

RSi

THE

JOURNAL

of the ROYAL SIGNALS INSTITUTION

Volume xxxi

Issue 1



THE ROYAL CORPS OF SIGNALS

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THE JOURNAL

of the ROYAL SIGNALS INSTITUTION

Volume XXXI

Summer 2012

No 1

Welcome to the first Journal of 2012, coming in a year when the Corps is for the first time without a Signal Officer-in-Chief, and is gradually getting to grips with the imperatives of its new posture. As ever, Corps personnel have continued to do astonishing things, notably in last year's polar challenge, which saw the Royal Signals Mercury team trekking overland to the South Pole, Major Dan Ashton attempting a winter crossing of Iceland and our soldiers continuing to deliver top quality service to our forces on operations in Afghanistan. The standard of our Supervisors courses remains very high, as the extracts from the last Foreman of Signals course projects will confirm. On this the thirtieth anniversary of Op Corporate, several books have been published about the campaign, some of which are reviewed in this issue. The influence and reputation of the Institution continues to grow, it remains in good health, and with my successor Lieutenant Colonel Nigel Harrison, it is in good hands.



Tom Moncur

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Cover photograph: *The Corps on patrol in Helmand*

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STOP PRESS ITEMS

CORPS SPRING GUEST NIGHT



The Master and relatives of Major General Deane-Drummond at his bust unveiling in the HQ Mess



The Master accepts a presentation from the Commander of the Sultan's Omani Signals

CONGRATULATIONS TO TOP STUDENTS

Congratulations to Staff Sergeants John Shambrook, Chris Brown and David Shilton for coming top of their Foreman of Signals, Yeoman of Signals and Foreman of Signals (IS) courses respectively. All of them win the RSI course gold medal, and the chance to take part in the Journeyman Scheme operated by the Worshipful Company of Information Technologists. Staff Sergeant Shambrook also won the AFCEA prize for best academic performance, while Staff Sergeants Ian Muirhead and James Elkin won the award for the Yeoman of Signals and Foreman of Signals (IS) courses respectively.

Congratulations also to 2Lt Matt Hollingsworth for coming top of Troop Commanders Course C82, and he will also be eligible to participate in the WCIT scheme. Matt is posted to 16 Signal Regiment at Elmpt station, and departs shortly thereafter to Afghanistan.

RSI SIGN

3 August - 25 August
form at Royal Edinburgh

3 September: Corps

4 October: Notifico

23 October: RSI S

15 November: Lond

To be notified: Th
Government and Inc

PIPES AND DRUMS IN COMPETITION



SSgt (PM) Jimmy Scott leads the Corps Pipes and Drums in their new competition dress at the Midlands mini-band competition

SIGNIFICANT DATES

1st: Corps Pipes and Drums perform at the Edinburgh Military Tattoo

2nd: Awards Sub Committee meets

3rd: Presentation of award winners via CoC

4th: Seminar on HQS Wellington

5th: Presentation Lecture and Dinner in IOD

6th: Third RSI Workshop for MOD, Industry



Colonel Garry Hearn, Commandant DCCIS congratulates SSgt (FofS) John Shambrook on his double prize-winning success

ARMY 2020

By Lieutenant General Robert Baxter CBE, Master of Signals



By now you will have heard the Army 2020 announcement and can digest the greater level of detail now promulgated. I thought that it would be helpful to add my perspective as Master of Signals and as someone who has been privileged to be included in the development and decision making process.

From a selfish R SIGNALS viewpoint the announcement comes as something of an anti-climax - we have known for some time that 2 Signal Brigade, 7 Signal Regiment and 19 Brigade Signal Squadron were to be disbanded. The announcement does not contain information on where we might be based nor any detail on our increasingly important Reserve component. However, there are some points I would highlight.

The process itself, whilst driven by the need to deliver savings, did take a fundamental look at how the Army should be structured for the future - with an emphasis on flexibility and agility. It most certainly is not preparing for the last war fought. Flowing from several decades of increasingly active operations, and certainly in the last decade serving alongside the US Armed Forces, the senior leadership of the Army has an intimate understanding and appreciation of the importance of timely, accurate and assured information and of R SIGNALS central role in the delivery of, and ability to manipulate, that information. The SO-in-C(A) and latterly Capability Director Information and their staffs have done an excellent job of marshalling and presenting the arguments for our future size and structure, most helpfully set against a backdrop of the fine performance of our young men and women on operations.

1 and 11 Signal Brigades continue into the future, and to mitigate 11 Brigade's span of command it will have 2 and 7 Signal Groups, each commanded by a Colonel, with another Colonel to help with Regional responsibilities. The location of 11 Brigade in the West Midlands nicely coincides with what I hope will become a significant R SIGNALS centre of mass based at Stafford. The two Group commands will also, I believe, provide significant operational capability and career development opportunity as OF5 led potential points of deployed command.

The sharp eyed will have noticed that divisional signal regiments and brigade signal squadrons no longer exist as such. Equally, R SIGNALS will no longer be responsible for the actual delivery of life support - this will be a task organised as appropriate during the force readiness cycle. There is a challenge here to ensure that the Corps does not get sucked back into the delivery of life support without the manpower, whilst at the same time building and maintaining that essential link between R SIGNALS and the commanders and staffs that we support. I

believe that there is a strong linkage between the two principal components of command support, information support and life support, and that R SIGNALS should be firmly in command.

Whilst 14 Signal Regiment will lose the additional squadron it gained to meet the demands of current operations, this is predicated on a move closer to the JSSO community based at Digby - important for maintaining the utility of the Regiment. Although 14 Regiment will be grouped in the Intelligence and Surveillance Brigade, I expect the strong linkages to the rest of the Corps to remain and be strengthened - crucial as they are to the overall operational effectiveness of the whole Corps. I also expect the Corps to keep a close eye on developments in the Cyber sphere; again fundamental to what we do.

The impact of technology has always had a major impact on the Corps and the flexibility required in the new structures is firmly based on the acquisition of a common set of communications and information systems including applications. We are a long way from that, and those involved in equipment acquisition will have to work hard to bring it about. We simply cannot afford the training burden we have endured to date.

In the context of equipment acquisition, we also need to think about how to best use our Reserves and properly incorporate them in our structures. If we are to make the Total Support Force a reality, with properly integrated contractors and Sponsored Reserves, we will need to build the notion in firmly from the very start of the acquisition process. Equally, we may need to make the Capacity Building and Resilience roles as well as enhancing the usability of our Reserve component more central in framing our requirements - do we need a 'Euromux for the 21st Century' ?

Overall, while there are no headline cuts in Regular Regiments, those Regiments for the most part will be smaller, so the Corps will reduce in both liability and manning. Whilst manning controls and natural outflow have their part to play, I expect that the prospect of redundancy will remain, but should not be on a dramatically greater scale than hitherto. In addition, the unique breadth and variety of our roles with other Government Departments remains, and there are increases to our support for Special Forces.

In summary and to close, whilst no one is happy with the prospect of reductions, the utility of the Corps in whatever tasks the Army may be given is understood and appreciated by the highest levels of the leadership of the Army. There now remains a great deal of detailed work to be done as we look to the future which I expect the Corps as a whole to embrace and get on with, as it always has when faced with change.

Certa Cito!

STILL SURE AND SWIFT?

By Colonel Tom Moncur BSc CEng FIET FBCS CITP MIL



Tom Moncur served a total of 26 years in the Corps, stationed in BAOR, UK, Belgium and Cyprus, including two tours on NATO staffs, specialising latterly in Electronic Warfare and Information Systems. He then spent nine years in industry, in a range of business development positions with DESC, EDS, DERA, Avaya Communications and EMW Inc, based in UK and in Europe. He took post as Secretary of the RSI in February 2003.

This is my final Journal as your Editor; the next issue will be in the capable hands of Lieutenant Colonel Nigel Harrison, so this this is an appropriate time to reflect on the changes to the Corps during my time in office.

After retirement from the Army, I had been employed in a range of technical and consultancy posts in industry, during which time I had little contact with the Corps. On returning to the fold in 2003, it was evident that in the intervening nine years, both the Corps and the Army had seen widespread change. The advent of human rights, equality, diversity, and health and safety legislation, as well as the new European order, had brought about profound changes in the conditions of service, and the way in which business was done.

With end of the Cold War, the continued presence of BAOR had come into question, and it was no surprise to observe the steady wind-down and withdrawal of units to the UK mainland. As I write, the Corps in Germany is left with 1 Armoured Division Headquarters and Signal Regiment stationed in Herford, 16 Signal Regiment at Elmpt Station (formerly RAF Bruggen), and 7 and 20 Armoured Brigade Headquarters and Signal Squadrons at Hohne and Sennelager respectively. Truly, changed days from the time when reputations were made and lost on Corps level exercises on the North German plain!

At the top level, the Corps no longer had a Director General but a Brigadier as Signal Officer-in-Chief (Army), the Training Brigade and the Army Apprentices College Harrogate were no more, and Blandford Camp had seen an increase in importance and focus with the construction of

new buildings and the arrival of lodger units. The Royal School of Signals merged into a Defence College of CIS, and only to re-emerge as part of 11 Signal Regiment.

Further Defence reviews and budget reforms eventually saw the complete disappearance of the Signal Officer-in-Chief (Army) post altogether, and Blandford emerging firmly as the de facto home of the Corps. Domestic matters are now in the hands of the Corps Colonel, with the Master of Signals, and the Corps and Master's Councils exercising increasing responsibility for the Corps family, backed up by the staff at Corps Headquarters.

Amidst all the upheaval and turmoil, it was especially pleasing to be part of the Corps Headquarters in supporting the serving and retired Corps, through the agencies of the Royal Signals Association and Institution, developing and adjusting to the new circumstances as it did so. The Institution, in particular, has successfully built on the solid foundation established by Major General Bill Robins twelve years ago to emerge as a respected technical entity in Defence circles, thanks to the popular series of Lectures, Seminars and Workshops over the years, and the strong liaison firmly established with industry, academia and professional institutions. The RSI Journal continues to attract favourable comment, as it seeks to engage with the serving and retired communities. The embracing of Web and Internet technology has further extended our reach, highly appropriate for a Corps at the centre of Army CIS.

Without tying my successor's hands in any way, the RSI now has to look to the future in how it will develop. The new Secretary takes office shortly before the arrival in post of a new Chairman, and he will inherit an organisation that has come a long way since its resurrection twelve years ago. The fundamental challenge will remain – how to maintain relevance to the Corps in an Army which is still evolving. Relations with the retired Corps are also important, if the cohesion of the Corps family at large is to be preserved. In this, an effective web presence is important. The RSI has a role to play, but it does need the support of the Chain of Command to be truly effective, and in this the cooperation of commanders at all levels is crucial.

What of our soldiers? The question is often asked - are they better or worse than those we commanded all these years ago? Much attention has been given in the national media to the fitness levels of our new recruits, and concerns raised about their educational standards. The facts are that our young soldiers now undergo a much more structured and supervised development programme than ever before; failures in training are expensive, and great effort is made to offer remedial help at all stages when needed. Many traditional trades have disappeared or been combined, thus placing an increasing learning burden on trainees. New trades have been introduced, particularly in the challenging Information Systems area, which are key in providing our traditional support to the staff.

The tempo of operations is such that young soldiers one year out of training regularly sport one or two medals, something which in the old BAOR days might only be worn by the Commanding Officer or Quartermaster. Our junior NCOs now have real responsibility on deployed operations, in contrast to bygone times when exercise performance was just about everything. The number of commendations for RSI Awards we receive every year is testament to their contribution. Not much is wrong here!

Personally, it has been my privilege to associate directly on an equal basis with our young soldiers through my involvement with our Corps Pipes and Drums, now one of the strongest and best led in the Army, evidenced by their selection to participate in this year's Royal Edinburgh Military Tattoo. The old military qualities of humour, banter, hard work and companionship remain unaltered. The chance to see the military operation from another viewpoint has been salutary, informative and totally enjoyable.

Sadly, there is now less time for units to participate in the traditional military sports, and field the highly talented squads produced in the past by 21 Signal Regiment in Athletics and 7 Signal Regiment in Rugby, but there is still much participation in Adventure Training, to the most far-flung regions, prowess in which is rightly recognised by the RSI Medal for Adventurous Endeavour. The accounts of journeys to the South Pole and crossing Iceland to be found elsewhere in this issue are good examples of the eye-opening ventures which are now undertaken.

Young officers now join the Corps with a first degree and a range of backgrounds, complemented by an impressive variety of post-graduate activities. There is a wider age spread and greater maturity than before. Not many offer qualifications in the traditional Corps disciplines of engineering and the mathematical sciences, but the benefits to the Corps of attracting such accomplished and multi-talented young officers more than compensates, especially when technical knowledge can rapidly be topped up by appropriate training.

A minor point to be made is that in the midst of the admirable modern drive towards increased professionalism; there is less room for the true characters for which the Army and the Corps were once renowned. A bit of style never does any harm, and reinforces the individuality of the officer, as well as the interest of his soldiers. This must go hand in glove with high standards, in comportment, dress and behaviour, as well as professionalism, for therein lies the key to true team spirit and *esprit de corps*. The challenge for the Corps is to retain the commitment and attention of our junior officers in the early years, and continue to nurture development through Staff College and beyond.

The influence of Information Technology is now everywhere apparent, and the tentacles of the Defence Information Infrastructure are all-pervasive. There is no room for

anyone who is not prepared to become "computer literate." The benefits for staffs deployed on operations and Joint Service working are clear, and these are being increasingly extended to in-barracks working, through systems such as the Joint Personnel Administration system. With increasing automation, the old style Registries are being supplanted by Information Hubs, and everything stored electronically. In my last Army appointment in CIS(A)2, a branch of DGCIS, we were propounding back in 1994 the vision of a unified Army CIS extending from the battlefield to barracks by 2010. This was derided by many at the time, and it is gratifying that it has after all, come to pass.

A nation's Armed Forces must necessarily reflect the society they serve, and human rights and diversity legislation in particular is something the Services have had to contend with. These days, in true Civil Service style, everyone is obliged to attend regular briefings to ensure they are fully aware of the implications for them in their daily routine. Many of the retired Corps have observed sourly that this smacks of forcible re-education, which would have been given short shrift in their day. These are changing times, however, and with an ever-contracting Armed Services, increased central control is perhaps inevitable.

Equality is now everywhere apparent, with women accepted in all trades and posts, even in the traditionally male preserves. They exist comfortably in an atmosphere of mutual respect and cooperation, reflecting changed attitudes in our modern society from that we once knew. The women in our Corps are confident, competent and independent, and well able to stand up for themselves. They routinely attract favourable comment from other Arms and Services, and we should be proud of them.

As regards the future, ours is nothing less than a history of continually adapting to changes in strategy, weapon systems and technology, always with an eye to costs and the bottom line. We moved from shutter telegraphs, heliographs, Morse sounders and line communications to the adoption of wireless, multi-channel radio and satellite communications, with spin-offs into cryptography, electronic warfare and multinational cooperation along the way. I believe therefore that our ability to adapt to change is unquestioned.

It is therefore with many happy memories and hopes for the future that I take my leave; I have been delighted to give something back to my Corps over these last nine years in return for 26 years of fun, personal development and enjoyment. In actuarial circles there is a saying that all men are held to be debtors to their profession; I hope that in some ways at least, by acting as your Secretary, I have discharged some of my own personal debt to the Corps.

ADDRESS TO THE CORPS WARRANT OFFICERS AND SENIOR NCOs CONVENTION

By Captain A McBean



Tony McBean enlisted into Harrogate as an apprentice Radio Telegraphist in October 1989. On completion of his training in October 1991 he was posted to 216 (Parachute) Signal Squadron in Aldershot where he served until July 1997. He subsequently completed tours at the Army Training Regiment Bassingbourn, 249 (AMF(L)) Signal Squadron and 30 Signal Regiment. As a Warrant Officer Class Two he was posted to Southampton University Officer Training Corps as a Royal Signals Permanent Staff Instructor. In July 2006 he was posted to 16th Signal Regiment as the Regimental Quartermaster Stores (General). He was then selected for the appointment of Regimental Sergeant Major 21 Signal Regiment (Air Support) in April 2008. He was selected in 2009 to be Corps Regimental Sergeant Major; a post he held until March this year. He is now Quartermaster of 4 Mechanized Brigade Headquarters and Signal Squadron (204).

Over the past year the SO-in-C (A) and I have continued to be impressed by the stunning approach to operations by our soldiers and officers. I am extremely proud of our present extremely high standing within the Army, which continues to grow as the Army's senior officers begin to grasp the importance of CIS now, and in any future Army conflicts. Hence C-in-C attending the convention yesterday.

Whether I am speaking to the CO of 11 EOD, the RSMs of ATC Pirbright and AFC Winchester or the RSMs/RSWOs of the Infantry Support Teams, they, along with their chain of command, are all massively impressed by the fitness, soldiering skills, technical ability but most importantly the adaptability and intelligence of our soldiers. Soldiers who continually to step up to the mark and face the dangers of operations with fortitude, courage, bravery and determination - none more so than Cpl Steve Dunn who paid the ultimate price and was killed on operations in December of last year. Also around the same time a LCpl CS Operator (EW) working as part of an EOD team was seriously injured whilst providing tactical and technical cover for his No1 when he triggered an IED. This resulted

in him losing both his legs and a number of fingers, but his strong will and determination now sees him in good humour and well on the way to recovery.

More recently, a Lance Corporal from the Corps received the Queens Gallantry Medal as part of the Armed Forces Operational Awards List. Our JNCOs continue to show quality command and leadership well beyond what is normally expected, in the most demanding of jobs and environments during the preparation and deployment on to operations. This all bodes well for the quality of our future mess members.

Of particular mention are those soldiers who are leaving phase two training, as they are an easy target of complaint. For the most part however, they are fit, keen and well motivated with a thirst to learn and test themselves under the toughest conditions in theatre. Although lacking in wider trade and military knowledge (as we all were as class threes on arrival within our first units) the true potential of our phase two soldiers was recently clearly on display during an operational medal parade at 3DSR where 40% of those on parade were in their first 18 months out of training and coped extremely well with had been thrown at them during MST and their time on operations.

This is particularly important at present as the Corps is covering on many permanent fronts, directly or indirectly in support of operations, and these tasks are not diminishing until 2015/2016. They are Campaign Signal Regiments, Task Force Helmond Brigade Signal Squadrons, Joint Helicopter Command, Royal Signals Infantry Support Teams, Rear Link Detachments, Light EW Team, EOD, SF, 299 Special Communicators, Instillation Technician trawls, Op ELEMERY, OP EAGLE IJC HQ 7SR support to Afghanistan, on the wider Single Sig Int Battlespace providing direct influence and information to soldiers on the ground providing 80% of actionable intelligence in theatre, Corsham and Colerne hubs and our enduring tasks in the Falkland Islands amounting to a significant amount of the Corps soldiers and officers. That does not however include those on Spearhead Lead Element, Joint Task Force HQ, Airborne Task Force, the Olympics or the ARRC's NRF commitment in 2013.

With this in mind, there is much that we should now be looking forward to the future signalling challenges that lie ahead during the transitional phases of the draw down in HERRICK, as well as taking on more responsibility and coming up with a coherent plan to rationalise and enable applications and the delivery of information together with the usual radio and trunk systems. Our most onerous future task however, is to maintain the Corps technical excellence within each trade sphere, and remain technically relevant to ensure we as a Corps mould what future communications systems are used throughout the Corps and Army.

Along with all this will be ensuring that the rest of the Army

know and understand communications and information systems, and are trained to the relevant standard to best manage and exploit information (presently referred to as Skill at Information, in the same manner we have Skill at Arms training). And that is before we mention cyber. All of this happens while we carry out any of our normal daily tasks relating to the business of training, leading and managing our soldiers - particularly challenging during these uncertain times of restructuring of the Corps, which has already incorporated the closure of 7 Signal Regiment and 19 Brigade Headquarters and Signal Squadron and the future phases of redundancy.

Within this Mess therefore, we must have robust forward thinking Warrant Officers and SNCOs that look upwards and outwards to ensure they and their soldiers fully understand the bigger picture at squadron, regimental or Corps and Army level and where they fit into that picture. People who are prepared to seek out information and not wait for it to be drip fed in to them by the chain of command or claim ignorance. Regardless of trade or appointment we require professionals, who are disciplined, physically fit, competent and confident at military skills and are quality tradesmen and women, managers and leaders. Without this over-arching approach we will be selling our soldiers short.

