section had to be divided between England and Belgium. Its enlargement for this purpose was accomplished by adding a number of WAAF meteorologists.

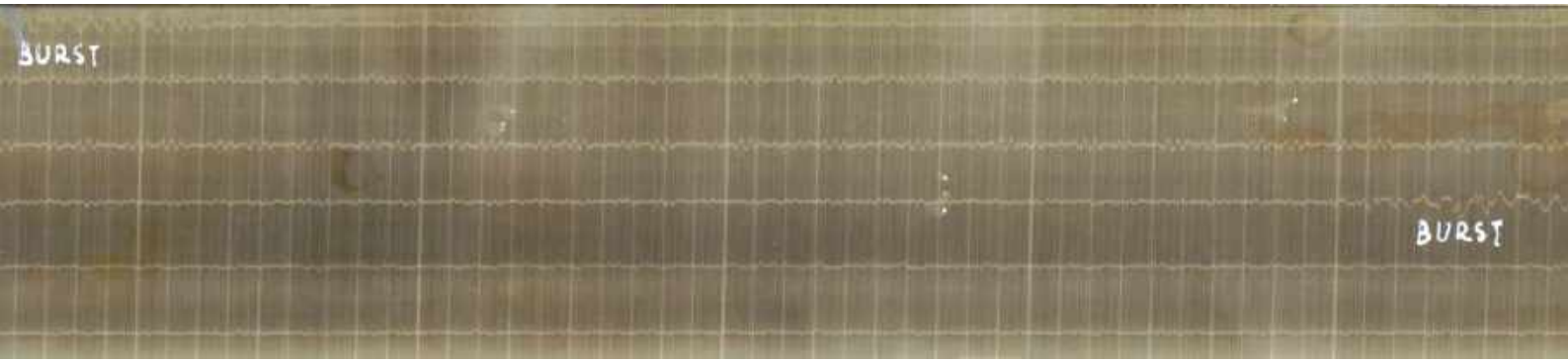
On the continent Colonel Brook's headquarters was established in Brussels and the operating units had their headquarters at Malines, except for the flash-spotting base which had its plotting centre in the Liege area. At Malines, our headquarters shared a bank building with the headquarters of the RAF unit sent to the continent to develop tracking of V2's with mobile radar. I made Malines my base, but visited our other stations on the continent and at Canterbury and Dungeness continuously.

A sound ranging lattice was installed consisting of a line of five squares arranged East-West through Southern Holland, two groups of six squares in double files of three squares each North-South in Eastern Holland and Eastern Belgium, and a pair of squares in the Ardennes. Each of these 19 squares had ten kilometre sides and was arranged exactly grid North-South for ease of plotting. To economise on public telephone line requirements, while the troops were being moved to Belgium by sea and road, enough carrier equipment was designed, made and flown over to enable six microphones to be operated on carriers over each telephone line. The outstation carrier equipment and local line maintenance sections were at local headquarters at Breda, Eindhoven, Genck and Huy. Again, there were in all 42 microphones with seven recorders in operation at any one time. The carrier equipment and timing equipment and the civilian lines, as also communications back to Canterbury used for meteorological purposes, were arranged with outstanding skill and speed by Walter Marriott, a civilian scientific officer from the Signals Research and Development