To ensure this happens the Corps needs SNCOs and WOs who uphold and implement strong values and standards and an ethos within the mess that is enshrines selfless commitment, moral courage and team work, this will hopefully develop future leaders who are mentally agile, comfortable with uncertainty and most importantly who are able to seize the initiative and positively exploit opportunities both on operations and in barracks, and not a Mess full of those in the walk by culture who see things are going but do nothing about it because its not their job! If we can do that, then the Corps will continue to develop and move forward to take on the many, many challenges that lie ahead.

Finally, these are uncertain but interesting times to be in the Army, but great times to be in the Corps - a Corps which is presently highly respected and greatly in demand, but most importantly a Corps that still offers diversity, opportunity and challenges for all ranks. All that being said, do not forget to make time for the good stuff - sport, adventure training, troop, squadron, regimental and mess socials. Make the most of what you do and enjoy it.!

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THE PIPES AND DRUMS OF THE ROYAL CORPS OF SIGNALS



By Staff Sergeant (Pipe Major) James Scott

As the Basel Tattoo photograph above shows, the Pipes and Drums of the Royal Corps of Signals continue to expand and develop their repertoire as we prepare for the approaching performance season. The presence of so many junior players in our ranks is encouraging, but it does mean that we have had to contrate on Class Three level tunes to enable all the band to take part. This does much to encourage the younger players, even if they now have to climb a steep slope to master the repertoire of tunes set for this year's Royal Edinburgh Military Tattoo! The photograph opposite shows the Pipes and Drums assembled for the annual RSA weekends, one of the foremost events in the calendar.

Participation in the Royal Edinburgh Military Tattoo is an honour for any band, and this year we reprise our attendance of five years ago. With that, comes a great effort to learn and memorise all the tunes specified for the performance, followed by an intense week of rehearsals in Edinburgh beforehand, both at Redford Barracks and Edinburgh Castle. The fact that Captain Gordon Rowan, the Deputy Director of Bagpipe Music and Highland Drumming is one of my predecessors as Corps Pipe Major does not cut us any favours!

One of our more significant events was taking part in the Freedom of York Parade for 2 Signal Regiment, where we had the rare chance of a week's concentrated practice followed by a high profile military event. The many testimonials we received afterwards were a gratifying reward for our efforts. As ever, we are most grateful for the continued cooperation of Commanding Officers and Officers Commanding for allowing our players the time to attend such events. Without this support, we could not continue, and I am most appreciative.

There is no doubt that our soldiers are worth the effort. All of the students we send to the Army School of Bagpipe Music and Highland Drumming continue to do very well, and we have established one or two notable firsts, including the first female drummer to graduate, and the first Corps Pipe Major, as well as regularly picking a fair share of the prizes on offer.

We are fortunate in having Colonel Garry Hearn as our Pipe President - as well as giving us more than a bit of clout when it comes to high level meetings in Army piping circles, it is invaluable in bringing P&D matters to the attention of busy Commanding Officers. Colonel Tom Moncur has acted as our unofficial Secretary for the last few years, and the occasion of his imminent retirement was an appropriate time for the P&D to get together for a farewell lunch and see him off in style. Tom was presented with a crystal whisky decanter set, suitably inscribed - one of the few times we have known him to be at a loss for words!

To conclude, the P&D is in good health, and we look forward to another successful year. *Slainte Mhath!*



Bowman VHF as a TIGR Bearer

SSgt (FofS) J Shambrook & SSgt (FofS) P Wade

INTRODUCTION

1. The tactical interface ground reporting (TIGR) system is widely used as a situational awareness tool within Afghanistan. Each terminal holds a database of recorded activity that allows the pattern of life to be analysed and emerging trends to be identified.
2. In order to maximise the benefits of the system all databases must be kept up to date. To do this the high capacity data radio (HCDR) is currently used as a bearer for the inbuilt TIGR synchronisation application. Locations that do not have HCDR provision or that are outside its operational range must exchange updates using physical media couriered across theatre.

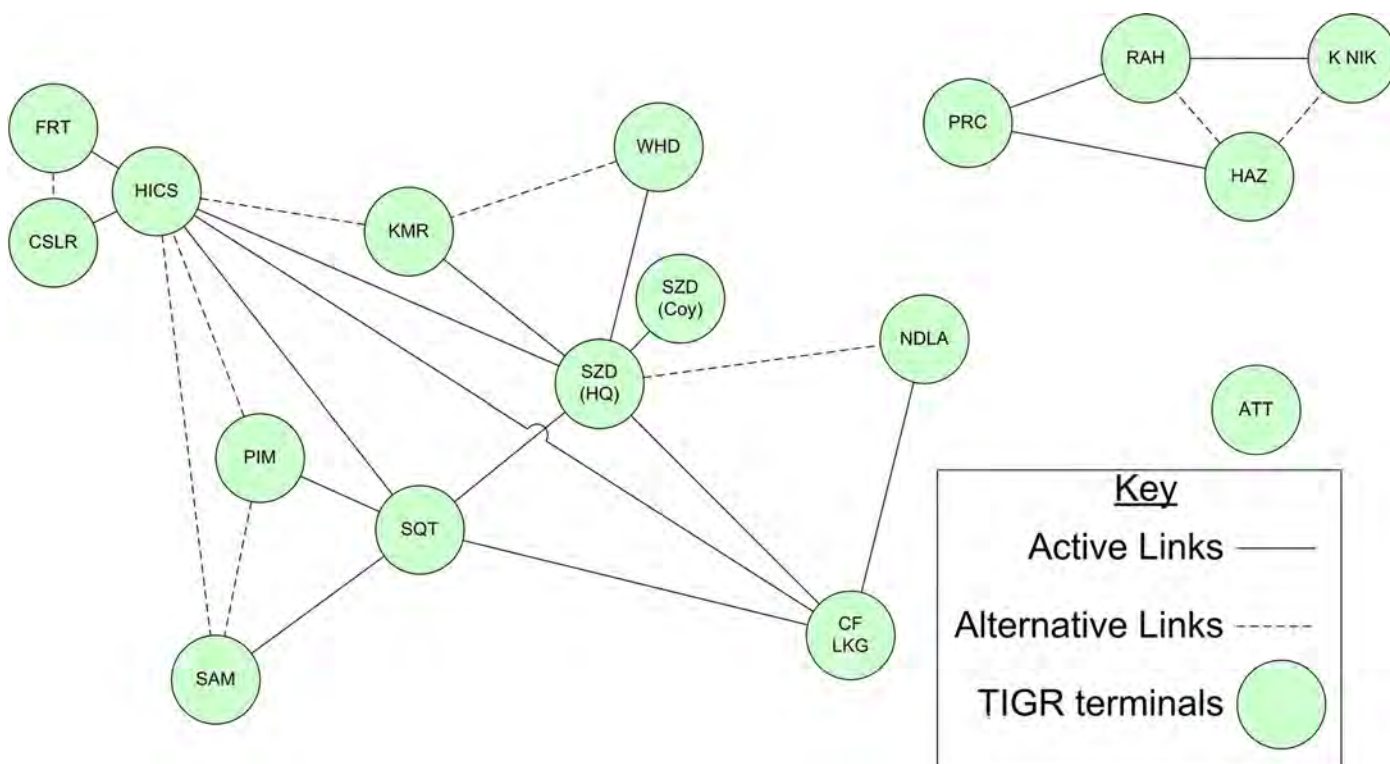


Figure 1: Possible HCDR connectivity

AIM & OBJECTIVES

3. The aim of the project is to connect a TIGR terminal to a VHF radio so that updates may be passed over the VHF data service.
4. The project was undertaken in two parts; initially a technique for connecting a TIGR terminal to a VHF radio was investigated. Once an interface had been produced a method of passing TIGR updates over the RF link was explored.
5. The solution will be used to bridge the gaps in HCDR connectivity increasing the timeliness and availability of information to the local commander.

CONNECTION METHODS

6. The VHF radio has two interfaces for data connectivity; a serial point to point protocol (PPP) port using RS-423 / RS-422 and an Ethernet interface. The Ethernet connection may only be used when the radio is fitted to a dual radio mount (DRM) and planned as part of a “complex fit” installation. The PPP connection requires a media

converter to allow connection to a RS-232 terminal. Modification of the modem software is also required to support correct handshaking with the radio.

DATA CONNECTIVITY

7. The VHF radio can only route IP addresses from its net address range. Each radio has two Net IP addresses, one is the address of the radio and the other is given to the device connected via PPP. A terminal connected via Ethernet cannot reach devices external to the installation, making Ethernet unsuitable for direct connection. A terminal connected via PPP can communicate with other terminals on the same net.

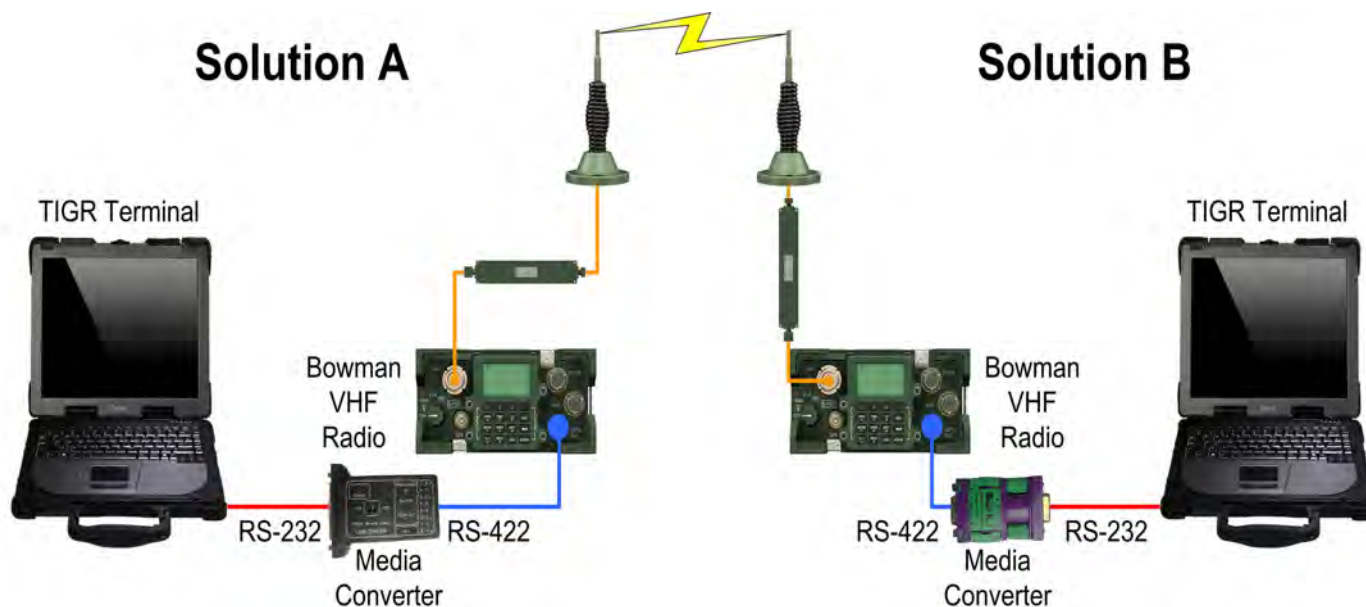


Figure 2: TIGR serial connectivity using the two media converters trialled

CONCLUSION

8. The project delivered its objective by proving the viability of the Bowman VHF radio as a bearer for TIGR. Once a connection is established Meta data events can be transferred with low latency. However due to the limited bandwidth of the radio, sending multi media files should be carefully managed. They can consume the available throughput of a net for a prolonged period.

9. This method of connectivity service should be implemented for users that are isolated from the HCDR network or have low update traffic requirements.

FUTURE WORK

10. All testing has been completed using version 1.6 of the TIGR application, however newer versions are available within theatre. These should be tested as they include features such as a hashing algorithm, to reduce the initial synchronisation data burden.

11. The project produced recommended settings for use, these will require tailoring for the specific data needs of the location it is to be deployed in order to provide the best possible quality of service.

BOWMAN OVER TACSAT (BOT)

SSgt (FofS) P. Mackay, SSgt (FofS) P. Thapa, SSgt (FofS) P. Vernon

Background

1. TacSat-4 is an experimental satellite, launched in September, 2011. TacSat-4 provides 2-3 hour access windows, 4 times a day. This is due to the highly elliptical orbit (HEO) of the satellite. The Harris AN/PRC-117F (117F) radio can be used as a ground station. The Bowman system provides maximum coverage of 15 km for High Capacity Data Radio (HCDR) data and 30 km for VHF voice. Operations that require geographical separation of battle formations beyond these ranges will not have these services.

Aim of the Project

2. Bowman Over TacSat (BOT) aims to remove this range constraint by using Tactical Satellite (TacSat), in order to provide data and voice connectivity between geographically separate Bowman networks, known as Bowman puddles.

Link Monitoring and coverage assessment

3. Due to the coverage limitations of TacSat-4, a link monitoring tool is required to confirm that ground stations are in the satellite footprint. To achieve this, a Python program remotely controls the 117F radios, switching them between Beacon Transmit and Receive modes to confirm link availability.

Data Store and Forward (SAF)

4. The SAF solution utilises a Simple Mail Transfer Protocol (SMTP) relay mechanism between Harris Wireless Message Terminal (WMT) and hMail SMTP server. This allows email data to be stored and forwarded by a Radio Operator when the TacSat link is available. The SAF Servers reside on an external Local Area Network (LAN) connected to Bowman domains via the Bowman Message Internet Gateway (MIG).

Voice interoperability

5. **Tactical Voice Bridge (TVB)** - TVB provides voice interoperability between Bowman and the 117F radio. This enables Bowman VHF net extension over TacSat to provide worldwide communication.

6. **Versatile Services Access Point (VSAP)** - VSAP provides remote control of the 117F radio and voice interoperability. VSAP can provide data interoperability when a 117G radio is used, there is no SAF capability.

Trials and testing

7. Trial scripts were designed to assess the capability of TacSat-4 in providing voice and data connectivity between Bowman puddles. Due to International Telecommunications Union (ITU) restrictions, TacSat-4 was unavailable for the duration of the field trials. For this reason a National Instruments PXI SATSIM was used to simulate TacSat-4 during laboratory tests and Skynet 5C was used during field trials. The link monitoring solution was successful and the beacon was audible during trials.

8. Voice communications were successfully established between Bowman puddles using VSAP and TVB. Bowman Data was successfully passed over the satellite link. The SAF mechanism operated correctly during trials.

Recommendations and Future Development

9. Future recommendations are:
 - a. Further trials using the syndicate designed link monitoring, SAF solution and trial scripts to assess the capability of TacSat-4.
 - b. Further trials and testing of the SAF solution, VSAP and TVB to assess suitability for use in an Operational Role.
 - c. Further development of the SAF solution is required to enable full end-to-end connectivity for Bowman data.
 - d. Future development to enable full automation between link establishment and SAF solution.

TACSAT BASELINE STUDY **SSGT (FofS) Macrae and SSgt (FofS) Widdup**

This report was commissioned to investigate the how the Army Navy (AN)/Portable Radio Communications (PRC) 117F operates in accordance with the Military-Standard (MIL-STD) -188-181C to enable Integrated Waveform to be used for Tactical Satellite (TacSat) Beyond Line of Site (BLOS) Communications. Furthermore it provides a baseline of the TacSat BLOS communication system and a Link Budget Analysis Tool that will enable military communications planners to investigate the performance of current and future Ultra High Frequency (UHF) TacSat communications links.

TacSat is the communication method of choice for Spearhead Lead Element (SLE) and expeditionary forces, allowing BLOS communications for rapid deployment anywhere in the world. Although initially intended to provide an interim UHF Satellite Communications (SatCom) capability for operations, TacSat has since become widely used throughout recent deployments, such as Op HERRICK, due its robustness and versatility. This has placed a strain on the Skynet satellite constellation, leading to the MoD to investigate waveforms that can alleviate this problem. In addition, as no 'best fit' user guide exists, there are various equipment configurations deployed. As such an understanding of how the MIL-STDs that mandate how TacSat is implemented is necessary, along with a clarification on the best way to utilise TacSat for current and future operations

The current MIL-STDs were released to the MoD in April 2012, which specified the techniques used to implement IW. MIL-STD-188-181C specifies the modulation and Forward Error Correction techniques used for this waveform, and as such was the focus of the project. To enable the syndicate to accurately model and therefore test the MIL-STD, a simulator was created using the Simulink software within MATLAB. Investigation of the other standards relating to IW was not achievable due to the project timescale.

To provide the necessary information for a TacSat baseline study the project team collated all the necessary information relating the variables of the TacSat system. It was found that as TacSat is a diverse system, containing many different components, which can be utilised in a variety of ways; it is impractical to find a single best fit solution for every possible TacSat operating scenario. To that end the project team created a Link Budget Analysis Tool using Microsoft Excel and Visual Basic 6 that will enable military communications planners to test the performance of current and future TacSat communications links to enable them to establish the best fit for their operating scenario.

This project recommends the continuation of the investigation into the MIL-STDs that govern the use of TacSat, expanding the investigation to incorporate the entire MIL-STD-188 document set, whilst also recommending the conduction of field trials to prove the accuracy of the Link Budget Analysis Tool developed by the project.

MENTORING THE AFGHAN NATIONAL POLICE COMMUNICATIONS IN HELMAND PROVINCE

By Capt Mark Miller R SIGNALS
Police Mentoring and Advisory Group S6 Mentor



Captain Miller is currently the Regimental Signals Officer for 1st Battalion Welsh Guards based in Hounslow. Captain Miller enlisted into the Army in 1997 serving at 7 Sig Regt and 216 (Para) Sig Sqn as a Tele Op (TG) before commissioning in 2006. He has served at Cyprus Communications Unit, 22 Sig Regt and on the JFCIS(ME) staff during the withdrawal of troops from Iraq in 2009.

Introduction

The PMAG are responsible for the institutional development of the Afghan National Police (ANP) within the boundaries of Task Force Helmand. The PMAG for Op HERRICK 16 is formed from the 1st Battalion Welsh Guards and attached arms. As the Regimental Signals Officer for the battalion, I have deployed into theatre as the S6 Mentor based at the Helmand Provincial Police HQ.

Developing the ANP is key to transition ahead of the withdrawal of ISAF combat troops by the end of 2014. Just like the British Army the ANP have a recruiting cap that can't be breached and they are now reaching the limit. This means that the ANP have to be able to do more with the same amount of people they now have without expanding to match the ISAF laydown and numbers. We have to improve the police ability to plan, command and control operations. Focus for development will be on police at Provincial, District and Precinct levels. As ISAF enters Security Force Assistance (SFA) the emphasis on advising takes on more importance as partnered operations begin to draw down. This is itself a challenge to those of us who advise particularly where Force Protection is limited. Subject matter experts deploy as mentors and advisors to police checkpoints in order to improve the basic skills

of the police. This is where the team of signallers in the PMAG is working hard to achieve communications effect.

The team is a mixture of combat signallers integral to the PMAG and fourteen Rear Link Detachment signallers from 228 Signal Squadron.

Policing in Helmand

Afghan Uniformed Police. The AUP have primacy in the province. They are largest pillar of the ANP and are stationed throughout the province. They are responsible for protecting the communities and enforcing the Afghan Rule of Law. As a general rule, most AUP are based at static locations with patrolling regularity dependent upon location and stage of transition for which the precinct is entered.

Afghan Local Police. The ALP is the result of a GIROA sponsored community overwatch programme. They are a locally recruited and locally employed police force which remains accountable to the elders and local jirgas within the community it is employed to secure. ALP have "citizen's arrest" authority and can detain people to hand over to the AUP.

Afghan National Civil Order Police. The ANCOP is the police element responsible for civil order, riot control, SWAT and natural disaster response. They are nationally recruited and trained in Kabul. They are formed of a higher standard of recruit who complete a sixteen week basic training package. There is a rotating ANCOP presence in TFH.

Afghan Border Police. The ABP are only deployed in areas with an international border. Helmand has ABP in the south and west of the province with a Zone HQ in Lashkar Gah.

National Directorate of Security. The NDS are the security and intelligence services for Afghanistan.

Helmand Province consists of 14 districts, of which Nad E Ali (NDA), Nahr-e Saraj (NES) and Lashkar Gah (LKG) are covered by TFH battlespace. In addition to the district AUP, there are 2 Reserve Kandaks and a Provincial Response Company. The Reserve Kandaks are currently committed to ground holding roles in LKG District centre and along Highway 601. Elements of the ANCOP are carrying out security tasks in NDA and NES.

AUP Command, Control and Communications

Helmand AUP are controlled and administered through the Provincial Police HQ (PPHQ). Besides the Chief of Police (PCoP) and his immediate staff, the PPHQ houses the administrative and logistical support elements of the force as well as certain specialist sub departments. District and Precinct C2 mirrors PPHQ but at a much reduced

scale. Control in the AUP is very centralised. As a result subordinate officers rarely have the latitude to make decisions without first consulting with their chief.

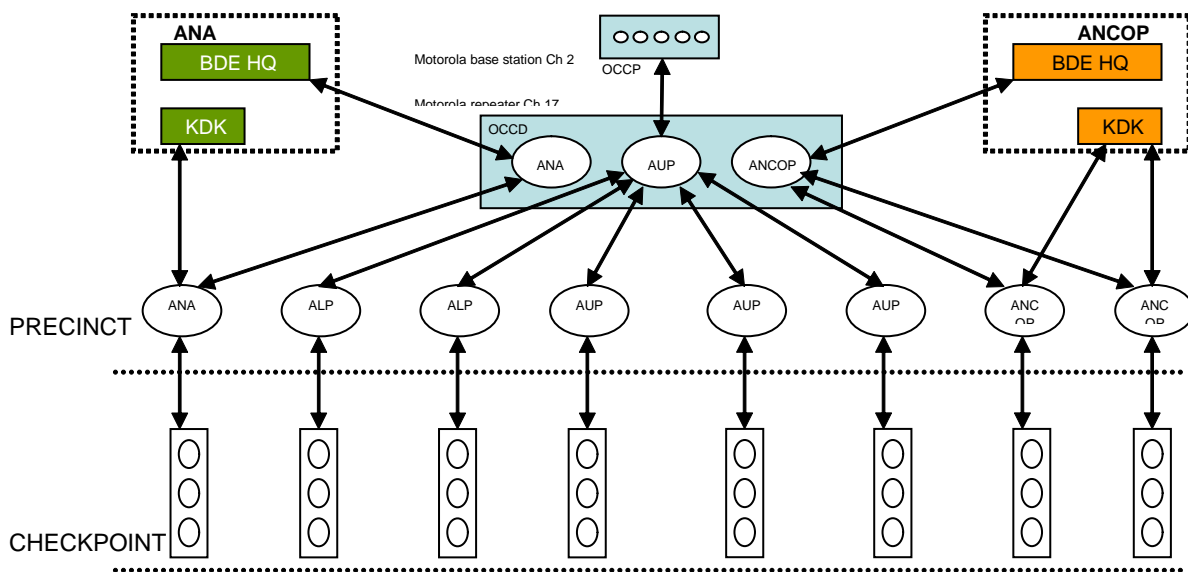
Afghan operational and tactical command is much less formal than western military forces. It is quite normal for commanders to run operations over mobile telephone without reference to the wider situational awareness (SA) or reliance on any form of staff. Central to developing this system of C2 is the Operational Coordination Centre (OCC). The role of the OCC as decreed by GIRoA is:

- Coordination between leaderships of ANSF, civil organisations and ISAF during meetings for assessment of security and operational situations.
- To develop joint security measure plans for

PMAG is mentoring the Chief and his staff branches of which the OCC is key terrain.

OCCs are a crucial link to ANSF stations and CPs and a good source of real time information. Joint SA is enhanced by two way information flows. As the ISAF laydown changes due to SFA the OCC will become central to the intelligence collect process for both ANSF and ISAF alike. In the timeframe left to develop the OCC concept and the ANSF Liaison Officers, the PMAG is working on areas such as map reading, accurate reporting, battle rhythm and empowering liaison officers to make decisions rather than relying on a chief that is not always present at the HQ.

A capable, trained and empowered OCC will only be effective if it has the capacity to control through a robust communications network. CIS capability is broadly



District ANSF Information Flow Example

their area of responsibility on the working map of OCC Commanders.

- Provide sustainable communications systems and receive timely situational reports from security organisations and disseminate information.
- Conduct daily and weekly security, reconnaissance, coordination and situational awareness meetings.

OCCs exist to strengthen SA and operational coordination within the ANSF and between ANSF and ISAF. It must be stressed that the OCC is a coordination centre and does not wield any significant power of command. That remains vested in the AUP chief, with the ANA as a significant supporting actor. At provincial level the OCCP is manned by liaison officers from all pillars of ANSF. At district level this depends on the geographical location and subsequent ANSF laydown. The OCCs are the G3 branch of the Police HQ. At provincial and district level HQs, the

delivered through VHF and HF insecure voice. There is also a fledgling data capability provided by a mixture of laptops with aircards, and the Ministry of Interior (MoI) intranet.

Information Flow Template

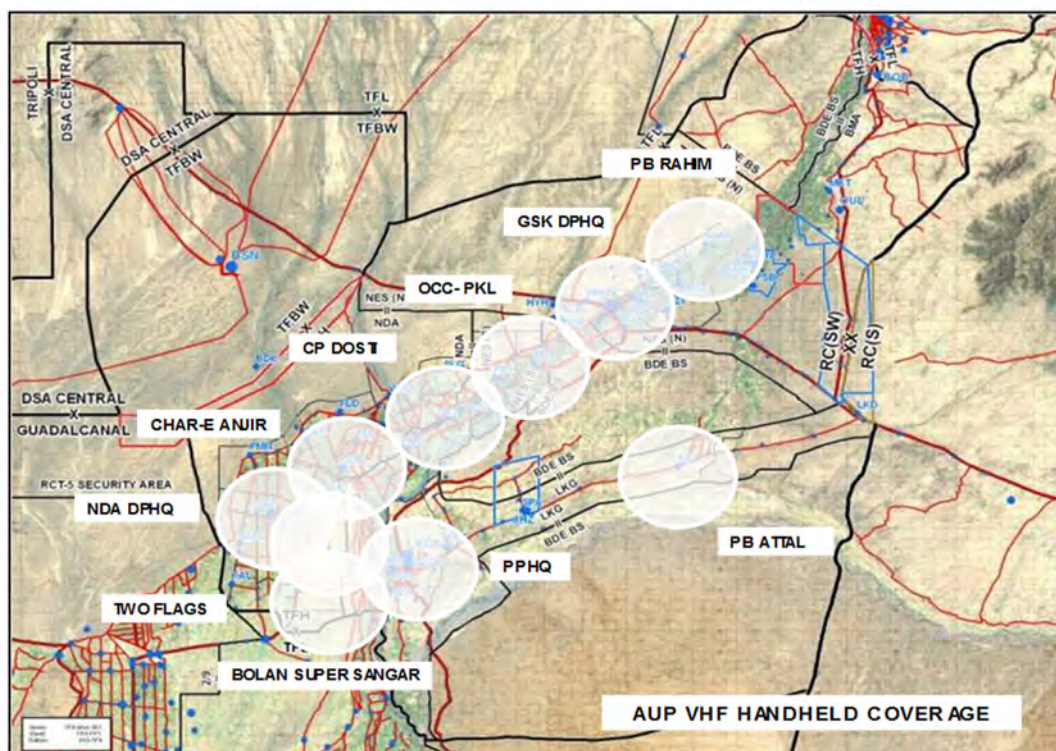
The CIS solution is already provided and is based on an Information Exchange Requirement submitted pre 2009. Within the constraints of the MoI Information and Communication Technology system it will not be practical to request changes to this solution and therefore the network is planned and managed accordingly. In order to advise the AUP communications chief I have conducted an information flow research project. Based on the results of the project the CIS requirement can be better understood and therefore enhanced. Each district is different but the figure below demonstrates a base template for flows of information.

Each pillar of ANSF has its own reporting chain from which a link into the OCC is provided. The detail of the research is not shown in this article but results lead to the following assessment:

- AUP communications should be the primary link between the OCCs
- OCCs should be collocated at District Police HQs
- There isn't currently a single command network throughout the province
- Further HF equipment is required to establish a single network

ANP Communications Information Systems

Ground Up Mentoring



The AUP at the provincial level and below use the following radio systems:

- VHF Motorola Repeater MTR 2000 series
- VHF Motorola GP and GM360 using commercial band frequency range
- VHF ICOM
- HF Codan 2020 transceiver and vehicle variant

Within the TFH AO, the AUP are not equipped with HF although the further afield districts are. The VHF Motorola radio is the official fielded system with ICOM being a legacy system pre 2009 and will be phased out as radios become unserviceable. The VHF network is based on a half duplex repeater network which provides coverage to a radius around each district HQ where the repeater is located. Whilst the transmit planning range of the repeater is an impressive 40km, the receive sensitivity is only as good as the radio which is used to transmit at the

distant station. Therefore if a policeman is equipped with a handheld radio with a planning range of 1-4km the ability to join the repeater network is severely reduced. The work round for this is the 'Talkround' feature which allows simplex operating. In order to improve the coverage of the repeater system and to reduce network lockdown¹ a plan has been submitted for funding to install a further eight repeaters across the TFH AO. This plan will see the vast majority of the protected community covered by the VHF network which greatly enhances the ability for police to join and benefit from a number of police networks across the AO. Coverage is estimated as follows:

The capacity of the police network will only be as good as the police that require connectivity. In order to develop a police force that has received zero communications training I have adopted a ground up approach to mentoring. This is achieved using S6 mentors in police locations across the AO and by delivering distributed training using mobile training teams. Signallers are attached to District Advisor Teams (DATs) and Police Advisor Teams (PATs). The DATs work at the DPHQ delivering training and mentoring the systems and processes that facilitate the OCC concept. The PATs are small multiple sized units which patrol to all police CPs delivering military, police and specialist training. The PATs will deploy in vehicles or on foot and can deploy for overnight stays in the CPs. DAT and PAT tasks include:

¹ The result of a 'sticky pressel'. Where the whole half duplex network is blocked as a result of a single radio having the pressel continuously pressed.

- Delivery of sustainment training on the ground to AUP and ANCOP
- Focus on the S2, 3, 4 and 6 functional areas at district, precinct and CP level
- Audit the police
- Facilitate movement of ISAF advisors
- Advise the CFs



LCpl Knill adjusting antenna siting

To date on Op HERRICK 16, the success of the S6 mentors has been achieved by an understanding of the systems used, a defined set of guidance, and initiative and ingenuity from signallers at all levels. This deployment has seen R Signals operators and engineers deploy to the most forward and austere police CPs in PATs and deliver communications training. They have identified the areas of weakness and have self taught the Motorola radio. It is the basic knowledge of communicating which has brought about success. Examples of this include repositioning antennas to avoid interference, teaching relay voice procedure, explaining the virtues of increased elevation and power. Visits to CPs and police stations will now see basic control rooms set up with net diagrams and maps on the wall. There is much to be done but slowly the principles of propagation, equipment care and accuracy in reporting are being taught at all levels of police.

Mobile Training Teams

Two areas of significant weakness were identified early on in the tour. Power management and radio operations and maintenance. As a result two courses have been designed and developed. They are delivered by mobile training teams. The first is a vehicle and generator maintenance course. As part of a REME team, Signaller Tovey (RSE) is working his way around the entire TFH AO. Every week he visits yet another location to deliver generator and power management courses. He is required to deploy

one day ahead of the course start date and learn the type of generator in use at that location. He has to date self taught and delivered training on four different generator systems.

The second course is the Communications Engineer Course. A title which lends itself to the Afghan perception of the course, rather than being an engineer specific course. The course delivers training on the following subjects:

- Basic antenna and propagation theory
- All Motorola radios operation including translating the LCD screens
- Fault diagnosis, reporting and basic or improvised repair
- Coaxial cable repair and re-termination
- Radio diagrams and checks
- Solar panels

LCpl Thomson an augmentee to the Bde Sig Sqn from 16 Sig Regt, has been the lead instructor throughout. Calling upon instructor assistance from locally based signallers, he is like Sig Tovey working his way around the AO distributing communications courses. It is not uncommon for the police to attend the course having arrived with broken equipment which is repaired where possible.



Sig Tovey teaching ANCOP

The Future of Afghan Police Communications

The future will rely on police trained at all levels from the Communications Chief to the patrolmen on the ground. The flow of information will be enhanced by a police force that is trained, advised and equipped with the necessary CIS. Below the provincial level, the next big step is to understand the levels of fielded radio equipment and to mentor the maintenance process. This will be greatly improved by the introduction of the Regional Radio Workshops at the PPHQ towards the end of September. Currently there is no facility to repair radios other than to send them to Kabul. The police are reluctant to release broken kit as they believe they will not get a replacement.

At the PPHQ we have seen the infrastructure of the MoI Intranet installed and await the delivery of computers and VoIP telephones. This will provide data connectivity to the higher formation HQs in the region and direct to the MoI in Kabul. It will be the responsibility of the S6 mentor to introduce SOPs on the use of this capability to the OCCP.



LCpl Thomson teaching coax termination

A further development will see the introduction of a national 119 call centre at the PPHQ. Using the mobile phone infrastructure network, Afghan local nationals will have a means to request civil emergency support or to report corruption. The call centre will be linked to the OCCP which will initiate a civil response.

These initiatives combined with greater connectivity and coordination between ANSF will lead to a far better protected community in the province of Helmand. Time is short but with dedicated signallers performing at all levels there will be no shortage of effort towards reaching the necessary end state.

JOURNAL PRIZES

Journal prizes for the best articles in the Winter 2011 edition of the RSI Journal have been awarded as follows:

£100: Lieutenant Colonel John Munnery - "It's a Man's Life in Business Development"

£100: Major Tom Johnstone - "SIGINT: The Secret Land War 1939-45"

£50: Lieutenant Colonel David Mullineaux - "A Troop Commander's Role in 1900"

£50: Warrant Officer Class One Warren Quinn - "Data over HCDR on Operations: The Story So Far"

Congratulations to them, with the hope that others will be inspired to contribute similar quality articles.

CYBER CHALLENGE UK

By Lieutenant Colonel Nigel Harrison

Nigel Harrison is a Director on the Board of Cyber Challenge UK, a position he took up during his last appointment in the Cabinet Office.. He retired from the Army earlier this year, after a career of over 30 years with the Corps. He will be the next Secretary of the Royal Signals Institution and Editor of the Journal, taking up post in September.

In response to the national cyber security skills shortage identified in 2009, Security Challenge UK was established in 2010 to promote careers in cyber security and identify talented individuals who have developed the skills necessary to take up careers in this sector. The main medium by which the Challenge promotes careers and identifies talent is by running an annual series of online and face-to-face competitions, the culmination of which is a national final held each March; this year's winner was a 20-year old Cambridge undergraduate and the previous year's winner was a 33-year old postman from Wakefield.

Thus far, for the two full years that this initiative has been running, roughly 4000 competitors a year have registered to take part; among which have been a number of service personnel, and in both years at least one serviceman has received a career-enhancing prize as one of the highest placed finalists. The overall pool of prizes on offer to the top candidates include sponsored places on an MSc course, private sector training modules, membership of professional bodies and even internships with leading cyber security companies; the value of the prize pot is now approaching £100K per annum.

The first round of competitions for the 2012/13 season have already started; they are run online and largely, but not exclusively, concentrate on testing a range of 'hard' technical skills. In the latter stages, face-to-face semi-finals are run which then also put the competitor's 'soft' skills under the spotlight; i.e. team-working, prioritisation, multiple-tasking, leadership, management, briefing and reporting. Two new initiatives for this year are a stand-alone competition to design a cyber security awareness campaign targeted at small businesses and, as a proof of concept, a five-day cyber camp to be hosted at the University of Lancaster to assist and encourage 30 promising young people (who have just missed out semi-final places) to hone their skills ahead of next year's competition. As with all the existing competitions, these events are being run directly by one or more of the Challenge's sponsor organisations.

Cyber Security Challenge UK operates as a not-for-profit company, funded partly by a small annual grant from the National Cyber Security Programme and partly by a

mix of cash and value-in-kind donations from the public and private sectors, professional bodies and academia. Currently, the Challenge has nearly fifty sponsors, supporters and partner organisations - all of whom put time, effort and money into the initiative and get the direct benefit of access to talented aspiring cyber security professionals and the indirect benefit of contributing to filling the national skills gap in this vital sector. Additionally, sponsors get the added benefit of being associated with the Challenge's regular and significant media coverage (broadcast, online and printed –including the BBC, Daily Telegraph, New Scientist and others).

The Challenge's patron is the former Security Minister Baroness Pauline Neville-Jones. Sponsors and supporters include GCHQ, Cabinet Office, BIS, Metropolitan Police, BT, Cassidian, HP, QinetiQ, Sophos, CompTIA, PwC, SANS Institute, OU, KPMG, Royal Holloway University of London, BCS, Royal Mail Group, 7 Safe, 2E2, DISA, HMGCC, Raytheon, IRM, Everything Everywhere, Get Safe Online and Ultra Electronics. The MoD is already a de facto financial supporter of the Challenge, in that the Office of Cyber Security and Information Assurance in the Cabinet Office pay via an annual grant from the NCSP.

Individual service personnel and MoD civil servants not currently employed in cyber security-related appointments are welcome to test their aptitude for employment within the profession by benchmarking their skills via one or more of the Challenge's competitions; indeed a number have already done so. The Challenge would welcome the opportunity to explore with the MoD (or one or more of its constituent elements) how it could support a more structured approach to identifying talented individuals to work within the realm of military cyber security. In return, the Challenge would also be keen to discuss what practical (value-in-kind) support that the MoD could provide to this national initiative. Helping the Challenge to provide regional coverage via the Reserve Forces, or helping the Challenge to engage with young people via its cadet organisations, may be examples of a potentially symbiotic relationship between the MoD and t

THE ARMED FORCES COMMUNICATIONS ELECTRONICS ASSOCIATION (AFCEA)

This year the annual Technet European/ITTE Conference took place in Prague in the Czech Republic with a theme of "Special Aspects of Cyber Defence". For the fourth time, this event incorporated the AFCEA Europe Student Conference.

This conference provided an opportunity for AFCEAN undergraduate, MSc and PhD students to present short papers on their current research to the assembly. This year students from Greece, Poland, Turkey, Slovenia and the Czech Republic took up the offer, including Major (TOT IS) Jonathan Heaton from the Information Capability Directorate in Blandford. In addition, he acted as conference student mentor and Chairman of the student conference.

Pictured below is Jon delivering his key-note presentation which addressed the challenges the British MOD currently faces in ensuring that its employees are aware of the risks in using social networks and a suggested route to deliver responsible usage.



The next conference takes place in Warsaw in May 2013. The theme for the conference will be announced later this year, when the request for abstracts will be promulgated. Any Corps personnel who are currently or have recently completed research at first degree level or higher who may be interested in presenting, are requested to contact Maj Jon Heaton who will be acting as the Student Conference Chairman. He is contactable by email at jonathan.heaton152@mod.uk

BLETCHLEY PARK – A MORE SECURE FUTURE

By Colonel Iain Standen, CEO of The Bletchley Park Trust



Iain Standen retired from the Corps in early 2012. During his career he served in Cyprus, the United Kingdom and Germany, and operationally in Northern Ireland, Bosnia, Iraq and Saudi Arabia. He commanded 20 Armoured Brigade Headquarters and Signal Squadron (200), and the Joint Service Signal Unit (Cyprus). His final appointment in the Army was command of the Joint Service Signals Organisation.

Many RSI Journal readers will already be aware of the history of Bletchley Park, and its invaluable contribution to the shortening of the Second World War. Perhaps less familiar will be the story of its post war history, and its resurrection to the highly successful heritage attraction it is today. In this short article I will outline a little of Bletchley Park's history both in the Second War and since, how

looming, the then Head of the Secret Intelligence Service (or MI6), Admiral Sir Hugh Sinclair purchased the Bletchley mansion and its estate as a 'war station' for parts of the organisation in the event that war forced their removal from London. One of the elements he catered for was the Government Code and Cypher School (GC&CS), the forerunner of today's Government Communication Headquarters (GCHQ).

After a short sojourn to Bletchley during the 1938 Munich crisis, the GC&CS remained in London until the outbreak of war in September 1939. It then returned to Bletchley Park lock, stock and barrel, bolstered by a number of brilliant brains from Oxford and Cambridge such as Hugh Alexander, the international chessplayer, and Alan Turing, the brilliant mathematician the centenary of whose birth we celebrate this year, to name but two.

Since the publication of "The Ultra Secret" by F W Winterbotham in 1974, the story of what ensued at Bletchley has emerged in ever-more detail over the ensuing 38 years. As a result of this book, and many that have been written since, the fascinating and incredible story of Bletchley Park's codebreakers and their contribution to the Allied victory in the Second World War has become well-known. Indeed by the 1990s the story was very much in the public consciousness.

This was no bad thing, as in 1991 the site at Bletchley Park, which since the end of the War had been in government use, was about to be redeveloped. In an effort to ensure that the work at the Park was not forgotten, local enthusiasts invited as many surviving Bletchley Park veterans as possible to visit the Park for a final party. At the party the veterans were interviewed and their stories recorded. For many veterans it was the first occasion at which they had spoken about their time at BP (as Bletch-



I came to be involved with the Park, and what the future has in store.