Continental (42 microphone) lattice

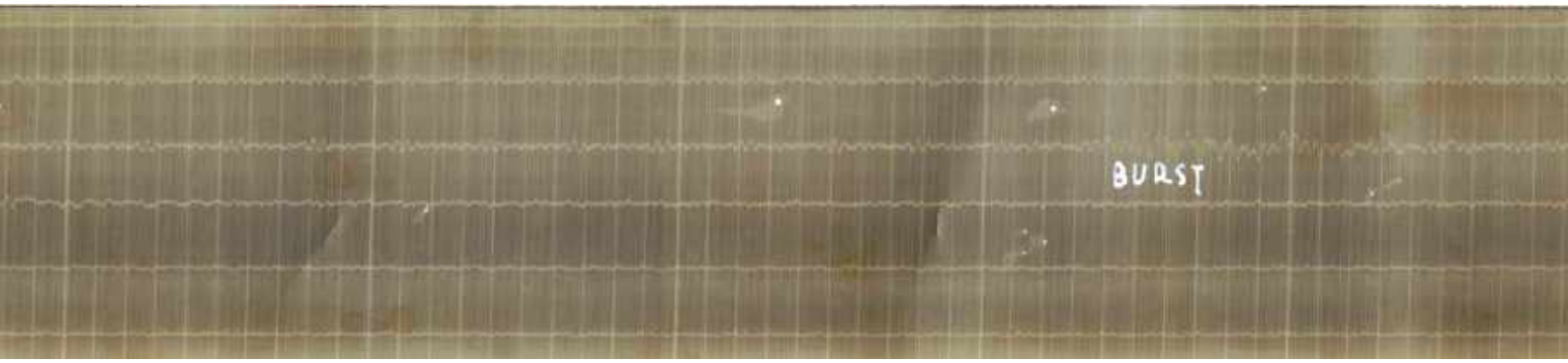


Establishment, who was attached to HQRA (SRg) with the military rank of Major from the Autumn of 1944. Observation posts were established on high buildings in Antwerp to locate the fall of V2's there. The survey of the continental microphone lattices was effected by a Field Survey Company of the Royal Canadian Engineers.

A removable "searchlight" and fixed socket of the improved three-dimensional plotter made in 1945 for the continental lattice. In this plotter the beam of light was focused to a dot at the average distance required. The dots of light cast on the screen were then sufficiently intense to enable the plotter to be worked in daylight. Each beam was projected vertically and bent to the appropriate bearing and elevation by an interior-reflecting prism on a horizontal pivot in bearings capable of rotation about a vertical axis. The socket was fixed at the centre of a square on the plotter table and its top adjusted by screws for difference in height above sea level of the microphones of the square. The "searchlight" was removed from the socket and put in a jig for setting. The jig had a screen on which con tours of equal diagonal time intervals were drawn and the bearing and elevation were set directly from the time intervals so avoiding computation to convert these into bearing and elevation and correct them for heights.

Experience had shown that the computation and plotting process took a fairly long time for each V2. Plans were made to speed this up with a new plotter designed by myself, with some helpful advice from Sir Lawrence Bragg. Manufacture of this plotter by the Cambridge Instrument Company was arranged by Sir Lawrence, who was then Cavendish Professor of Experimental Physics at Cambridge and the principal Ministry of Supply adviser on sound ranging. This new design eliminated the computational processes of turning time intervals into angles, and applying the height corrections, by making the miniature searchlights detachable from their sockets, which were permanently set to allow for dislevelment in the squares, and by setting each searchlight in a jig where its beam could be aimed onto a glass plate inscribed with the requisite two families of curves of equal time intervals. Each miniature searchlight could thus be set to point in the direction corresponding to the time intervals read from the film for its microphones without any computation of the bearing or elevation at which it should be put or any height corrections. As a second step it was proposed to move to a set steady speed for the recorder film so that time intervals on each film could be directly measured with a scale without having to subtract one time from another. The curves to be reproduced on the glass plate of the setting jig were computed and drawn on paper by draughtsmen of HQRA (SRg) in Malines. The new plotter was delivered in Belgium about February of 1945, but its plain glass plate on which the beams of light were thrown to plot the V2 trajectory had been broken in transit. A replacement for this was made locally from mirror glass. The firing of V2's at Antwerp had then ceased and it was thought that the V2 units were withdrawing to a redoubt in the South of Germany. It was expected that the new plotter would be brought into use when the microphone lattices were redeployed against this redoubt, but the War in Europe ended without any further firings of V2's or therefore any redeployment.

On arrival in Belgium, the 11th Survey Regiment deployed a flash spotting base in the area of Liege. This was successful in locating V2 launch sites in the Southern launching area throughout the winter.



"X" Radar Battery, RA, commanded by Major A.M.H. Jones, was added to the Special Defence troops in the autumn of 1944. It deployed an anti-aircraft radar in Holland to watch V2 launches against London.

After the campaign. Outside the German V2 launching headquarters at Bad Sachsen, Harz Mountains on 3 May 1945, from left to right –

Lt Col Sam Attenborough (CO, 11 Survey Regt, RA), Dr CJ Birkett ("John") Clews (AORG), Gnrs Cross and Emery (Drivers, 11 Survey Regt), Major Bill Taylor (Author of this article), Lt Vickers (11 Survey Regt).