In 1938, alive to the fact that there appeared to be a war

leaving Park is affectionately known to them). It quickly became clear that the site was such a crucial part of this nation's history, that it could not be allowed to be redeveloped, and so started the campaign to save it.

In 1992 the Bletchley Park Trust was established and for the last twenty years the Park has been run as a heritage attraction. In the early days, the survival of the Park was touch and go, and even as recently as 2005 its future was uncertain. Over the last seven years, under the expert leadership of Simon Greenish, the Park has been truly saved, and now runs as a self-sustaining heritage attraction, open three hundred and sixty one days a year, and attracting upwards of 140,000 visitors a year.



Inside Bletchley Park Block 2

In January 2012 I took over from Simon as the CEO of the Bletchley Park Trust having completed some 28 years service in the Royal Corps of Signals. I have a lifelong interest in history and heritage, which I put down to my mother's passion for the same, and recall with great fondness how my siblings and I were taken around the United Kingdom's archaeological sites, museums, castles and cathedrals during our formative years. As the son of an RAF officer, and the grandson of an officer in the Royal Signals, it could also be said that the military and military history are in my blood. I have a passion for visiting battlefields that stretches back to my childhood, having visited my first, Bosworth Field, some thirty-five years ago. Since then I have toured the battlefields of the United Kingdom, France, Belgium, Germany, Italy, Crete, and the United States, covering battles and campaigns from the Seven Years War to the Second World War.

Bletchley Park first came to my attention some years ago when I noticed the ongoing campaign to save the Park, and it continued to crop up when I worked in, and ultimately had the privilege of commanding the Joint Service Signals Organisation, (essentially the modern day equivalent of the 'Y Services', a crucial part of the Bletchley Park story.) In this guise I also had the privilege to work alongside colleagues from GCHQ who had trained in the Park in the post-War era. Further work in this area meant a continuing association with GCHQ and a greater interest and understanding of the role Bletchley Park played in the Second World War.

It was therefore somewhat serendipitous when in late 2011, having decided to leave the Army that I came across the advertisement in the Sunday Times for the post of CEO. It required only a few moments thought before I was submitting my CV and two months and three sets of interviews later, I was being offered, what I call the perfect job!

Having been in post for nearly five months, I remain of that opinion. For someone with my background and interests this is the most fantastic opportunity, and I am thoroughly enjoying the role and its many and varied challenges. I have been hugely impressed by the commitment and enthusiasm of both the permanent and volunteer staff, and look forward to working closely with them all over the months and years to come.

But what of the future for Bletchley Park? Under Simon Greenish's leadership the Trust put together a successful bid to the Heritage Lottery Fund for £7.5 million project to start the restoration of the Park. Of this target, £5 million would come from the fund with some £2.5 million to be raised in matched funding by the Trust. The task of gathering the matched funding required to unlock the Heritage Lottery Funding (HLF) has now been completed and, as I write this article, the project is about to receive its clearance from the HLF to start the work.

With this money now available to the Trust we will be able to get under way with this first phase in the restoration and renovation of Bletchley Park. The main elements of this phase are the restoration of some of the original wooden 1939 era huts, built when the GC&CS first moved into the Park. This restoration work will be followed by some work on exhibits, which will see two of the huts (Huts 3 and 6 for those who know the site) filled with what is termed 'light touch' interpretation, made up of visual and audio displays designed to give the visitor an understanding of what it was like to work in the environment during the War.



Block C Renovated

The other major part of this project will be the restoration of Block C, which will become a new and impressive

visitor centre. In this we will have superb facilities to welcome our visitors, including a new introductory exhibition, a gift shop, toilet facilities and a coffee shop. We look forward to 2014 when it is envisaged that the new facilities will be opened. But, like most similar projects, this HLF project is more than just buildings.



Block C Internal

As we open the new facilities in preparation for the 2015 season, we will also have had to develop our ways of operating. HLF make some clear provisos in providing the money for such projects and demand that we, like other recipients, refine and develop our ways of working in three broad areas: learning, interpretation and training. In the learning area we will seek to expand our already excellent learning and education offering by developing new ways of delivering the service such as expanding our education outreach programme. We will also be seeking to develop our target audiences by increasing our engagement with the local community, youth groups and adult learners. This ambition is vitally important if we are to meet the HLF's demand that we continue to encourage 'people to be involved in their heritage'.



Renovated huts

The project will also bring exciting new opportunities in how we interpret the Park. Displays will be multi-layered

and using modern methods of interpretation to ensure that visitors of all ages and interests can understand the story. A whole range of training activities have been identified in the project, which includes the development of an apprenticeship, increased levels of formal training for all staff and a volunteer accreditation process to ensure Continued Professional Development.

As well as these specific provisions that we are directed to deliver, there is a whole raft of routine business that we will need to redefine, redesign and reorganise so that we are in the right state to make the newly renovated buildings work for us.

In summary, the next three years promise to be an exciting and busy time, as we start to shape the long-term future of Bletchley Park. As indicated earlier, this work is just the first phase of an on-going process of regeneration that, over the course of the next ten years, will see all of the historic buildings within Bletchley Park renovated and returned to use as part of a thriving world class heritage attraction. It is truly a stimulating time to be CEO of the Park, and a privilege to be in charge of such an iconic and important national heritage site.

Bletchley Park is open all year round except for Christmas Eve, Christmas Day, Boxing Day and New Year's Day. For more information, please visit our website at www.bletchleypark.org.uk.

ARTICLES FOR THE JOURNAL

Articles are sought for publication, subject to editing and the possible risk of omission if we are deluged with copy! Electronic Word format in Times New Roman 11 point type is preferred.

Photographs, figures and diagrams are encouraged, and should be sent as separate jpeg files as well as embedded in the text.

Articles should be accompanied by a passport type photograph and a one paragraph bio of the author to accompany the by-line.

The e-mail address is: [secretary @ royalsignalsinstitution.co.uk](mailto:secretary@royalsignalsinstitution.co.uk).

Note that the deadline for the submission of articles in the Winter 2012 edition is 1 October.

A NIGHT TO REMEMBER

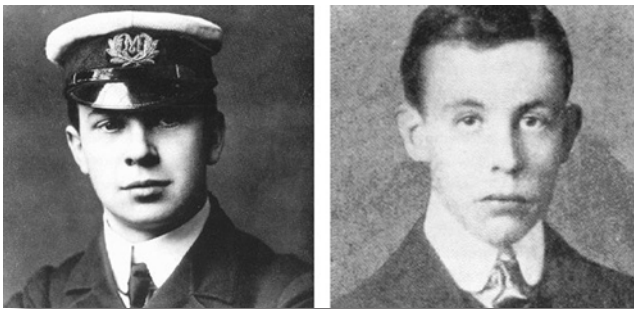
By Peter Weale



Peter Weale is now retired and keeps sheep in his native Wales. He served in the Corps from 1964-70 as a Special Operator. On departure he joined the Diplomatic Wireless Service as an operator/technician serving in Bangladesh, Saudi Arabia, Nigeria, Russia, Vietnam and The Lebanon. He rose to become Deputy Head of Signals in the Foreign Office and was on loan to British Military HQ Cyprus in 1993/5. He ended his career as Head of Overseas Communications at HMCE. The title of this article is taken from a 1958 film of the sinking.

Readers may be forgiven for wondering what the sinking of the Titanic has to do with Army Signals. However, this story gives a fascinating insight into the early use of radio, operating procedures and the technology of the day, all employed in the most arduous of conditions. On the centenary of Titanic's sinking, public interest in the events of that night has grown. Here is my narrative of the disaster from the radio operators' perspective.

On the night of 14/15th April 1912 the call CQD de MGY could be heard rippling across the airwaves. But in fact this distress call was not heard by many, missed by some and in the early hours of the tragedy, not taken as seriously as it should have been by others.



Jack Phillips and Harold Bride

The Titanic's "wireless" equipment was the most powerful in use at the time. Before the voyage began, Senior Radio Officer Jack Phillips and his assistant Second Radio Officer Harold Bride had tested the equipment with successful

contacts as far away as Port Suez, some 3000 miles distant. The main transmitter was of a rotary spark design, powered by a 5 kW motor generator, fed from the ship's lighting circuit. The equipment operated into a 4-wire antenna suspended between two of the ship's masts, some 250 feet above the sea. There was also a battery powered emergency transmitter and a separate motor generator in the adjoining room. The main equipment's guaranteed working range was 200 miles, but communications could be reliably maintained for up to 400 miles during daylight and well over 2,000 miles at night.



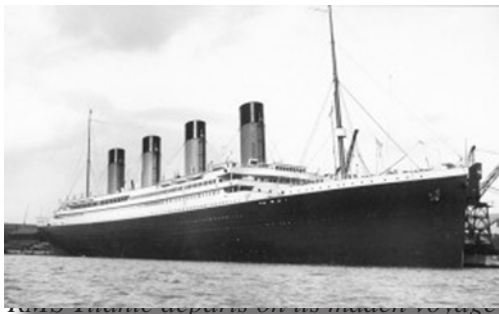
Inside the Titanic Radio room

In 1912 the Marconi Company had a monopoly on the use of maritime radio. They supplied the equipment and operators to the majority of ships and owned and ran most shore stations. The allocation of ships call signs by country had yet to come into force, and here too Marconi dominated. Ships using Marconi installations were given a three-letter call sign beginning with the letter 'M'. Titanic was allocated MGY, (after initially being designated MUC) and if this call was heard then operators throughout the North Atlantic would know it was to or from the Titanic. To this day, every ship in the world has its own unique call sign and still do. For example, British ship call signs begin with a 'G' and German ships call signs begin with the letter "D" (for Deutschland).

The "Marconi Room" as it was known on board, was some 40 feet aft of the Bridge, on the boat deck, and connected via a corridor running down the port side of the Officers quarters. The Radio Room was in the centre of this accommodation – it did not have an outside facing porthole, natural light being provided via a skylight in the ceiling. The Radio Officers' sleeping quarters were in a separate room to starboard of the Marconi Room, separated from the operating room by an interconnecting door. The Radio Operators shared the Officers washroom facilities across the corridor. The radio room did have a telephone, connected to the ship's telephone exchange but, surprisingly, there was no direct connection to the Bridge.

Despite the distress call SOS being internationally agreed in 1906, Marconi operators were slow to use it, preferring instead the then traditional call of CQD which was CQ [calling all stations] still in use by Morse and SSB voice

operators to this day, with the addition of “D” for distress. It is often said that SOS is instantly recognizable in CW by telegraphists and hams alike, but this is not true. For SOS does not really exist. It is a procedural call with the three letters run together without spaces and convention has it that it is sent three times. CQD, on the other hand, is instantly recognizable, because CQ is heard all over the radio bands and at all times of day. However, Jack Phillips who manned the Titanic’s radio throughout the time leading up to the sinking, tapped out CQD de MGY (instead of CQD MGY) which could be interpreted, especially in poor conditions, as simply a Morse error for CQ de MGY. It was precisely to prevent such mistakes that SOS had been introduced.



For Phillips to send the distress signal he had to change the transmitter to the distress frequency. This involved making several adjustments to his transmitting and receiving equipment. In those days, and bearing in mind that the Titanic’s radio equipment was one of the largest afloat, this was not a simple task. Moreover, it meant making adjustments to equipment in two rooms. Prior to Jack Phillips being told to prepare to send a distress signal, he had been transmitting and receiving radio cables with Cape Race (callsign MCE), a Marconi shore station in Newfoundland. Over 250 cables had been sent and received since the ship left Southampton, so the two operators had been kept busy. The distress frequency of 500kHz, or 600 metres as it was then known, remains the international distress frequency. Transmitters in 1912 were more bulky machines than those of today. Phillips would have had to move handles and levers, requiring considerable effort, adjust knobs which gave only a coarse reading and replace frequency range coils that were 12 inches or more long.

That Phillips could send the distress call at all was extremely lucky, as the transmitter had broken down the previous night and it had taken Phillips and Bride nearly six hours to repair it. The problem had been fairly simple but troublesome to locate. Due to the intense vibration of the engine and generator, a high-tension lead carrying 20,000 volts had rubbed off its insulation against an iron bolt. Once that lead had been inadvertently earthed, no proper spark could be generated from the rotary spark unit. That spark was crucial to obtaining a high frequency or transmittable signal to the ship’s aerial. In

a later interview with The New York Times, Bride, still exhausted from his ordeal, explained that “the secondary of the high voltage transformer” become earthed and that he and Phillips worked for six hours to fix the problem. The Times reporter had no idea what Bride was talking about and wrote the secondary as “the secretary.” As a result, Titanic buffs all over the world still refer to the problem of “the secretary of the transmitter” being at fault. In his report to the Marconi Company of events that night, Bride explained how he and Phillips had grappled with the leaking voltage near the secondary winding of the transformer.

When Phillips began sending distress signals they were received by a number of ships as well as Cape Race where Jimmy Myrick, a 14-year-old Newfoundland boy, was one of the first people to hear RMS Titanic’s late-night distress call. He was in the wireless shed the night of Titanic’s collision and had to run out of the shed and get the radio operators. The transmissions from the stricken vessel and the resulting bustle of activity at the Cape Race Marconi Station that occurred after the wireless operators made contact, was re-enacted on April 14 as part of the 100th anniversary of the world’s most fascinating marine tragedies. Incidentally, the transcripts of those messages are part of the Titanic exhibit at Halifax’s Maritime Museum of the Atlantic Cape Race, the nearest shore station was in contact with Titanic before the collision on a working frequency and once contact was re-established on the emergency channel, continued to coordinate traffic to and from ships throughout the crises. The station first went on the air on 17 November 1904 and closed down in 1967. It was the first point of radio contact with the “new world”, coming westward, and the last point of contact going back eastward. Marconi visited Cape Race many times between 1902-04.

Soon news was flashing across the land-line telegraph wires to the major cities on the East coast of America. Well before Titanic had sunk, newspaper editors and local White Star representatives had got wind of what might be unfolding. The first ship to reply to Titanic was the Frankfurt (callsign DFT) but Phillips did not choose to pursue this contact probably because it was not a Marconi company ship. Despite Phillips dealing with an extreme emergency he was not about to choose a rival company, in this case German, with which to communicate! The other point to bear in mind is that Phillips, like so many of the ship’s officers, crew and passengers did not for a minute think that the ship would sink. Instead there was a belief that aid would arrive and that the Titanic could be towed to New York for repairs. It was not until much later that the inevitable entered their minds. Titanic calls were also heard by other ships including the Carpathia, Mount Temple, Virginian and Titanic’s sister ship, Olympic (which was some 500 miles away). Some of these ships did not immediately understand the seriousness of the situation, and as late as an hour or so after the collision, the Olympic

was asking the Titanic if she was steaming south to meet with her. Meanwhile the Frankfurt kept requesting more details from Titanic that only served to frustrate Phillips. Throughout the crises, Phillips manned the radio and Bride ran messages between the radio room and bridge. This gave Bride the opportunity of observing at first hand the situation going on around them, at first orderly soon to degenerate into panic. It was not until near the very end that Bride told Phillips that it was time for them to abandon their place of duty. By this time Captain Smith had visited the radio room and personally relieved the two men of their responsibilities.

Transmitting messages is always easier than receiving them and it was no different in 1912. The received signal was often so low in volume that operators had to strain to hear it. It was a common sight in those days for an operator to wrap a cloth or towel around his head in an attempt to block out ambient noise. The preferred receiver was that which used a Fleming detector, a lamp or tube that worked as a diode or electrical valve in which a high frequency signal was broken up and an audible signal sent to the operator's headphones. A back-up receiver was the so-called Multiple Tuner with a magnetic detector. The instrument was inferior and more complex to handle than the receiver with the Fleming detector but remained much in use by Marconi-equipped ships and shore stations. A third receiver worked with a crystal detector and was rather similar to the receiver with the Fleming detector. All three worked satisfactorily, were reasonably reliable but delivered very weak audible signals. The magnetic detector even had a constant crackling interference similar to that over a bad telephone line. It made receiving extremely difficult at times. Of the three receivers, the magnetic detector had the disadvantage that its clockwork motor required winding from time to time, which moved a braided iron wire through the detecting coils and past strong magnets. If the iron wire did not move, nothing was heard in the headphones



The Californian

The Californian (callsign MWL) was the nearest ship to the Titanic, only some 20 miles distant, and was equipped with just such a magnetic detector receiver. The vessel was at a standstill due to the amount of ice in the vicinity and the wireless operator, who had previously tried to warn Titanic about the ice threat, had been told by Phillips to stop sending as he was busy working Cape Race. So the Californian's radio operator had shut down for the night and turned in. A friend of his, the Third Officer, came into

the radio room to listen to what was happening on the air, something he frequently did. However, the clockwork mechanism of the magnetic detector was either switched off or had run down. As he did not know how to wind it up, so he heard nothing and gave up. Later, he learned that at the time he had tried to get the set working, Titanic was sending frantic distress calls. It bothered him for the rest of his life that he had not been more adamant in persuading his shipmate to explain how to activate the magnetic detector. Meanwhile California watch officers claimed to have spotted a large passenger liner and to have seen flares fired by the ship, but no one thought to wake the sleeping radio operator.

The last known transmission from the Titanic was picked up by the Carpathia (callsign MPA) that said "*Come as quickly as possible old man, the engine-room is filling up to the boilers*". It is worth mentioning that in those days only a handful of large passenger ships carried two radio officers. Almost all ships carried one operator whose duties were not to keep watch but to handle the radio traffic for the ship. It was only a matter of luck that the Carpathia's radio operator had been delayed taking a press release from Cape Cod (callsign WCC) when he heard the Titanic's distress call. His captain, figuring that they were only 58 miles away ordered the ship to steam flat-out which they did for three and a half hours. At 4am they reached the Titanic's last known position. There was no sign of the liner and after some searching they took on board approximately 700 survivors out a total of more than the 2200 passengers and crew. The Carpathia left the site at 8.30am bound for New York.



Like so many others, Jack Phillips lost his life that night to hyperthermia. Harold Bride survived but had frostbite to his legs from exposure to the cold water. When rescued by the Carpathia he assisted the ship's radio operator to handle the copious amount of telegraphic traffic generated by the tragedy. Marconi was on hand to greet his two exhausted radio operators when the Carpathia docked in New York on 18 April. He had travelled to America on the Lusitania having originally intended crossing on the Titanic!

When the wireless room of Titanic was visited by a remotely-operated robot some 85 years after it had last been set foot in, all that was recognisable were some dirty

boxes. One box on the wall was identified as the adjustable transformer that matched the impedance of the transmitter to the ship's aerial. In other words an early aerial matching unit (AMU). This unit required re-adjustment each time the operator changed frequency. Without it we could have been left wondering "whatever happened to Titanic?"



There are no secrets about what occurred that night, the mistakes leading up to the disaster and the different but natural human reactions to the tragedy. Instead, this tale highlights the devotion to duty of two dedicated young men who kept the world informed as the disaster unfolded around them and gave many passengers a chance of survival. Harold Bride went on to marry and work as a wireless operator on a steamship during WWI. He died in 1956 aged 66.

Following the outcome of the American and British Boards of Enquiry into the tragedy, a number of recommendations were made which subsequently become law. Those pertaining to the use of radio were: 1) a separate frequency and watch to be kept for distress signal messages; 2) universal adoption of the distress call SOS; and 3) 24-hour watch (and by implication at least two Radio officers) to be kept on all ships carrying more than 50 passengers.

As a postscript, some of the Titanic's distress calls were picked up by Mr Moore, a radio ham, who lived at Gelligroes, near Blackwood Monmouthshire. He reported hearing SOS calls to the local police (but did not know who or what MGY was). The police took no action and in any case could not have influenced events in mid-Atlantic. When Mr Marconi heard of this he visited Blackwood to inspect Moore's equipment, which was all home-made. Moore subsequently worked for Marconi for many years and his equipment is on display at Gelligroes Mill.

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ELECTRONIC WARFARE IN OP CORPORATE

RSI/AFCEA Joint Lecture

On 14 June 2012, the thirtieth anniversary of the ceasefire in the Falklands, the RSI in co-operation with the AFCEA (UK) Southern Chapter staged a joint lecture by Major David Thorp, who commanded a special task detachment providing tactical EW support to our forces during the campaign. He has recently published a book about his experiences, available in paperback from the Royal Signals Museum shop, priced at £12.99.



The author commenced his military career at the Army Apprentices College, Harrogate, initially into the Corps to become a radio mechanic, then an OWL, and eventually a Radio Telegraphist, before undergoing language training and joining the Intelligence Corps. His subsequent postings nevertheless embraced many signal units, including 223, 224 and 225 Signal Squadrons, and 9, 13 and 14 Signal Regiments, as well as Comms and Security Group UK, from where he was dispatched in command of a special task detachment at the outset of hostilities.

The author describes with feeling the problems associated with mounting such a last-minute operation, including finding equipment, qualified personnel, storage facilities and dealing with the GCHQ imposed peacetime security guidelines. Based on board a Naval warship, which offered optimum communications and accommodation facilities, his operators were able to listen into the Argentine tactical radio nets, and provide information to our fighting troops on enemy locations, status and intentions.

After the conflict, the author was tasked to investigate the circumstances surrounding the sinking of the Belgrano, which had been the subject of much comment in the media and in Parliament. Using intercepts from various quarters, he was able to show that the warship had in fact been steaming towards a rendezvous within the exclusion zone, and was therefore a legitimate target. The author answered many questions from an interested and informed audience, one of the largest to attend such lectures in recent months, and was accorded a hearty vote of thanks for his presentation.

SIGINT: THE SECRET LAND WAR PART II

By Major Tom Johnstone



Tom Johnstone served a full career in the Corps, including a tour with 9 Signal Regiment (Radio) in Cyprus. He now lives in Australia, where he is an active military historian and contributor of articles to military journals. This article follows on from Part 1 published in the last issue of the RSI Journal.

Enter the Deutsch Afrika Korps (DAK)

The most serious intelligence gap in the early war years was GC&CS's inability to read the German Army (GAR) Enigma until Sep 1941. Until when GC&CS had to depend on intelligence gleaned from GAF intercepts for GAR intelligence; especially troop movements. By 3 Mar this source had revealed the rate of build-up in North Africa and provided information about the DAKs eventual size: the positions of forward GAF and GAR units and that General Erwin Rommel was GOC DAK. It also revealed reference to further 6th 7th and 8th convoys pending which revealed the rate of build-up. GHQ Cairo therefore had a good idea of the strength of the DAK before Rommel began his attack. (41)

With the arrival of the DAK in Libya, the volume of intercepted cryptograms forwarded to GC&CS from the Middle East Y service increased considerably from May 1941 onwards. The W/T links to GC&CS were overwhelmed. When this was sorted out, the increased flow of intercepts swamped Huts 6 (Army and RAF) and its support staff became incapable of dealing with the vastly increased volume of intercepted crypts and outgoing intelligence decrypts. Much valuable intelligence was delayed. Although GAR tactical intelligence derived from GAF intercepts was good, by the time it reached Cairo it was out of date; added to which was the marked British inferiority in field intelligence. To

complicate matters, general staff appreciations out of London and those in Cairo were contradictor.

Until the arrival of the DAK in Libya, 2 Wireless Regiment, long attuned to the Italian and Soviet Armies and their field ciphers, had acquired an enviable reputation as the best providers of Sigint to its users. The arrival of the DAK changed this. Because the only Army Y unit orientated towards the GAR at this time was in Greece. Catch-up would take time. (42)

On the other hand Rommel's intelligence unit following service in Poland, had taken part in the Battle of France; followed by service on the Channel coast monitoring British communications. This unit, No 3 Company of 3rd Reconnaissance Battalion, which together with 39th Anti-Tank Battalion were the first two units to arrive at Tripoli. Working by floodlights under the impatient eye of Rommel they landed, unloaded, organised and moved fully operationally to Sirte two days after landing. (43)

Ultra had alerted Wavell to the pending arrival in Libya of the DAK and its commander; and shortly afterwards informed him that Rommel's orders were not to advance beyond El Agheila. Acting on this, Wavell reluctantly accepted the intervention in Greece; notwithstanding an appreciation by his M.I. on 28th Feb which 'thought it unlikely that Germany would adopt a solely defensive role, especially if British forces did not advance to Tripoli then on 4 March M.I. had 'indications' that Germany's strength in the desert might be raised to two armoured divisions and thought she would aim at surprise, doing everything she could to overcome the disadvantages of climate and terrain, and launch an attack at the earliest possible moment.(44)

Wavell had good reasons for being reluctant on Greece. Most of his operational transport, 800 vehicles was going to Greece, leaving his only infantry force, 9th Australian Division without transport; 7th Armoured Division was refitting in Egypt - only 50 tanks had been considered worth salvage. It would not be battle-ready until May. (45) In Mid March General Wavell and Field-Marshal Sir John Dill, visited the forward area and were horrified by General Neame's deployment of 9th Australian Division. To the relief of its commander, Wavell ordered a retirement to a more defensible position. Dill commented "he'll get a bloody nose and this won't be the only place either". (46)

Situation at the end of March 1941

In Ethiopia, Addis Abba had been captured but the main Italian army was still in the field. Asmara,

capital of Eritrea had fallen. In Libya, elements of the Deutsches Afrika Korps (DAK) had advanced to the borders of Cyrenaica, threatening Benghazi. German troops in Bulgaria and Yugoslavia were threatening Greece. Wavell was on the point of having to conduct four campaigns with barely sufficient troops for two, when he learned a *coup d'état* led by pro-German Rashid Ali was imminent in Iraq. Repeated warnings had been given by the SIS bureau in Baghdad to the Eastern Department of the Foreign Office since January 1941 of a likely coup in March. But these warnings were not passed on. Consequently, "neither then nor later did Whitehall and Cairo discuss what steps they would take in the event of an internal crisis in Iraq." (47) Doubtless Wavell had been relieved when on 8 Mar 1941, responsibility for Iraq was passed to CinC India, and an Indian brigade had been sent to Basra.

The DAK attacks

Rommel's orders given on 21 March were to confine himself to defending Tripolitania until mid-May, and then not to advance further than Agedabia. He ignored them, and on 24 March attacked and captured El Agheila, following which, 'contrary to his instructions and against Italian protests, took advantage of the weakness of the British front to develop a full-scale offensive.'" (48)

Doubtless this was because Rashid Ali's long threatened *coup d'état* began on the night of 2/3 April, and he expected the British to be heavily engaged there.

Without halting at Agedabia as ordered on 2 April, he captured Benghazi on 4 April, Derna on 7 April, and by-passing Tobruk on 10 April. Following a pause in the Badia-Sollum-Sidi Omar area he captured Halfaya Pass on 26 April. Rommel's next intention was to assault and capture Tobruk on 30 April. Meanwhile, Berlin was not overjoyed at Rommel's flagrant disobedience, and on 27 April General Paulus deputy chief of the general staff was sent to Libya. Paulus refused to sanction the assault until he had studied the situation but Rommel pressed ahead.

General J. Lavarack whom Wavell had placed in overall command in Tobruk, had been advised to hold the inner perimeter, considering the outer lines being too extensive. However, Lavarack decided on defence in depth and manned the outer perimeter, the Italian defences of which were largely intact, manned by 9th Division, well supported by three dug-in RHA regiments. When the DAK assaulted on 30 April, the Australian infantry allowed the tanks to pass through and over them, then repulsed

the enemy infantry with heavy loss. The now isolated tanks ran straight onto guns worked with superb professionalism; and the German panzers suffered their first defeat of the war, later referred to it as the 'hell of Tobruk' (49)

General von Paulus forthwith gave Rommel written orders to reorganise, create a mobile reserve and establish a secure base before attacking again; "even on a small scale unless quick success without substantial losses could be expected." This signal, originated on 2 May and sent by GAR Enigma, was read in Cairo on 4 May. (50) They mirrored Wavell's thoughts exactly; but Rommel totally disregarded them.

In the succeeding eighteen months, the pendulum of fortune swung for and against both sides. British operations Brevity, Battleaxe and Crusader followed. Some came within an ace of success, however Rommel always riposted where the British were weakest, or ambushed them with dug-in anti-tank guns at the very places they attacked. British commanders were repeatedly baffled by Rommel's uncanny feel for battle.

Retraining Army Y

The months before operation *Crusader*, to relieve Tobruk in November 1941, was a relearning period for Army Y. Following the arrival of DAK, the level of tactical intelligence had dropped dramatically. GAR field codes and ciphers posed more of a challenge than Italian ones; and GAR radio discipline stricter. There was also a notable tightening of Italian radio discipline and their nets never mentioned GAR formations. Remediation would require language expertise and retraining in decryption of GAR medium and low-grade ciphers. During July, CBME, doubtless reinforced by the experienced unit from Greece and Syria using documents captured in Crete, broke the codes used by the GAR in North Africa. Firstly, that of their *recce* units and the code used for relaying to units of what was now called *Panzerarmee Afrika*, their 'thrust lines'; these codes and others gave increasing quantities of operational intelligence; eg axis of advance. They were judged 'suitable to be used alongside comparable Italian codes and ciphers'; and units trained for this were inserted into Eighth Army, XIII Corps and for a short time with 7th Armd Div.' At the same time, Army Y's base unit in Cairo

also made progress constructing the networks, frequencies, call-signs and code names used by the GAR in Libya. However, enemy locating was not yet possible because there was insufficient DF equipment. (51)

Ultra - Intelligence and Deception

In September 1941 after long failure, GC&CS had a breakthrough with GAR Enigma, and it was given the code name *Chaffinch*. Breaking key settings which consisted of three related keys required great effort, and more than a week's work. Two of its keys were for use between logistics bases in Africa, Rome and Salonika; and a third for operational traffic between Africa, Rome and Berlin.

Operation *Crusader* to relieve Tobruk opened on 18 November 1941 and ended on 16 December. It witnessed some of the fiercest fighting of the entire war. Not only was Tobruk relieved but it brought the surrender of German/Italian garrisons in Bardia and Sollum. Ultra and Army Y played a significant role these battles and more importantly an enemy headquarters was overrun on 28 Nov and amongst captured documents was the *Chaffinch* settings for November. GC&CS able to break its entire November traffic in these settings. In the same haul of captured documents were key settings for another system code named *Phonex* at GC&CS. This was for operational traffic between corps and divisions, enabling GC&CS to break a week's intercepted traffic in that key. Sigint from this system, such as *Panzergruppe Afrika's* daily reports revealed Rommel's intentions and, crucially, his daily fuel situation. (52) In addition to filling out the enemy order of battle, it also provided a background against which intelligence from other sources could be weighed. These Sigint gains were of crucial importance to what followed in the desert war.

Crusader saw some of the fiercest fighting of WWII. One battle, Sidi Rezegh, fought on 19 November 1941, was known as 'the Cauldron' by the British, and 'Hexenkessel' – witches cauldron, by the Germans. It was described by a German general - who later fought in the tank battle around Kursk, as the classic armoured battle. . "The Eighth Army and the Panzergruppe Afrika were engaged in an armoured battle which has a unique place in the history of war. There has never been a battle fought at such an extreme pace and with such bewildering vicissitudes of fortune. More than a thousand tanks, supported by large numbers of aircraft and guns, were committed to a whirlwind battle fought on ground which allowed complete freedom of manoeuvre and handled by commanders who were prepared to throw in their last reserves to achieve

victory. The situation changed with such rapidity that it was difficult to keep track of the movements of one's own troops, let alone those of the enemy. . . This battle made tremendous demands on generalship and staff work." (53)

In the course of *Crusader* Army Y at corps headquarters gave crucial warnings of enemy movements– which were not always heeded. It also informed British commanders that late on 22 Nov Rommel was about to abandon Gambut, showing that the advance of XIII Corps along the coast was increasing the strain on the enemy. Several messages indicated anxiety about a thrust against Benghazi by 22nd Armd Bde, well to the south of the battlefield; and the GAF's reports that its operations were being 'severely hampered' by the loss of the *Procida* and the *Maritza*. (54)

Also, for the first time in the war, GC&CS had been able to provide timely warning of the operational intentions of an enemy commander. Knowing he had superiority in armour, Rommel intended to lead two panzer divisions and Ariete Div from Sidi Rezegh in a sweep to the Egyptian frontier; aiming to precipitate a British withdrawal by threatening their communications. It failed because General Auchinleck (who had replaced Wavell as CinC in June), forewarned by Ultra, intervened personally. The battle ended with Rommel back on the borders of Tripolitania.

Delays and Leaks.

Following the arrival of the DAK in Libya, the volume of intercepted crypts to GC&CS from Middle East Y vastly increased. First the radio links to GC&CS were swamped, when this was remedied, the support staff there could not cope with the increased workload. Valuable intelligence was lost or delayed. 'Although GAR tactical intelligence was good it was out of date by the time it reached Cairo. Finally, when all normal avenues of remedying the situation had failed, in October 1941 senior civilian staff 'took the unusual step of writing directly to the Prime Minister outlining the delays together with the causes – mainly shortage of clerks and typists.' Churchill directed 'Make sure they have all they want on extreme priority and report to me that this had been done.' (55)

Another problem concerned Col Fellers, the American military attaché in Cairo. Fellers had free access to GHQ Middle East and its information on a daily bases and his despatches to Washington, in diplomatic cipher were read by Abwehr. This was because Italian security had penetrated the American Embassy in Rome and photographed

the diplomatic code books. Fellers became known to German intelligence as "The Good Source". (56) That leakage was disclosed when GC&CS, which had been breaking Abwehr Enigma since Feb 1942, broke an Abwehr message with one of Fellers reports. (57)

But the main intelligence gain from *Chaffinch* came from daily logistics returns. By detailed scrutiny of *Panzergruppe Afrika's* ordnance returns and requests, then matching vital items to the loading manifests sent by signal; of incoming ships. Ships carrying vital supplies were specifically targeted en route. All of the details were supplied by Ultra decrypts. The difficulty was ensuring reconnaissance aircraft sightings and radio reports were made immediately before every attack, so as to divert suspicion away from Ultra. It was a brilliant example of economical use of limited resources achieving strategic goals. (58)

Naturally, when specific sinking's begun to hurt, German and Italian Intelligence staffs became suspicious. However, British deception directed them towards a fictitious spy network in Italian ports. The British deception was however, to have unexpected repercussions. In the investigation which followed, the Director of the Italian intelligence and counter-intelligence service, General Cesare Amé became implicated in treachery and when investigated by the SD, led to Admiral Canaris, head of the Abwehr, Canaris being suspected of involvement with German resistance, *Schwarze Kapelle*, was arrested and executed.(59)

Ultra in the Ascendant

By June 1942 *Chaffinch* was being broken regularly, although with a delay factor of about 24 hours But a serious limitation was that although the intelligence made a vital contribution to the general operational picture, despite the sheer bulk of the traffic, not many gave information of the enemy's intentions and where it was given it arrived in the Middle East 24 hours too late. However, some *Chaffinch* crypts could be broken quickly at GC&CS and turned around quickly. Here the delays were in transmission times to and from the Middle East. Other crypts had to have their daily changing settings broken "It was something of a luxury for the British commander to have advance notice of the movements and intentions of the enemy's ground forces." When they did get advance notice of operational importance via Enigma it was largely due to the fact that the *Panzergruppe Afrika's* daily reports, which included a summary of operations, admin and logistics, could be recognised externally at GC&CS and given priority. Usually the daily report was issued in the evening just before the settings changed. Therefore, GC&CS would have

had sufficient time to break that day's settings by the time of its arrival at Bletchely.

From the middle of June 1942 when GC&CS began to break this code it was not uncommon for the decrypt of the report to reach Eighth Army HQ within twelve hours of transmission by the Germans. The bonus was the report sometimes contained a summary of Rommel's intentions for the day following. However, the commands had to deduce the enemy's reactions from the accumulated evidence, ground and air reconnaissance and now, for the first time, also by Army and RAF Y.

Tactical intelligence in high-grade cipher – *Scorpion*, had to be intercepted locally, transmitted back to Cairo and thence to GC&CS. By the time its decrypts were returned to the Middle East it was out of date. (60)

At the same time many other advances were made which enhanced intelligence gathering, photographic reconnaissance, early warning radar, and additional Army and RAF Y units. At this time there were some 2500 personnel in Middle East Army Y units and just over one thousand in RAF Y.

Gazala

Many of these improvements were in situ at the opening of the Gazala battle in June 1942. Before his attack, Rommel had signalled Berlin his intention to feint at the British centre, turning its southern flank and rolling up the British line. Auchinleck had received this plum by Ultra the day following its transmission and informed Ritchie, the Eighth Army commander by mouth of his Chief of Intelligence, Major-General F de Guingand, who was privy to Ultra. Ritchie was given details of enemy intentions and advised to mass his armour in the northern sector ready to counterattack. Additionally, Eighth Army's own Sigint unit, confirmed by a separate POW's interrogation statement all gave similar information. (61) Ritchie ignored all this and positioned his armour piecemeal in brigade groups all along his line. On 26 May 1942, Rommel duly feinted at the British centre, turned its southern flank and defeated Ritchie's armour in detail. Tobruk was captured within two days and the Eighth Army sent in rout to the Egyptian border. In addition to an Army Y unit at Eighth Army HQ, both XIII and XXX Corps headquarters had similar units. All passed vital tactical information to their commanders. The Signals Intelligence historian commented wryly; "it is safe to say that Rommel owed his victory less to the performance of his field intelligence service than to his superiority in direction in battle and in the quality and handling of his tanks."(62)

Commenting on the improvement in tactical Sigint from this time onwards, Hinsley tells us; “Thereafter it produced such a flow of tactical intelligence about even the enemy’s smaller units that, in the opinion of the officer who was to become the head of Eight Army’s operational intelligence, Ultra (i.e. Enigma) and Ultra only put intelligence on the map’ in the in the Western Desert, but in battle it was the Army Y service that was usually more valuable than the Ultra.”(63)

First Alamein

Lasting just two weeks of hard slogging, the battle known as first Alamein was costly to both sides. However, being close to their base areas, the Allies quickly replenish and repaired. There was then a pause in general operations, and in Eighth Army a significant changes took place; Y was integrated with operational intelligence at Army and Corps level. This showed dividends immediately. “The intelligence summaries of Eighth Army and of XIII and XXX Corps, with their pre-attack estimates of the enemy’s strength and dispositions, leave no doubt that during July Y, complemented by the Enigma and co-ordinated with other intelligence collected locally, gave the C-in-C all the evidence he needed for the planning of his attacks by following the moves the enemy made in response to them, locating the enemy’s formations and by showing up his weak points.

“It was at this time that Y first obtained in full measure the results which enabled it, during the rest of the African campaign, to contribute to ‘the rounder pattern which Ultra could not achieve’ and, by ‘building up a day-to-day knowledge of the enemy which enabled us to handle Ultra with more confidence’ brought the intelligence staff at Eighth Army HQ to the point at which it could feel that ‘we had not done our day’s work unless we knew what was happening and could appreciate what would happen before it could arrive.” (64)

It was too difficult after the war to analyse the extent of the Y data derived from cryptanalysis, plain language intercept, and how much from DF and Traffic Analysis. Or how all of this or Enigma influenced the Commanders tactical and operational decisions. *“But a brief account of his conduct of the fighting suffices to show that he followed the Sigint. By 8 July, when the CinC decided to attack at Tel el Eisa at the extreme north of the line on 10 July, he knew from both sources that Rommel had moved the bulk of his forces – 90th Light Division, 21st Panzer Division and the Littorio Division – to the southern sector, and the news that Rommel intended to press his advantage there, received from the Enigma on 9*

July, did not divert him from his own attack. This was delivered against a position that was known from Y that it was held by two Italian infantry divisions. It virtually annihilated one of these divisions – and capture of Rommel’s field Sigint Unit.” (65)

That ‘Sigint Unit’ was of course, 621 Strategic Intercept Company; the heart of Rommel’s superb signals intelligence. As usual, Rommel’s tactical headquarters was not far away, and 26 Australian Brigade having smashed the Italian Sabratha Division, overran Tel el Eisa and reached Rommel’s tactical headquarters. The Australians were repulsed by the headquarters staff led by Lt-Col von Mellentine, chief operations officer *Panzergruppe Afrika*. *“It was clear to me that Sabratha was finished. . . I called on the staff and personnel of headquarters to form a rough battle line, which I strengthened with our anti-aircraft guns and some infantry reinforcements. . . We succeeded in holding the Australians. . .” (66)* Rommel was on one of his tours of the front, but when informed, 21st Panzer was thrown into counterattacks over two weeks to recapture the feature; and the precious vehicles and documents. But 26 Brigade held tight to its gains. That was to have enormous effects on the future course of the war.

621 Strategic Intercept Company

A highly experienced Sigint unit, originally deployed in Poland and France where it was known as 3 Coy, 3 Int Recce Bn. Its operators, like German intercept operators in 1916-18, were English speakers, often being former waiters from London hotels, who tuned into British command nets and receive message traffic as readily as British operators, staff officers or unit C.O’s. During the course of an engagement Rommel had at his fingertips the intentions of his enemy as quickly as his opposite numbers subordinate commanders.