After a few weeks in Belgium it became apparent that the V2's were always launched from a few fixed areas and that our role had become to identify as soon as possible after a V2 explosion which area had fired the missile. The possibility was explored of doing this automatically with a small square of sound ranging microphones under the line of fire to Antwerp from each area. But Norman Bunten of AORG propounded a simple method of determining, roughly but quickly, the line of fire by plotting the successive positions of the wave front at the ground on tracing paper placed on a gridded plotting board. This could be done by noting on the tracing paper at points corresponding to the microphone positions the times of arrival of the sound at the respective microphones and then interpolating the lines of particular set times between these points, an exercise akin to plotting contours between spot heights. The paper could then be folded through the marked point of burst so that lines of equal time on either side of the line of fire fell as nearly as possible on top of one another. The line of the fold then represented the line of fire subject to making a rough correction for the effect of wind and temperature. As the pattern from particular areas became known, some estimate could also be made of the range. This was a useful quick rough method, though it did not of course have the refinement of, or produce all the information derived from, plotting the trajectory in three dimensions after full individual meteorological and height corrections.

517 Company personnel resting during the withdrawal from Greece. Colin Wylie is bottom right.

Lieutenant Colonel Colin St Aubyn Wylie

Colin Wylie was born on the 16th of July 1918 in Calcutta India where his father worked in the jute business. He came back to England in 1919 with his mother to Bedford and subsequently went to Bedford School after which he was commissioned into the Royal Engineers in 1938 and went up to Cambridge, to St. John's. He was an accomplished oarsman and hoped to row for the university in his second year but his time as an undergraduate was cut short when war was declared in 1939. He married Claudia Quarry in January 1940.

January 1941 saw Colin arrive in Egypt with 517 Field Survey Company RE however, his time in the land of the Pharaohs was short as the unit was deployed to Greece in early April as part of the hastily formed Expeditionary Force sent to counter the German invasion of that country. The enemy advance was so swift that within a few weeks the British were rapidly pushed south and forced to evacuate back to Egypt. During the withdrawal on the 30th April/1st of May Colin, along with many other members of 517 Company, was taken prisoner of war.

Transferred to prison camps in Germany he made three attempts to escape and was involved in the famous 'Wooden Horse' escape from Stalag Luft 111 at Sagen in eastern Germany. His record as an 'escaper' led to his 'graduation' to Oflag IVC, the infamous Colditz Castle where he continued to pursue escape activities until liberation by the Americans on the 15th of April in 1945. After four years of incarceration Colin was repatriated to England and given just three weeks leave, during which time he met his daughter Tessa for the first time, before a posting back to Germany. On his return to England he did a supplementary course.

Colin Wylie as a prisoner of war in Oflag VIB at Dossel

In 1947 he took up the appointment of Officer Commanding Administration Wing at the Survey Training Centre then occupying a hutted camp in the grounds of Longleat Castle in Wiltshire. This was to be a particularly busy tour as the introduction of National Service that year generated a continual inflow of both officer and soldier recruits. This tour also saw radical changes in the training of regular soldiers and the introduction of the Long Survey Course, later to become the Army Survey Course.

Spring of 1949 and Colin moved to Bushy Park to become 2i/c of the newly formed 135 Survey Engineer Regiment (TA). At this time the regiment existed only on paper and no sooner had he arrived than the Commanding Officer was posted early and so it fell to Colin to physically form three independently administered squadrons at three different locations.

After a hectic year forming the first Military Survey TA unit he was again to be involved with creating a new unit when in April 1950 he was appointed to reform and command 13 Field Survey Squadron RE at Tolworth. Again location came into play when the following year he moved the squadron to Fernhurst Camp near Haslemere as did links to the TA as the unit's summer task was to train the fledging volunteer military surveyors.

Three years as an instructor at the Royal Military College of Science at Shrivenham followed and then in August 1956 he was given the rare privilege of a second independent squadron command when he moved to Dortmund to command 14 Field Survey Squadron RE which he did until January 1958.

Promoted to Lieutenant Colonel, Colin took up his final appointment as Assistant Director Survey 2 at Tolworth with responsibility for directing Military Survey's map production and distribution, a post he held until retirement in 1962.

He was immediately strongly encouraged to join the Oxford University Press but chose not to do so, preferring to pursue his many interests.

Colin had been an excellent sportsman, particularly excelling at rowing. A very personal man with many talents including watercolour painting, gardening and an all-embracing love of nature. He died after a short illness on the 29th of May 2007.

Alan Gordon

David John Pegg - 1951 – 2007

Dave was born into an army family in November 1951 in Guildford, a place he never regarded as home, compared with Cardiff where he attended High School and grew up with his sister, Susan. At 16 he left school and went with his father to enlist in the Royal Engineers at Chepstow, where he completed his apprenticeship as an Air Surveyor Technician, a trade that he regularly practiced throughout his service.