621 Company performed its operational role with extraordinary success, about which Rommel’s chief operations officer stated honestly, “our wireless intercept unit was a very important factor in Rommel’s victories”. (67) However, its bureaucratic hording of daily operators logs and message and other files in a forward area was a constant danger to security. Just as the capture of a German listening post’s files at Owillers-la-Boisselle in 1916, first alerted the British to their security failures; 621 files did exactly the same and with precisely the same results; stringent measures towards offenders against security. When surprised early on the morning of 10th July 1941; all ranks of 621 Company fought bravely with personal weapons and their OC, Oberleutnant Seebohn, was mortally wounded (he later died in hospital in Alexandria), but were quickly overpowered. Initially they were treated

as normal prisoners of war and in the after battle lull marched to POW concentration areas in the rear. However, once the Intelligence importance of their unit was realised, almost all were traced and interrogated. But due to the specialization and compartmentalization of the unit, little was gleaned from the rank and file other than their particular role. Nevertheless the aggregate of this would have been very useful.

Why the archives of the unit were carried so far forward is difficult to understand. More properly, these should have been held in a secure area well to the rear. Where in the event of emergency destruction being decided up, there would have been time and opportunity to do this. Luckily for the Allies, the swiftness of 26 Brigades attack gave 621 Company insufficient time to do anything but fight, and with only personal weapons matched against infantry automatic weapons, there was no contest. Over 80 personnel surrendered. Rommel was left with one intercept section with the company 2/IC, he was dispatched by air to Germany for replacement personnel and equipment, but for a highly specialised unit, and with most, if not all, similar units now deep in Russia, this took time; and Rommel was already running out of time. There was a new master of the battlefield at El Alamein.

Rommel's Secrets Revealed

When the captured documents were trawled through and the extent of security lapses revealed, the true nature of Rommel's tactical instinct in his desert battles at last became known. A senior signals intelligence officer, Lieut-Colonel Walter Scott, R. Signals, who was in charge of the Sigint group examining the documents stated later: "*The consequences of this capture were far-reaching, for the rest of the North African campaign, for the Sicilian and Italian campaigns, and then for the invasion. It enabled us to build powerful forces at all points thereafter without giving the fact away as we had done in the past.*" (68)

It has been suggested that the capture of 621 Company at Tel El Eisa had as its objective 621 Company 'which had been located by British Y. This is not credible for two reasons; direction finding (D.F.) is achieved by homing in on a transmitter not a receiver and 621 was essentially a listening post. Moreover, had the assertion been correct, Eighth Army intelligence would have had a team of signals and intelligence experts ready for immediate examination of captured equipment and documents; plus isolation and interrogation of prisoners. This did not happen. By the time the importance of the capture was realised, the personnel of 621 Company had been evacuated and took some time to locate. One officer managed to change his identify and succeeded in having himself sent to the United States before he was traced and returned to Britain. (69) It has even been advanced that 621 was in its forward position to prove Oberleutnant Seebohn was not a coward. This was unnecessary; he had already been awarded the Iron

Cross. Additionally, to his front was the Italian Sabratha Division and immediately behind the Tel el Isa position was Rommel's tactical HQ as has already been explained. Tel el Isa, the most prominent feature in the area, was ideal positioning for VHF (used by armoured formations) interception – looking down their throats.

The Aftermath

Following First Alamein, a major shake-up of Eighth Army took place, generals came and went. A new army commander, General B.L. Montgomery, stamped his personalty on his command from generals downwards. However, importantly, the army chief of staff was retained. Maj-Gen de Guigand before being appointed CofS had been Intelligence Chief at GHQ and was familiar with Ultra and the nature of Sigint. He was to bring a new understanding of the value of Sigint to Eighth Army headquarters and senior commanders had at last learned at last to trust Sigint.

As a result of Scott's report, strict radio discipline was imposed on all Eighth Army radio nets; and to enforce it, a self-monitoring service known as the 'J' service, similar to that of 1916-18 was established, additional to the Y service. The monitoring reports of the 'J' service and the severe disciplinary follow-up action, on staff officers and operators, soon had the desired effect. After Sep 1942 the Germans found that positive identification of British formations was hampered by 'numerous frequency changes'. (70) These would be accompanied by daily changing address groups and net identifications signs; plus, where possible, a change of operators to avoid his 'fist' being recognised. Eavesdroppers would then have to start the process of net identification from scratch. Towards the end of the North African campaign in early 1943, German Y units were 'badly hampered by blanket security measures such as the enciphering of all wireless traffic.' (71) Henceforth, Rommel had to depend on air reconnaissance for intelligence. The only indication of pending attacks on the Mareth Line by Eighth Army was the negative one of prolonged radio silence. The learning period in the secret war had come a long way.

Reorganisation of Y Direction at the War Office

In the spring of 1943 a new deputy directorship was created at the War Office, DDMI (Y). He was responsible to both the DMI and D of Signals for the work hitherto uneasily divided between MI8 and Signals 4. DD (Y) acted as War Office representative on the Y Committee, as the channel between DMI and GC &CS and as the formulator of general policy regarding the provision, administration and allocation of Army Y units. MI 8 implemented interception policy, disseminated information from Y and had operation control of fixed Y stations in the United Kingdom. Signals 4 became responsible for all signals personnel and equipment, for the administration of fixed Y stations and

for the requirements of Y communications. A section of the Signals Directorate, Signals 6, became responsible to DD (Y) on matters of technical security. (72)

Conclusion

During the war years from 1941 onwards, the British attempted and failed to find common ground with the Soviets on exchanges of information and cooperation. In particular was Soviet denial of a small station at Murmansk to assist the safe passage of convoys to Russia. This was requested in return for having during the Stalingrad battle given them information regarding GAR and GAF intentions. 'Which had caused the Director of Intelligence to voice his concern that the Prime Minister was requiring him to provide intelligence derived solely from Enigma, when the Germans were tightening their signals security; "it is for this reason that I am always embarrassed at sending the Russians information only obtainable from this source, owing to the legibility of many Russian ciphers."' (73) The Soviet non-cooperation of the war years was a clear indication of future Soviet policy.

What transpired in WWII with signals intelligence did not cease with the celebrations of VE and VJ Days in 1945, but continued long afterwards. Indeed, 2 Wireless Regiment, reverted immediately to its pre-June 1941 target, Soviet Russia and continued to do so throughout the Cold War, with a later change of location and title. Just two of its many major successes were the reporting the commissioning of the Soviet aircraft carrier *Kiev* and giving the operational readiness date of the Red Army's SS20 missile system.

Notwithstanding the ending of the cold war, electronic espionage is certain to be waged covertly by old and new aspiring nations in the 21st century. Possibly more immediately dangerous will be the activities of terrorists, nihilists and sophisticated cyber criminals. They will target humankind at large long into the information age, using new, challenging methods of electronic penetration. So serious is the threat that recently, Maj-Gen Jonathan Shaw, head of cyber security at the MOD, felt compelled to issue a public warning concerning cyber industrial espionage and revealing recent heavy losses - 27 billion pounds, to the British economy. (74) We live in interesting times.

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SOLO ACROSS ICELAND

By Major Dan Ashton



Major Dan Ashton joined RMA Sandhurst in 1996, and was subsequently commissioned into the Royal Corps of Signals. Assigned to 24 Airmobile Brigade HQ and Signal Squadron (210), he commanded Alfa Troop until September 1999. After completing his Degree in CIS at the Defence Academy, Shrivenham, he was posted to 8 Infantry Brigade HQ and Signal Squadron (218) as the Second in Command and Operations Officer. He then spent three years as Adjutant of 30 Signal Regiment in Bramcote, including time with Queens Ghurkha Signals. After Staff Course and Technical Employment Training, he was assigned as SO2 J5 Plans HQ Defence College of CIS, and subsequently commanded 4 (Military Training) Squadron, 11 Signal Regiment.. He is a Winter Mountain Leader, and has led expeditions worldwide, tackling peaks in the Alps, Norway, the Andes, Africa and America. His passion for mountaineering and wild places have been a key part of his life that he has always been keen to share with others, believing that it defines the qualities of effective administration, skills and leadership that is essential to success in the British Army.

Background

Exercise Solo Iceland, (planned dates 29 January - 24 February 2012) was the first recorded attempt to conduct a solo, unsupported, north to South crossing of Iceland in Winter. The expedition was not conducted as official Adventure Training, but lessons about the expedition may be of benefit to future endeavours. Figure 1 shows an overview map showing my initially proposed routes (different starts) and my actual route taken.

Equipment

Traveling solo adds a separate complication to usual

expeditions in that all traditional 'group' equipment has to be carried and managed by an individual. To that end, I had to ensure that all my safety and routine stores could be used in violent conditions, on my own when tired. To minimise additional weight, I ensured that I was able effect repairs to all my equipment in the event of them being damaged. The only piece of equipment where I felt this was unachievable was my cooker, so I carried a spare.

Gas cookers are good and lightweight but don't like the cold. It is also difficult to use all the gas in the containers, as when the level gets low, the efficiency of the cooker is much diminished. The MSR multifuel cooker has long been a trusted ally of mine. When you can strip and maintain it effectively, it is first class. It is however, an awkward shape and does require a significant degree of 'loving' to maintain it. I knew from previous experience that I would need unleaded fuel and as this would be readily available, decided on this option. After recording the burn time from my 0.65 litre bottle, I worked out that I would need 11 litres of fuel. The additional advantage here is that the petrol stations in Iceland treat the fuel with additives to prevent the fuel from freezing.

The other main issue for resolution was food. Dehydrated rations have the advantage of being lightweight but rarely offer sufficient calories for a prolonged journey of this nature. Water is of course not an issue, so long as you can melt the snow. I therefore opted for the more traditional 'boil in the bag' style of meals, despite them being considerably heavier. These meals can be eaten cold so even without a cooker, I wasn't going to go hungry. By the time I had accumulated all my food into single day bags, the 22 days of food weighed in at 28 Kg.

Weather and conditions

The weather in Iceland is notoriously variable. Like the UK, being an island, it can be affected by the weather systems far out to sea. The high ground in the highlands is glaciated and has the ability to channel the winds therefore increasing wind speed and lowering temperature. Although having a reputation for snow, the warm winds from the Atlantic have the ability to rapidly thaw the snow cover at low level (below 400m). More reliable snow cover down to sea level is most reliably found in late December or early January.

In many mountainous areas, this sort of weather behaviour has the potential to have a significant effect on avalanche conditions. My experience of the Icelandic Central Highlands would suggest that there are very few slopes that are of the optimum angle to cause avalanche formation.

Having expected very low temperatures, I was caught unawares by the surprisingly warm weather. This anomaly (when discussed with the locals) is a noticeable trend over the last few years. I experienced daytime temperatures of

between -12 to + 3 degrees Celsius. At night, the lowest temperature I recorded was - 16 degrees Celsius.

The wind was very unpredictable, both in direction and in speed. This was compounded by the channelling effect caused by the two glaciated volcanoes located to my south. My experience of the wind was unlike anything I had experienced in the UK, even in the worst of Scottish winters. The only comparison would be the catiabetic winds experienced in the Alps and Argentina. The winds in Iceland were far more constant and not catiabetic. The wind has scoured many of the tops to leave very icy conditions with exposed rocks. It also distributed deep, soft snow on leeward slopes. The best weather website I found was at <http://en.vedur.is>.

This included the ability to text and receive emails for free direct from the Iridium website to the phone. Batteries do not operate well in the cold, and despite my best efforts to keep them warm, I only managed 70 minutes of talk time from each battery.

Terrain

Once away from the coast, the terrain in Iceland is quite tame (excluding the glaciated volcanoes), and is similar in many ways to the Cairngorm plateau. The average height is approx 880m with very gentle undulating features that are free of large rock structures, crags or significant flowing water. There are however several large ponds and lakes hidden under ice and snow, that posed a very



Figure 1: Iceland map showing route

Safety

Being on my own meant that I had to establish a safety net; I did this in two ways. The Iceland Search and Rescue (IceSAR, www.icesar.com) is a government sponsored organisation similar to that operated in the UK. It is managed via the police and can be raised via their emergency number, 112. IceSAR offer trackable beacons at 25 Euros per week as well as advice on routes and safety. For my expedition, my wife was in email contact with them so that they could track my progress.

Secondly, I secured the use of an Iridium 9555 satellite telephone. I was concerned about the cold effecting the screen and circuitry, so I had to keep the phone and spare battery on me at all times. The phone worked well, although there some areas that appeared to have better coverage than others. I did however, manage to always make communications work through perseverance. Some of the additional functionality on the phone was very useful.

real threat, especially in white-out conditions as they. I was constantly nervous of straying off course and onto the open water.

I experienced for the first time the dangers presented by hot springs. At source, they are immediately obvious, having no snow cover and steam rising in to the air. It would seem however, when they flow away from the spring and cool, that there must be a certain temperature at which the snow is able to bridge across while allowing the warm water to continue to flow underneath. The snow bridges can be weak, and on two occasions I fell through into the water. Fresh water courses were totally frozen and could be crossed relatively safely with care.

Due to the mild nature of the angle of the slopes, only on two occasions did I find any build-up of snow which allowed a traditional snow hole to be dug. As this was one of my preferred methods to spend the night, this was a severe problem. Emergency shelters such as the coffin

or 'build up' style would have been possible. However, these would have been difficult to dig for any more than one man.

Transportation within Iceland

Public transport in Iceland is limited by space, once you leave Reykjavik. The buses around the island are minibuses with limited room for equipment. They can also be expensive. For example, a single ticket from Reykjavik to Akureyri cost approx £70. If a group were to rely on the one available bus a day, that would have to be booked in advance. There are flights around the island, but they are subject to the weather and are more expensive.

The International airport is located about 1 hour from Reykjavik at Keflavik. A regular coach service runs in to the capital. The cost is about £17 per head each way.

As I only had cause for short journeys around the capital, I cannot advise the cost of the urban taxis or buses.

Accommodation in Reykjavik

There is a string of good quality, low cost hostels in the capital that are readily available in the off season. I am led to believe that it is essential to book in the spring and summer. For a four man room with en suite facilities and sheets, I paid £14 per night.

Finances

My aim was to run this expedition as cheaply as possible, as I was raising money for charity. As I already possessed over 95% of the equipment, my expenses were focused on travel, food and fuel.

Route

From the most Northerly point I had two options for my start. Due to the thaw before my arrival, I started in the inlet on the Eastern route. I was finally extracted from the point shown.

Diary

29 / 30 January

Plane from Gatwick to Keflavik. Coach from International airport to Reykjavik main bus station. Overnight spent in bus terminal. Bus to Akureyri after no snow below 300m. Arrived approx 1500hrs. Sorted out equipment, bought fuel for cooker and caught a lift approx 10-15 miles inland to edge of snow line. Bivvied on edge of track. Windy night but was in an exposed position due to lack of available flat ground for tent.

31 January

Started early so as to make the most of the expected good weather in the morning. A storm was expected from late to mid afternoon. Whilst getting my crampons on, I slipped on the ice injuring my left wrist. At the time I didn't think too much about it. I was to discover later that the damage was far more severe. The track was a series of switchbacks that lined the edge of the mountain. I had approximately 600m to climb. About an hour after dawn, the small side valley I was aiming for opened out and I could see well. The snow was soft in places making towing the pulk more difficult. There was no sign of life, apart from four ptarmigan I disturbed and a set of fox footprints.

The mountain isolation was perfect. I stopped for a bite to eat and to swap my crampons for snow shoes as the snow had become softer, meaning I was sinking to mid shin. As lunchtime passed by, the wind picked up, the cloud base dropped and reduced my visibility until, at around three o'clock it was less than 25m. The temperature was about -5 Celsius. As the next hour passed, things began to get quite desperate. The wind had increased dramatically and the visibility, as it got darker and more spindrift was blown about, was reduced further still. It had also begun to snow heavily.

I did not feel that I would be able to get my tent up in these conditions as, by now I could hardly stand. When reviewing my options, I decided upon using the Zdarsky bag in the leeward side of a rock. I dug myself in, arranged my sleeping equipment and settled in for an uncomfortable night. I checked in with my wife via the satellite phone and went to sleep after eating a few snacks.

The night saw a considerable amount of snowfall, which with a change in wind direction, saw me buried twice. On both occasions, I had to fight hard to be released from my snowy cocoon.

1 February

By 0530hrs, my tolerance of the situation dwindled significantly, so I decided to pack up and head for the hut that was about 6Km away as the crow flies. Over the next 10 hours I would only just cover this distance through the most violent weather I have ever encountered.

I had given myself a cut off time of 1600hrs before having to arrange something to overnight in. I had not seen much more than 40m all day. Navigation was tremendously difficult as I had been unable to calculate the GMA correctly from the information on the map. The figures calculated from the mapping went past true north thereby reversing the application. I opted to use the current UK figures of 2 degrees. When I manually calculated it the following day, it was 11 degrees.

My GPA fixes were causing me great confusion as I couldn't get short legs accurate. I also had the additional problem of approx four feet of new soft snow. This measurement

is based upon the depth I had to dig to release the pulk before I set off. The implication of this was that any features there may have been protruding from the snow, rocks for example, were far fewer. I therefore had to have my compass out constantly, making very short legs to no discernible feature. The fluid in the compass housing was also freezing which meant I had to rotate through two compasses (one in use while the other defrosted in my smock).

Although the wind did let up a little around midday, the visibility did not. I set the tent up to have a break and make a brew for my flask. This gave me time to read the map in significant depth. In 5-6 hours I had covered just 3 Km. As I was preparing to leave, I came across a cairn about 4 feet tall. I could see no others at the time, although I did encounter a handful more in the afternoon. I didn't know at the time, but these led directly to the hut I was aiming for.

As the afternoon began, the weather deteriorated significantly again. At times, despite wearing goggles, I couldn't see my feet. The hut was only marked on my map through local knowledge so I couldn't guarantee its accuracy. When I reached the NW corner of my search area I began a 400m sweep pattern. I was lulled in to false hope at one point by a large rock, but had no joy with finding the hut. At about 1545hrs, tired, frustrated and being very aware of my cut off time, I nearly broke. The thought of a second night out in the same conditions was far from welcoming.

As I continued my search in a last ditch, vain attempt, the cloud base lifted momentarily. About 75m away to my right was a yellow walled, red roofed hut. I must have passed within meters of it on my previous leg. It was 9 minutes to four. Those 75m took so long. I was exhausted, elated and desperate to get inside.

The hut was my saving grace, as the weather that night was



Figure 2: The hut that I struggled to find. I walked 23 paces past this hut in a whiteout and didn't see it.

the same, if not worse than previously. Significant snow fell again to the point where I was initially unable to open the door of the hut the following morning. The hut was well equipped with a gas hob, candles as a small heater that I used to dry out my frozen gear. I slept well.

2 February

Although the weather was stable and I was able to see my surroundings, I was not fit or prepared for another slog just yet. My admin took most of the day and in the afternoon another storm formed, just as quickly as before.

I had to work out how to make the most of the gaps in the weather so formed a table of elements risk. I scored each against the varied conditions and calculated how best to manage them. I also manually calculated the GMA now that I could positively identify specific features at 11 degrees. My fear of walking over frozen water features was also confirmed as the lake to my west could only be identified as I knew it was there. In a whiteout, I could easily walk out on to them.

I also decided to find my tracks from the previous afternoon. Despite the spindrift and new snow, I found the dip in the snow caused by the weight of the pulk. I was 23 regular paces from the hut and had walked past it. But for the quick lift in cloud cover, I would have walked either side of the hut without noticing it. This would have meant that I would have bivvied in horrendous conditions within 150m of sanctuary. After checking in with my wife and receiving the weather forecast, I wanted to be away early the following morning as storms were again predicted overnight.

3 February

I awoke at 0530hrs and checked outside. The storm was still blowing hard and another 18 inches of fresh snow had fallen. After checking every half hour, I decided that as soon as the wind dropped a little I would start. This happened around 0730hrs and I was away before 0800hrs.

Initially, the soft snow made the going extremely tough, despite my snow shoes. The pulk felt heavy as it was sinking. My route headed away from the hut just to the east of south (165 degrees) so that I could gain the high ground. As the terrain is gentle up there, I was hoping that little of the snow had settled as the wind would have blown it down and fortunately I was right. Many of the tops were scoured back to ice and I could see rock formations buried beneath it.

After first light, the wind had dropped significantly and the cloud base had risen. This made navigation much easier. The gentle plateau reminded me in places of the Cairngorm Plateau but was significantly larger and arguably more 'rolling'. The mapping had 20m contour spacing so clear

identification of smaller features was difficult. Here too, were a number of water features. The fresh water, smaller features were easily crossable.

I was not covering ground particularly quickly, maybe 2-2.5Km per hour. I could see the cloud formations to the south growing quickly. There was both high and low cloud gathering. The low cloud was swirling around and although it would have made navigation harder, I wasn't particularly worried about it. The higher cloud however, did cause me concerns. It was a dark, heavy grey that hung ominously. It was also moving from the south towards me. At one point it appeared to begin the process of forming a ring around me, but stopped in a horseshoe shape with me being in the 'U'. With this cloud, I could feel the temperature dropping and see snow falling.

As the day progressed, I descended off the plateau and came into mist. Visibility was approximately 80-100m. I wanted to cross the river before I camped, and spend some time looking for a place that looked good, ie wide and shallow so that the chances of it being frozen solid were higher. Whilst approaching the main river, I was following a smaller tributary. This was the first time that I had found any snow bank that would have been able to house a traditional snow hole of any reasonable size.

I crossed the river at around 1530hrs and moved a few hundred meters up the opposite bank. I found a flat area and pitched my tent. The weather report suggested that the wind direction would be from the south until the following day so I used the pulk as a wind break. I then dug the tent in so that the fresh snow (or spindrift) would be unable to get in between the fly sheet and the inner. When complete, I settled in for a good night. The wind blew quite hard during the night and about 9 inches of snow fell.

I had covered only 14Km (as the crow flies) in about 7.5 hours. And although I was tired, I wasn't exhausted. This meant that my initial calculation of covering approx 19 Km per day was not realistic and that I would have to readjust. I don't believe that I could travel much faster with fresh snow on the ground.

4 February



Figure 3: My fourth night out was the when the least snow fell overnight

I woke just after 0600hrs, warm and dry. Some spindrift had come under the door of the fly sheet in the night, but apart from that, the tent had performed well. After breakfast and admin, I was away before 0730hrs. My route took me back over some high ground with a view to hitting a track and then following it south west to my next hut. I had been told that the hut was near a hot spring and that a small pool had been dug out that was suitable for bathing. It had been 6 days since I had washed properly so I hoped that it wasn't a wind-up.

Gaining the track concerned me. With this volume of snow cover, I doubted my ability to find it. I also had no idea what size it would really be. As previously mentioned, the map was drawn in 1982 and said that it was a gravel track suitable for off road vehicles. I didn't know if it was still in use, left to disrepair or converted into a road; after all, it had a road number!

Dawn came and the cloud base was swirling, through changing visibility from clear to less than 40m. The wind was still quite strong but was easing steadily. This was good as it was directly in my face and I had to use goggles to see through the spindrift that was being blown at me. I could also see from the map that there was a track junction that split the road in two in a 'Y' shape. The road headed in from the south west, split in two with one leg carrying on to the north east and the other breaking off to the east. I decided therefore to hit the track to the east of the split, thereby giving me two 'back stops'. If I crossed the first track, I would get a second chance!

As I came over the rise before the track, I briefly saw the tip of a yellow piece of wood in the snow. It was protruding by about 10cm. When I checked the GPS, I saw that I was about 300m away from the track junction, but level with the first track. I turned to the south west and within minutes came across a sign post; the track junction. It only cleared the surface of the snow by about 2 feet, but was metal and reflective in the same way that ours are. It was a bizarre feeling seeing this human intrusion into such a vast, blank wilderness. It made me curious as to who would drive out here and in what vehicles. I was to find out later in the day.

I was fortunate that periodically, and usually on the more exposed tops, I would see another road marker similar to the wooden one I initially found. This made navigation easier and had an odd feeling of confidence about it. Without them, I would have had no concept that a track was there.

Shortly after midday, it warmed significantly, the cloud base tightened around me and it began to snow hard. I was about 1Km from the hut and arrived just after 1300hrs. There was indeed a hot spring pool that had been dug out in 1976. This area had three huts now and seemed to be

a tourist destination. However, the huts were all locked. I was on the verge of despair once more. There was a toilet block with changing rooms for the spring though that was open, and warm. I realised that the water from the spring had been plumbed in to the building and it was cozy.

On one hut, there was tiny external safe with a combination lock on it that held the key. As I started going through the 10,000 combinations, I recognised a pattern of numbers on a poster on the inside of the window. The man who had given me the lift to the snowline had also given me his mobile number. This string of digits in the window was in the same format. I tried it with the satellite phone. The ensuing conversation was, in hindsight, very amusing. The warden had very little English and I, no Icelandic. However, through counting, I managed to decipher three of the 4 wheels to the lock; 6, 3, *, 8. By quickly rotating through, whilst the warden kept saying 'Grolsh' at me, (which I now know to be zero), the lock sprang open to reveal a shiny key. It opened the door and I was in. I'm not sure I would have had the resilience to rotate the bezels to 6308 to gain access independently!

Again, this hut had the water plumbed in so was warm inside. I quickly set about hanging my kit up to dry out and was pleased to see that I was in good order with only a little dampness on certain bits of kit, eg around the hood of my sleeping bag and my contact gloves. The tent was damp from where it had been rolled up, but this would have been fine should I have had to use it again that evening.

I poured over the maps again, ate and drank to top up my reserves, and had a short dip in the hot spring! At around 1800hrs, I heard a deep noise and thought that the wind was picking up again. When checking outside though, it was a steady 15-20mph. The noise was from 4 off road trucks. They were huge, some with 6 wheels. 7 people joined me in the hut for the night. They were very friendly and we spent the evening chatting. The leader was an off road guide called Laddie whose English was good. He and a group of friends, often spent the week ends up in the mountains driving around from hut to hut for fun. They showed me pictures of their day and how, due to the soft snow, they too had had lots of trouble sinking despite their large, low pressure tyres. Because of the recent thaw, they had seen water flowing under the snow pack that had formed pockets they had fallen in to. Some were so big that one of their trucks had fallen on its side.

They were very intrigued about my journey and told me that they had never heard of anyone attempting this crossing. Laddie gave me some additional help for the southern leg of my journey, showing me where two other huts were. He was also worried about my left arm as he saw I was not using it properly.

It was a great evening and the company was well needed. I had not seen anyone for 5 days and was beginning to

feel the effects of having nobody to talk to or confirm my decisions were correct.

5 February

Laddie had told me that the weather today was going to be perfect and he was right. I was away by 0730hrs so as to make the most of it. Laddie took a couple of photos of me with the pulk (surprisingly difficult to do on your own) and sent them via email to my wife. I set off to cross the hot spring stream and the bottom of the hill, and immediately fell in to about a foot of water as the snow around it collapsed under my weight. By acting quickly, I ran as hard as I could up the opposite bank. My boots and waterproofs, kept all the water out but they quickly froze up. This was ok, as I was able to break it off rather than let it seep in to my clothing.

I've been mountaineering for 27 years all around the world. This day, however, has to be in the top three. As dawn broke, I could see for 20 miles from the high ground. It was about -10, there was no wind, and the snow was solid, meaning that neither me or the pulk sank; it slid almost effortlessly across the ice. As I gained my first highpoint of the day, I got my first proper view of the glaciated volcano. It looked a long way away, but as the day wound on, I would pass by the main glacier and begin my approach on the larger one further away to the south east.

The isolation was again fantastic after my short 'top up' of human contact. My confidence was high and my speed was good. I was moving really well, and although the hut was 35 Km away (in a straight line), felt that two nights out was going to be easy. I didn't stop until after 1100hrs for a break. I was having too much fun and was on a high. I spotted a hot spring to my front due to the steam and the rocks clear of snow. It stood out from quite a distance, and it was only when I was within a few hundred meters did I fully understand what it was. I was not so fortunate a little later on, though.

After gaining some height, I was able to make good progress across about 2Km of very flat ground at about 850m. This brought me to a small rise from which the view was tremendous. The land in front of me dropped down to a fold that originated out of sight behind the next rise, which was lower. Beyond this, I could see the second volcano and the tight folds in the land of the water course I wanted to cross. Originally, I had planned this part of the journey on my revised distances of 14Km per day. I had passed this by 1300hrs so was pushing hard to try and enable me to get to the hut in two days rather than three. Laddie had suggested that this period of high pressure was only going to last for 36 hours, so I was going to make the most of it.

I had set myself the challenge of getting over the river before stopping at 1600hrs. This would be about 21Km as

the crow flies. I had identified a flat area to cross and as it was fresh water, and a cold day, had confidence it would be solid. I set off down hill towards it. The pulk has a fixed trace, so is attached to you through a harness via some straight metal poles. When you go down hill therefore, its weight pushes you. Earlier on in the day when trying to traverse so as to maintain some height, it had slid sideways down the hill meaning I was being pulled off balance. Now though, I had a good route downwards ensuring the pulk was directly behind me. As it was steep though, it was pushing me hard. By controlling my descent, I was reaching the lowest point when I fell through a snow bridge.

I was unable to see the hot spring that had brought boiling water to the surface as it was on the other side of the rise to my front. The water had flowed around the large knoll and cooled. There must be a temperature that the water gets to, that allows the surrounding snow to begin to form bridges across it between the stream banks. I fell through about 2 foot of snow, through about a foot of space into about 3-4 inches of warm water. In itself this is a shock, but not the end of the world. My problem was the momentum of the pulk as it forced me forwards against the opposite bank.

Instinct reacted faster than my coordinated thought and I put my hands out to arrest my fall. In doing so, my left arm took a severe blow. I felt the pain from my wrist to my arm pit and was stunned into silence. But not for long! I fought my way out on the opposite bank and up on to the small rise where I released myself from the harness. From here, I could see the hot spring and the route its water took around the knoll. The snow cover had started within about 50m of the water emerging.

I sat on the pulk and went for my flask. I couldn't get the top off though. There was no power in my left hand at all. Using my feet to stabilise the flask, my right hand could. However, over the next hour, I also found that I could no longer twist my compass to change bearings. Even with medication, the ache was quite high. I found I was exposing my right hand far more to conduct basic tasks that it was suffering all ready. I was also unstable on my feet as the left arm was not able to push the pole either.

I wanted to pass the river so carried on to it. I had slowed down considerably now, and it was all ready 1545hrs. I didn't think the weather was going to change as per its normal 4 o'clock cycle, but didn't want to get caught out. The area I had identified from the map as a crossing point turned out to be good. I had rehearsed how I would escape from the pulk if the ice broke and was on full alert as I crossed. The ice was solid all the way through. I pulled about 300m from the water course to a flat area that was next to a small hill and began to get set up for the night.

As I finished, I noticed how dark it was getting. This surprised me as I thought I'd left more than enough time.

A task that normally took me 15-20 minutes had taken me 45. I also realised I was cradling my left arm. With some snow melting, I looked at my arm and devised a splint from my spoon and knife with a bandage. This felt much better. My right hand had been gotten by the cold though as it had been exposed more regularly and consistently over the last few hours. The outside tip of my pointing finger had gone white and had no sensation. I set about warming it slowly and rubbing it with my thumb for the next few hours.

It was a long night as I didn't sleep. The wind picked up to over 40mph which threw a lot of spin drift about but there was no fresh snow.

6 February

After checking back with my wife, I made a call to the SMO on Blandford Camp. He very kindly did a diagnosis over the phone, and although he couldn't be absolutely sure, knew it wasn't good. His initial advice was to get my friends with me to help and begin extraction from the mountains. When I told him I was on my own, his advice was simple, get in a rescue team.

To say that I was disappointed is an enormous understatement. Nine months planning and training had been thrown out after only a week on task. A simple slip on the first day, followed by a reasonably benign fall had ended my endeavour. I made the call to IceSAR with a heavy heart. Three hours later, the coast guard Puma picked me up and flew me to Reykjavik where I was taken to hospital.

I had sustained a four inch longitudinal split along my left ulna, with soft tissue damage in my tendons along the forearm and soft tissue damage in the ligaments of my elbow. I have been reprimanded for not calling an end on the first day, but at that point, wasn't ready to give in. That night after being checked over, I booked in to a hostel. Over the next 36 hours, I sorted out my return flights, and slept well.

TEAM MERCURY – THE CENTENARY SOUTH POLE RACE DECEMBER 2011 – FEBRUARY 2012

By Captain Billy Morris and WO1 (RSM) Mark Morgan



On 14 December 2011 Captain Billy Morris of 22 Signal Regiment and WO1 (RSM) Mark Morgan of 21 Signal Regiment (Air Support) departed from London to take part in the 100th Anniversary Amundsen-Scott South Pole Race. Originally there were 3 in the team, but unfortunately WO1 (RSM) Sean McIlroy of 7 Signal Regiment had to withdraw, and so it was two of us who arrived in Cape Town, South Africa to finalise our preparations for the race. Two days of frantic lectures, kit packing and food preparation were followed by four days of waiting around as the weather in Antarctica was too bad for the flight into the Russian Station at Novo.

Finally, on 22 December we made it, and set up in Novo, fitting skis and packing more food prior to setting off on the training leg of the race on Christmas Eve. We were delighted to finally be in Antarctica, on skis, and despite the weight of the pulks set off in good humour. The training leg was split over seven days over a total distance of 150 km with some hills worthy of a good Welsh mountain day and one of the strangest New Year's Eve parties ever. After completing the training, in all climbing to an altitude of 2950 metres, we flew forward to the start point. From here we had 800 km between us and the Geographical South Pole. There were seven teams in the race, including two others from UK, one from Germany, one from Holland, one from South Africa and a team from Norway. There was a great feeling amongst us all at being in Antarctica exactly 100 years after the original race between Scott and Amundsen, and on 4 January 2012 we set off on the long journey south.

Temperatures ranged on average from -30 to -35 degrees and the romance of Antarctica was quickly replaced by a barren, bleak flat white landscape day after day. We experienced a few difficult days during the move to the halfway checkpoint, with Tramadol playing a big part in the treatment of chest infections and swollen joints. After completing 80km in 24 hours, we arrived at the checkpoint 24 hours behind the Norwegian team and in second place. This was a mandatory 24 hour stop and a chance to recharge for the second half. The second half was tough going, as the constant effects of the weather and the weight loss took effect. We stuck at it and at 0800hrs on 24 January 2012 made it to the South Pole, experiencing a mixture of pride, relief and exhaustion at -43 degrees! We finished second in the race, which was won comfortably by the outstanding Norwegian team. We consoled ourselves that they were all SF and had conducted full time training for six months prior to the race. The fact that the official MOD team finished well back made us feel even better. We each lost over two stone during the race (six packs had already disappeared, unfortunately) and I sustained some frostbite damage to my fingers, which has put paid to my piano career for a while.

This project started in September 2009 with us being accepted into the race and raising the £93,000 needed to take part. Our sincere thanks to you all for your help in raising this significant figure, in particular the following;

HQ SO-in-C (A), RHQ Royal Signals, Global Radio Data Comms, BAE, C3IA Solutions, DATONG, Berlin Infantry Brigade Trust Fund, WCIT, all ranks 11, 21 and 22 Signal Regiments, Captain Torrington and WO1 (FofS) Robson.



The Corps will be 100 years old in 2020, and it would be marvellous to see the name and spirit of Team Mercury continuing, with bigger and better challenges being undertaken by our officers and soldiers leading up to this significant anniversary. Aim high! If anyone would like more information about the South Pole Race 2012, please contact us.



In addition, we have raised over £30, 000 for charity, being split between the ABF (£19, 000 donated as part of the 11 Signal Regiment Carrington Drum success), the Royal British Legion and the Royal Signals Benevolent Fund.

As well as our race, the Team Mercury name has recently been used for a team from the Corps competing in the Marathon Des Sables and for a team from 22 Signal Regiment who will be competing in the Siberian Ice challenge in March 2012. (www.extremeworldraces.co.uk).

MUSEUM NEWS

The Museum is currently undertaking a ambitious project which includes a complete restructuring of their storerooms and the creation of an up to date digital inventory of all items in the collection.

During the move a number of artefacts have been re-discovered including what was at first appearance a container of washing or scouring powder, presumably Dutch.

On closer scrutiny we discovered this wonderful clandestine receiver.

It is believed that this was used by either Dutch SOE or perhaps the resistance. SOE's work in Holland was the most seriously compromised of all their operations, with circuits thoroughly penetrated by the Germans, captured radio sets played back successfully and skilfully to SOE in London with false information, and scores of SOE agents parachuted directly into German hands.



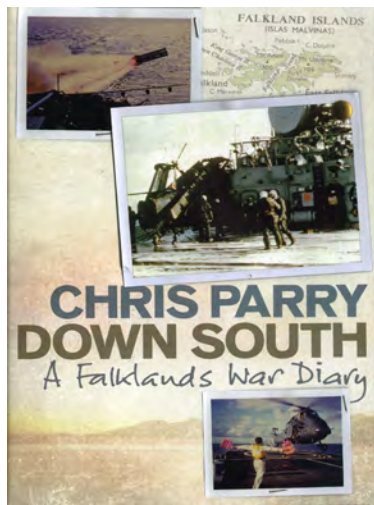
Book Reviews

Reading is to the mind what
exercise is to the body”

Richard Steele, Tatler 1710

DOWN SOUTH

By Chris Parry



This is an intriguing book that is strangely hard to put down. It paints a compelling account of the Falklands War through the eyes of the Observer of HMS Antrim's flight. The sequence of events in May 1982 unfolds unsentimentally: from the re-taking of South Georgia and crippling of the submarine Santa Fe by depth charges, through the sinking of the Belgrano, to the loss of four of our own warships in 'bomb alley' of Falkland Sound/ San Carlos water, the devastating attack on the Welsh Guards in Sir Galahad, and the eventual recapture of the islands.

Clearly written as a synthesis of his diary of the time and subsequent hindsight, it brings a rare insight of war from a junior officer's perspective. For those who know the author, whose illustrious career went on to Flag rank, it will come as no surprise that he brings the story together the way he does. A deceptively simple, homely style brings out the people dimension of the campaign. The fog of war swirls across the pages, as does the struggle to guess the enemy's next move – and the myriad of local initiatives to try and increase their personal and the ship's chances of survival. Sharing a ship with an unexploded 500lb bomb nestling next to the main missile magazine removed any lingering doubts there may have been about the reality of it all!

Down South pulls no punches either when it comes to the personalities of the time. The author's views are often uncompromising, whether it be for shipmates or the Admiral's staff. But regardless of how they fare, the personality types are very easy to picture, and indeed often to empathise with, despite their perceived foibles. Success was clearly founded not only upon the quality of the leadership, but also upon that extraordinary blend of humour, fortitude and raw courage of the 'ordinary' serviceman. Logistics are an important and enduring thread through-

out the narrative. An incessant round of naval replenishment of fuel, food, and ammunition - and the necessity to do this out of easy range of the enemy - drives the tempo of the operation. With the amphibious assault this shifts to troops and their stores – now very much within range of the Argentine air force and at considerable cost to both sides. As Chris Parry so clearly brings out, the difference between success or failure can be a hair's breadth. Strength in depth saved the day on many occasions. Sitting at the end of an 8,000 mile long supply train, and in an environment hostile in so many different ways, the reader is left understanding that failure was a distinct option. For the upper echelons of Defence, so currently focussed on asymmetric warfare, this account should perhaps be required reading, lest we forget the impact attrition has on such a major endeavour.....

In summary, Down South's straight talking narrative and easy use of the naval parlance, takes one back to those distant waters and historic events of the Falklands War. Certainly for those who served in the South Atlantic in 1982 it is well worth a read, in part due to the fact that you know at every turn, but want to read about, what comes next. For those less fortunate (!), it is still an excellent read and imparts much of the flavour of those heady days.

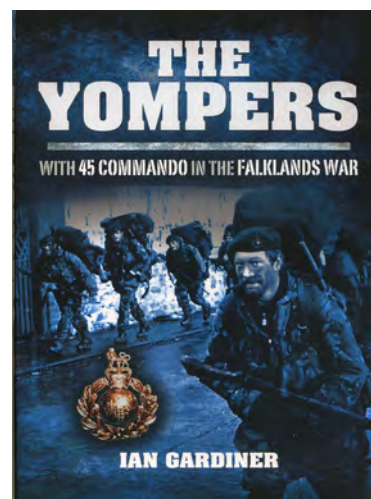
Commander Russell Searle

(Russell Searle is an Associate Member of the Royal Signals Institution and took part in Op Corporate)

Available from Amazon £13.14

YOMPERS

By Ian Gardiner



A good Royal Marine is never backward about sharing his opinions and Ian Gardiner is from the top drawer of good

Royal Marines. He is experienced, eloquent and erudite, and his book is interesting and easy to read. There is, however, a difference between expressing opinions and reporting facts. In his introduction he sets out his goal of giving the perspective of 'the marine, the corporal, the lieutenant and the captain' and then admits that 'It can never be the full story of course – no two people will ever paint the same picture of any one event'. Therein lies the problem – on reading "The Yompers" it is not always clear what is fact and what is the author's picture.