In 1978 he was serving with No 1 Air Survey Liaison Section RE at RAF Wyton, when he met Vanessa whom he married 5 years later in 1983 and their first tour together was as an instructor back at the Army Apprentices College, Chepstow.

His life in military survey was constantly on the move and when 42 Survey Engineer Regiment was being relocated from Barton Stacey to Hermitage they bought their home in Compton. Shortly after this an accompanied overseas posting to the NATO headquarters in Naples, Italy beckoned which enabled him to develop his love of sport diving and attain Professional Association of Diving Instructors (PADI) qualifications. As an instructor Dave was in great demand both within the military and, on return to the UK, with the Newbury Diving Club. This sport continued to take him to other exotic places such as the Blue Hole in Belize, Ascension Island and the Shetland Islands as well as many other dive locations around UK.

Upon completion of his 22 years service (attaining the rank of WO2) he found employment as a civilian instructor in the Air Survey department at the School of Military Survey, a post he filled for 3 years. However, Dave was always seeking new challenges and so when an opportunity arose to work in the newly formed Field Support Section that provided technical support to the deployable Tactical Information Systems (TACISYS) he happily moved across the way from the School to the new organisation. It was in this post that he was to become a key member of the team that developed and maintained the deployed information systems, a role that took him to all current operational theatres such as Kosovo and Iraq as well as many other locations.

Dave Pegg had a wide circle of friends and was well respected throughout Military Survey and the Newbury Diving Club. The brain tumour that swiftly took his life has left an immeasurable hole in our lives but he will be remembered in many different ways; for the support he provided to operations, his social interactions, always having time and caring for everyone, to walking his pet poodles around Hermitage Camp. He will be sadly missed.

Phil Maye

DEFENCE SURVEYORS' ASSOCIATION
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To: Honorary Membership Secretary
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BATH, BA2 5QQ

E-mail: membership@defencesurveyors.org.uk

Personal Details:

Family Name		**First Name**	
Title/Rank		**Decorations and Qualifications**	
Date of Birth		**Service and Rank (if applicable)**	
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Home Telephone Number		**Work Telephone Number**	
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Summary of relevant experience and courses with dates and/or details of professional, commercial or academic background in the Defence Surveying business[1]			
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Submission of Applications. Applications may be submitted either by e-mail or post using the addresses given above. When accepted for membership, applicants will be informed by the Chairman and receive an introductory pack from the Honorary Membership Secretary.

Membership Fees. Do not send any money with this form. New members are required to pay an annual membership fee of £15 starting from the 2nd January after they join. You will be sent a standing order form in due course which you will be asked to complete and return to the Honorary Treasurer covering the fee for the next calendar year. Any member who wishes to do so may alternatively pay the annual subscription of £15 by cheque, Any such cheques should be made out to the 'The Defence Surveyors' Association', and reach the Honorary Treasurer by 2nd January each year (Roy Wood, DSA Hon Secretary, 9 The Chase, Donnington, Newbury, RG14 3AQ).

Data Protection Act. In accordance with the Data Protection Act, the above information will only be held for administrative purposes by the DSA.

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[1] This information will form the basis of short biography for inclusion in Ranger Magazine (6 lines maximum). Please append additional information if there is insufficient space on the form.

[2] Any applicant who does not have a sponsor but believes that he/she meets the criteria for membership of the Association should contact the Honorary Membership Secretary who will provide advice on possible sponsors using his knowledge of the membership list to assist the applicant in finding a suitable sponsor.

This form can be downloaded from the DSA website at www.defencesurveyors.org.uk. If you would prefer to reply in hard copy but do not wish to remove this page from the magazine please photocopy this application form. Replies in either hard or soft copy are welcomed by the Membership Secretary at the addresses given above.

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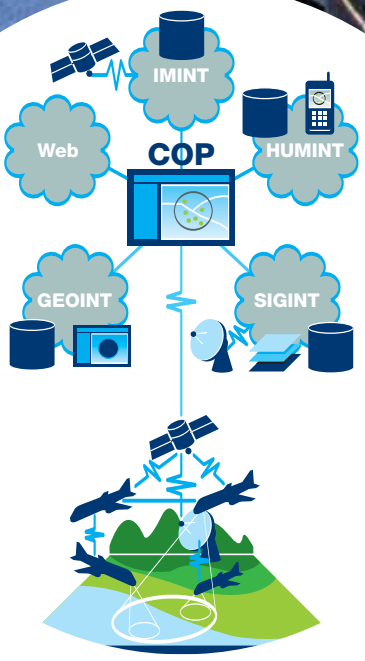

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