Many of the author's opinions I agree with, and some I don't, and I am concerned that readers should not take all his opinions as facts. Thus most, if not all Royal Marines, share the high opinion of Brigadier Julian Thompson, but I doubt if you will find many, if any, marines who with 40 Commando at the time who would share his high opinion of Major General Jeremy Moore. I am concerned that readers don't assume that specific experiences of X Ray Company were shared generally. The hospitality and co-operation given to 45 Commando on RFA Stromness, for example, was very different to the experience of the unfortunate passengers on some of the LSLs.

Nevertheless it is a valuable book. The author usefully sets the context of the deployment by taking us back to a time when the whole MOD focus was on Germany, most Royal Marines believed the days of the Corps might be numbered and you could only make a telephone call from Condor Barracks by picking up the receiver and waiting for the operator to put you through.

The accounts of the assembly of the widely dispersed elements of the Commando, training on Ascension Island, the San Carlos Landings, air attacks in Ajax Bay, The Yomp, the battle for Two Sisters along with the chaos that followed and Stanley in the immediate aftermath of the war all make fascinating reading and are an important contribution to the history of the conflict.

The author's integrity is underlined when he makes no attempt to conceal his own errors and their tragic consequences. His modesty is illustrated when he admits that 45 Commando didn't actually yomp very far or very fast, all of which reflects very creditably on him as a person and as a leader. His wisdom is evident in his reflections as a company commander on the value of investing in good training and leadership, the critical importance of getting the communications, coordination and logistics right and the relative ease of the conflict when compared with the actions and conditions of the First and Second World Wars. All useful reminders for current times.

I wish that he had confined himself to painting a picture of the events in which X Ray Company participated and of their perceptions at the time of events in the wider theatre. Instead, he broadens his story into a commentary on some but not all of the other elements of conflict and in my

opinion this diminishes its value. Thus the actual rights or wrongs of the sinking of the General Belgrano are hardly relevant to the X Ray Company perspective. It is the impact that this action had on the marines' thoughts and actions that is relevant. Again his observation that 2 Para was in a 'highly vulnerable condition' at dawn on the second day during the battle for Darwin/Goose Green would have been news to us who were there and doesn't add anything to the picture of the marines in 45 Commando. On the other hand, discussion of the psychological contribution made by the Gurkhas on the resolve of the Argentinean forces facing X Ray Company is omitted.

Nick Kendall-Carpenter

(Nick is Director of the Royal Signals Museum and a former Royal Marines officer who took part in Op Corporate)

Available from Amazon £13.99

STORMING THE FALKLANDS MY WAR AND AFTER

By Tony Banks

'I knew the answer: I would fix bayonets and get stuck in. I would do it all over again'.



Tony Banks served with 2 Para during the Falklands War during which he fought at both Goose Green and Mount Longdon, both of which get a graphic airing in the book as do the humour and horror of the life of a soldier at war. He subsequently suffered for years from PTSD, wrestled internally over whether the conflict and war in general, was worthwhile, and eventually became a successful businessman, including being selected to take part in *Secret Millionaire*.

The book takes a chronological look at his early and formative years, before joining the TA and regular Parachute Regiment families, then moves on to the Falklands War, before turning to his life events after the conflict. As such, it makes for an easy to follow biography and it is offered as exactly that, with no pretence to being a masterful omnipotent reference tome

COLONEL HLL HOWES SACS

From memories supplied by Dr Brian Austin

of the Max Hastings or Antony Beevor genre. The book is usefully illuminated by personal testimonies from other soldiers, Argentine veterans and Falkland Islanders, bringing additional colour to the chapters.

This is not a book that wallows in a deep search for the meaning or futility of war, rather it is very much the view and experiences of a young soldier, before, during, and after the conflict. It is an easy but very worthwhile read, and if the reader wishes to understand how soldiers think, it is a must. Banks doesn't hold back in his views of certain officers and controversially views the death of Lieutenant Colonel 'H' Jones as being '...gung ho and brave, but irresponsible' (p.125). However, throughout the book he also recognises the professionalism, bravery, commitment, and leadership of officers and soldiers alike, regular and TA.

Bank's PTSD affected him for the best part of 20 years after the conflict, and he explains the impact this debilitating illness had on his family and friends. As part of his recuperation he visits veterans in Argentina, where amongst much friendship he poignantly returned a trumpet he had taken as a 'war trophy' to its original owner, an Argentine regular soldier. Finally he returns to the Falklands where he gains a degree of closure on his previous experiences after feeling the warmth and respect of the people of the Islands. His insight into the impact PTSD on Falklands veterans from both sides is a sobering lesson; more people subsequently committed suicide than actually died in the conflict. He leaves the consequences of events in Iraq and Afghanistan for the reader to extrapolate but also rightly credits the excellent work done by charities such as Combat Stress and Help for Heroes.

Banks ultimately concludes that the conflict was worthwhile and he would do it again. However, in a way the stronger message is gained from trying to put oneself in the shoes of a young soldier from Dundee who rides the emotional peaks and troughs of war and its aftermath.

'When you are faced with these stark realities, you would be a very insensible person if you did not think more profoundly than you ever have in your life before'. Padre Cooper June 1982 (p.160)

Colonel Garry Hearn

(Garry Hearn is Commandant DCCIS and as a Signalmen took part in Op Corporate)

Available from Amazon £12.10



The death after a long illness on 2nd December 2011, at the age of 96, of Colonel 'Bert' Howes, South African Corps of Signals, brought to a close not only a very long life but a whole era of military and amateur radio communications in South Africa.

Herbert Louis Lockwood Howes was born in Cape Town, on 17th October 1915. Both the year of his birth and his imposing forenames – after Lord Herbert Kitchener, Generals Louis Botha and Henry Lockwood – bore testimony to a war that was raging at the time and of those military men who had most impressed his father. Bert, as he was always known, left school with every intention of furthering a career in radio engineering at the local technical college but the Great Depression put paid to that and he had to find work. Fortunately, a well known Cape Town company required someone to assemble the Fairbanks Morse wireless sets it was importing in kit form from the USA and Bert took on the task. His skills as a self-taught radio technician were soon evident and none more so than when he designed and built, within five days, a transmitter for a ship whose crew had recently mutinied by refusing to play any further constructive part in the voyage. The skipper, with enthusiastic assistance from the able-bodied passengers, managed to bring the vessel into port but for its onward journey (and with a new crew, one presumes) he insisted on having a wireless transmitter, just in case.

While at school Bert was a member of the school cadets who were fortunate (or possibly not) in being put through their paces on the parade ground by the RSM of the 'Dukes', the Duke of Edinburgh's Own, a voluntary rifle corps and one of South Africa's oldest regiments. Howes then joined the Dukes himself at the age of 16 and soon became an accomplished shottist and a trained Vickers machine gunner. But his prowess with the Morse key and his ability to make wireless work brought him to the attention of Major AL 'Tubby' Beamish in 'Signals' and a transfer soon followed in July 1936 to 3 Brigade Signals as a radio operator. So began what was to become an illustrious career in the South African Corps of Signals (SACS) that

culminated in Bert Howes being appointed, some quarter of a century later, the first Director of Signals of the South African Army.

In 1936 motor racing was most popular in Cape Town but controlling the annual Grand Prix around a large circuit was a problem. The answer lay in better communications and it was Bert Howes with his home-built VHF apparatus who provided the solution. He mounted one set in a Puss Moth aeroplane and two others, manned by his amateur radio friends, at the extremities of the track and thereby provided excellent coverage and control of the race. The fact that the private aeroplane happened to be piloted by Major CW Meredith, Chief of Staff of Cape Command and later an Air Vice-Marshal in Rhodesia, was fortuitous for not long afterwards enthusiastic press reports (and presumably the Major's too) brought the possibilities of airborne wireless to the attention of the South African Air Force (SAAF).

The SAAF soon took steps to try out VHF communications for itself and, once again, Private Howes found himself airborne, this time in a SAAF Wapiti, with microphone in hand and earphones clamped to his head. Fortunately for him – and his amateur radio licence too – the Postmaster General's concerns about the rather irregular use to which amateur radio had been put were assuaged by the technological leap Bert's efforts had conferred on the Air Force.

Later that year the Union Defence Force, as it was known in those days, took delivery from England of the new Wireless Set No.1 and it was necessary to have a well-trained group of signallers to operate the sets. Howes was sent to the Military College in Pretoria for instruction and, naturally, the inner workings of the WS No.1 interested him greatly. His comments, reported in this Journal as recently as last year, were not overly favourable when compared with the performance of his homemade apparatus!

His prowess in all matters technical soon led to greater things when in 1938 he was commissioned as an officer in the SACS and was posted to 3 Brigade Signals Company in Cape Town. At the outbreak of war a year later 2nd Lieutenant Howes was posted to 10 Infantry Brigade Signals Company then training in Potchefstroom, a military base south west of Johannesburg. From there he made the long trek to Italian Somaliland where he served as Wireless Officer with 10 Mobile Field Force until the fall of Addis Ababa in May 1941.

This victory was followed by a brief period of leave back in the Union before moving on to Egypt for intensive training. Howes was appointed 2ic of 1 SA Division Signal Coy in Libya where he served until after the battle of El Alamein. Then followed a period of more than two years in a training role in South Africa where he served in 12 Armoured Brigade Signal Squadron; then as Officer Commanding 12 Brigade Signal Squadron and finally, before

moving 'up north' again as part of the 6th South African Armoured Division, he was acting OC of 17 Brigade Signal Squadron.

Howes was heavily involved in the reorganisation of all Signals matters to do with the various artillery regiments and was somewhat dismayed to discover that a new man was to fly in from the Union as Signal Squadron commander. He protested strongly to the Divisional Signals Officer, Lieutenant Colonel WG Perkins, by making the point that as he was both senior in rank and had considerably more experience than the new man, that surely the position was rightfully his. With the wisdom of Solomon, Col Perkins ordered both men to spend the weekend together in the fleshpots of Alexandria and come back to camp in Khatatba with their ranks reversed. Remarkably, this manoeuvre worked and acting-Major Howes and acting-Captain Milne not only worked extremely well together thereafter but remained close friends after the war when Sandy Milne became Judge President of Natal.

At Khatatba, Howes led the training of what he described as 'a hotchpotch of humanity' with the intention of turning them into signallers of all necessary trades and musterings. Early in 1944, the 6th South African Division, under the command of Major General Everard Poole, proceeded to Italy as part of the US 5th Army, commanded by Lieutenant General Mark Clark. By the war's end Major Howes had been Mentioned in Despatches and had decided to make his career in the army.

Various staff courses followed on his return to South Africa with a memorable highlight from that period being the investiture at the Military College by HM the King during the Royal Visit in May 1947. The following year the government of Field-Marshal Smuts was defeated at the polls and that ushered in the Nationalists of DF Malan, many of whom had actively opposed South Africa's very involvement in the war, let alone on the side of Britain.

During the subsequent 48 years of nationalist government, South Africa underwent many changes not least of which was the 'Nationalisation' of the military with the often less than subtle breaking of so many of the old links with British military customs and traditions. Out went the crown on badges and emblems while in came ranks such as Field Cornet, Commandant and Combat General that dated from the days of the Anglo-Boer War. General Poole, the man designated by Smuts to become Chief of the General Staff, was unceremoniously sent off to Germany as South Africa's representative to the Allied Control Commission for Berlin while below him numerous officers whose political sympathies were deemed to be suspect were summarily dismissed. But Howes survived not for any political reasons at all but simply because he was quite indispensable as the most competent technical officer in the Corps of Signals. An article he wrote for the Defence Force magazine Kommando in 1958 in which he cast his mind for-

ward and predicted where he thought modern electronics would lead was remarkable in its percipience. He foresaw, amongst many other things, tropospheric scatter communications, helmet-mounted radios, precise but variable frequency control at VHF and above, electro-optics and night vision technology and even unmanned airborne vehicles, the almost ubiquitous UAVs of today.

Various technical, staff and command appointments came his way during the decade after the war and in 1959 Commandant (Lieutenant Colonel) Howes was appointed Officer Commanding, the School of Signals in Voortrekkerhoogte, just outside Pretoria and the largest army base in the country. It too had seen a name change having previously been called Roberts Heights, after the British Field-Marshal who turned the tide against the Boers during the war at the turn of the century. In 1963, he was appointed Chief Signals Officer (Army) and two years later, following the renaming of that post (at his suggestion) he became Director of Signals, the first person to hold the position in the South African Army.

This was to be his last signals-related role in the SADF. In 1968 he became Second in Command in the rank of Colonel, at Witwatersrand Command HQ in Johannesburg, and he retired from the Permanent Force, but not from full time service, in 1972. For the next eight years he served as SO2 in charge of mobilisation at Wit Command until he finally retired, still in the rank of colonel, and returned to civilian life in October 1980 after serving 47 years and 106 days in the uniform of the UDF/SADF.

As was made evident at the beginning of this tribute, Bert Howes was an avid amateur radio operator. He obtained his amateur licence and the call sign ZS1AL in Cape Town in 1935. When he died 76 years later, with the call sign ZS6HS in Johannesburg, he was the longest serving member of the South African Radio League. His work both of a technical nature and in setting numerous operating records, most particularly at VHF and above, made him a legend amongst South African radio amateurs.

Bert Howes was a remarkable soldier much loved and admired by the men who served both alongside and under him. In 1953 he married Jennifer James, daughter of Major Arthur Redvers James RFC, and later SAAF, who arrived in South Africa in 1922 with 100 aircraft plus some crews to start what would become the South African Air Force, the second oldest air force (after the RAF) in the world. Bert and Jenny had two daughters and a son who are now scattered between Australia and South Africa.

BRIGADIER A W McL McKINNON OBE

Alistair William McLachlan McKinnon was born in Glasgow on 9 November 1929, and educated at Glasgow High School and the Royal Technical College of Glasgow. He joined the Army as a National Serviceman in January 1949 and was commissioned into the Corps later that year. In 1950 however, he relinquished his commission and reverted to Officer Cadet to attend RMA Sandhurst.

Re-commissioned in 1952, he was posted to Korea with the 1st Commonwealth Division, and on return to UK he read for a degree in Electronics at RMCS Shrivenham, gaining a Second Class Honours. This was put to immediate use as an instructor at the School of Signals for three years, compensated afterwards by a tour with the Trucial Oman Scouts from 1960-62.

In 1962 he was posted to the War Office with responsibility for all future equipment requirements except net radio, and followed this with a posting to 8th Signal Regiment for one year as a squadron commander. From 1965 to 1967 he served at the Signals Research and Development Establishment as a staff officer for radio and radio relay systems. He then commanded 39 Brigade Headquarters and Signal Squadron for a short time before being selected for attendance at the Joint Services Staff College. In 1968 he was appointed as Second in Command/Operations Officer of 1 Divisional Headquarters and Signal Regiment in BAOR. He left in 1969 on promotion to command 9th Signal Regiment (Radio) in Cyprus, where he remained for over two years, and was awarded the OBE for results gained by the regiment. He returned to the Ministry of Defence in 1972 as GSO1 Signals 31 in the Signals Directorate, dealing with technical and operational matters. He was promoted to Colonel in 1974 and sent to the MOD Operational Requirements Directorate, followed two years later by a posting to Headquarters 2 Signal Brigade in Aldershot as the System Controller for UK static communications.

In 1979 he was promoted to Brigadier and appointed to command the Saudi Arabian National Guard project (SANGCOM) team. This was followed by his final appointment in the Army, as Commander Communications HQ UKLF at Wilton. He retired in 1984 and settled in Hartley Wintney, Hampshire, retaining for some time afterwards a number of consultancy posts in industry. He had a daughter and a son by his first wife Pauline, whom he married in 1962. He was widowed in 1978, and remarried in 1980, gaining two stepsons and a step-daughter. During his service, he was an enthusiastic rugby player and referee, and a Vice Commodore of the Army Sailing Association as well as Commodore of the Royal Signals Yacht Club. He died on 30 March 2012, much mourned by many friends and colleagues.



MEDAGLIA CIVILE DI VALORE
Italian Medal for Civil Valour



The family of Brigadier Russell Frank Maynard MBE with the Master of Signals.



Family donate rare medal to Museum.

Major Matt Maynard, on behalf of the family of the late Brigadier Russell Frank Maynard MBE, presented his rare “Italian Medal for Civil Valour” medal to the Master of Signals on behalf of the Museum.

Brigadier Russell Frank Maynard MBE was born in Rhanikhet Station, India, in 1940 to an Army family. He attended Campbell College, Welbeck College and Sandhurst and was Commissioned into the Royal Corps of Signals in 1960.

During his career he served in several theatres worldwide including Commanding 661 Signal Troop aboard the assault ship HMS Intrepid and 4th Guards Armoured Brigade Signal Squadron in Germany and was Commander Communications in Northern Ireland on Op Banner where he was mentioned in Despatches. In 1985 he was promoted to Brigadier and assumed command of Catterick Garrison and the Royal Signals Training Group from his brother, Brigadier Roy Maynard. This was a unique event in both Corps and Army history. From Catterick he was posted to the NATO Staff College in Rome.

On 15th July 1988, Brigadier Maynard was relaxing at a beach near Fregene, Rome, when several children got into difficulties in the water. Brigadier Maynard, along with several other officers rushed into the water to save them.

“Alerted by cries for help, he did not hesitate, together with another military officer, to dive into the sea to go the rescue of six young people who, because of the adverse weather and sea conditions, were about to drown. General Maynard [sic] generously succeeded in saving the lives of all the young people but, overcome by fatigue, was himself swept away by the waves and drowned. He sacrificed his own life for the most noble ideals of altruism and human solidarity.”

Tragically Brigadier Maynard and a Danish officer, Colonel Niels Thorn, both drowned rescuing the children. As a result of their gallant actions, they were both awarded the Medaglia Civile di Valore. The medal is Italy’s Highest Decoration for Civil Bravery and is equivalent to the British George Cross.



Bletchley Park-Home of the Codebreakers

Bletchley Park was once Britain's best kept secret. Today the Park is a heritage site and museum. Explore the wide range of exhibitions and learn how its codebreaking successes helped to save countless lives by shortening World War Two by around two years.

More incredible than fiction, the story of Bletchley Park was a desperate race against time. The mission of codebreakers like Alan Turing, was to crack Germany's communications, such as those encrypted by the German Enigma machine.

Bletchley Park was Churchill's secret passion; he called its codebreakers his "geese that laid the golden eggs and never cackled". Discover how it was done; be amazed by the total secrecy in which 8,500 people worked; and marvel at the technology designed to crack the codes.

Discover
a secret
world

WHAT THERE IS TO DO & SEE

The main Block B Museum - the complete Bletchley Park story.

- **Bombe Rebuild** now complete and fully operational.
- **Largest collection of Enigma machines** on public display.
- The spectacular **Alan Turing Statue** by artist, Stephen Kettle.
- **3D Theatre** showing Bombe rebuild project
- **World War Two Aviation** display – one man's tribute.
- **Home Front** exhibition.
- **The Oxf. & Bucks L.I. at Pegasus Bridge** display.
- **The 65th Nachrichten Abteilung** - a German Signals Group.
- **Gift Shop.**

OTHER EXHIBITIONS & COLLECTIONS

- **The Mansion** - a beautiful & atmospheric Victorian Mansion
- **Hut 8** - Alan Turing's workplace.
- **The Bletchley Park Garage** - collection of vintage vehicles.
- **"From Bletchley With Love"** the true amazing stories of WW2 Spies & Double Agents - an exhibition which includes the war time exploits of **Ian Fleming**.
- **The Churchill Collection** - a unique collection (Closed Thursdays).
- **The Projected Picture Trust** - The 1940s Enigma cinema.
- **Hut 1** and the **Diplomatic Wireless Service** – exhibition of radio & communications 1930s -1970s. (weekends only).

WHEN, WHAT IT COSTS

Open every day except Christmas Eve, Christmas Day, BoxingDay & New Years Day.

Summer opening times 1 March - 31 October
Weekdays / Weekends & Bank Holidays 9.30am to 5pm.

Winter opening times 1 November - 28 February
Weekdays / Weekends & Bank Holidays 9.30am to 4pm.

Admission Charges: Adults £12. Adult Concessions £10 (Over 60's & students with valid ID card) Children (12-16) £6.

Children under 12 admitted free
Family Ticket: £26 (2 adults +2 children aged 12 to 16).

Your admission charge is a season ticket giving you free entry to Bletchley Park for one year from the date of your first visit.

Under-16's must be supervised by parents'/guardians'.

On-site parking: Cars £3, Motorcycles £2 - each visit.

Dogs are STRICTLY not allowed on-site, with the exception of registered assistance dogs, for Health and Safety and Wildlife Preservation Reasons.

Further Information:

24 hour recorded information line:

01908 640404 or www.bletchleypark.org.uk.