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90th ANNIVERSARY ISSUE

The Journal

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This special 90th Anniversary edition of the Journal comes at the end of another busy year, which saw the continuation of our popular workshops for MOD, Government and industry, as well as a very successful Seminar in October and the London Lecture and Dinner in November. The latter saw a capacity audience assembled to hear the address by Mr Andrew Manley, the Director, Defence Commercial. In between, the Blandford Lecture programme has been well supported, and attracted guest speakers of the calibre of Professor Richard Aldritch, Brigadier Allan Mallinson and Kate Adie. In this edition, we reprint some interesting articles from earlier editions of the Journal and its predecessor, the Royal Signals Quarterly Journal, which have some resonance with present times. Our technical section features an article on FALCON deployed on Op Herrick, and a special article exposing the relative merits of the Defence Information Infrastructure, of interest to many. The popular historical section includes an account of the Ashanti Expedition from one of noted contributors, and an account of the retrial from service of the Ptarmigan communication system. The next issue of the Journal is planned for Spring 2011; I look forward to receiving your articles!

Tom Moncur

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A 90TH ANNIVERSARY MESSAGE FROM THE MASTER OF SIGNALS

Lieutenant General (Retired) Robert Baxter CBE DSc FIET FBCS CITP

As I write, the date is 1 September 2010, or 140 years to the day that C Troop, Royal Engineers was formed at Chatham. You will know that this grew over the years to become, successively, the Telegraph Battalion, the Royal Engineers Signals Service and eventually the Royal Corps of Signals in 1920. The Royal Warrant was signed by the Secretary of State for War, the Rt Hon Winston S Churchill, on 28 June 1920 and six weeks later His Majesty the King conferred the title Royal Corps of Signals. Over the next 20 years, the Corps was to serve in many outposts of the Empire such as Shanghai, Hong Kong, Singapore and Egypt, and by the end of World War II had grown to 8,518 officers and 142,472 soldiers. Post-War, we continued to be involved in many campaigns, including Palestine, Malaya, Korea, Cyprus, Borneo, Aden, Kenya and Belize.

Throughout the Cold War we maintained a substantial presence in Germany, whilst supporting operations in Northern Ireland and the Falkland Islands. The fall of the Berlin Wall in 1989 brought little let-up in activity, with peace-keeping operations in the Lebanon and Namibia, as well as support to operations in East Timor, Kurdistan, Bosnia, Croatia, Kosovo, Western Sahara, Cambodia, Rwanda, Angola, Zaire and Sierra Leone. The Corps had a major involvement in the first and second Gulf Wars, and we remain heavily committed to operations in Afghanistan, with troops still stationed in Germany, Cyprus and the Falkland Islands.

*At present, the Strategic Defence and Security Review is firmly in the headlines, and the Defence Training Review will have a major impact on how we train our young servicemen and women. The one certainty is that there will be change and I trust that this holds no fears for members of a Corps that was formed in response to new technologies and has changed in response to changes in those technologies as well as to the nature of military operations. Our fundamental role is to support commanders wherever they are, at all levels of command and across the full range of operations from Military Aid to the Civil Authorities to highly intense counter-insurgency: hence the term Command Support is used. Some of you will have noticed how over time some of the tasks and equipment, once the preserve of special forces, have migrated into the 'green' Army and you will also be aware of just how far forward you find the Corps in support of special forces. The Corps can only add value by understanding both the technology **and** the requirements of operations as well as the demands of command; only with this dual understanding can the potential of technology be fully exploited. In addition, our lead in electronic warfare adds tremendous value in delivering robust and assured communications and information systems – working as a 'poacher' gives precious insight to the 'gamekeeper'. Cyber warfare is merely an extension, albeit a complex one, of this activity and any failure on the part of the Corps to understand and grip this will mean that we fail in our primary role.*

We must be active and not just reactive, spotting both the need and being ready with the solution. This requires us to be fully in the mind of the commander and his key staff. Field Marshal Alexander of Tunis offered this advice in his Foreword to a history of the Corps:

'Good signal communications will not be forthcoming unless signal officers can merit the full confidence and trust of their commanders. Such trust implies that commanders should give their signal officers the earliest practical information regarding their future intention, should take into account any limiting factors in the provision of communications, and should then accord their signals officers a free hand in the ways and means of provision.'

He goes on to comment on the imperative of understanding the signal methods of Allies to ensure smooth communications. Those experienced in delivering communications and information systems on recent and current operations will know how true these words remain.

When I look back over our heritage, it is a nothing less than a story 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. The key to the future will be in the way we develop our young soldiers and officers, education rather than mere training will be vital if we are to have an even chance of keeping up with the rapid change that notably characterises our key technologies. We must be demonstrably professionally competent if we are to gain that trust referred to by Field Marshal Alexander – part of the role of the Royal Signals Institution. Perhaps I am biased, but in my role of Master I have the unmatched opportunity of meeting and talking with many young soldiers and officers of our Corps, and I have always been uplifted by their intelligence, enthusiasm, energy and love of life. I therefore look forward with optimism to taking the future by the scruff of its neck— Certa Cito!

Robert Baxter

THE ROYAL SIGNALS INSTITUTION LONDON LECTURE AND DINNER 2010

THE LONDON LECTURE 2010

The Speaker this year was the Director of Defence Commercial, Mr Andrew Manley, a key figure in the Defence procurement organisation, and acting Chief Executive of Defence Estates. The Speaker was introduced by the Chairman of the Royal Signals Institution, Major General Tim Inshaw, who also welcomed another capacity audience to the Institute of Directors. Guests of the Institution on this occasion were the Master of the Worshipful Company of Information Technologists, the Past Master of the Worshipful Company of Engineers, and the President of the British Computer Society.

The speaker delivered a concise, focused and positive address, identifying where past mistakes had been made and pointing our milestones for the future. The post-dinner question session saw some pointed and knowledgeable points raised, all of which the Speaker dealt with in detail. The Master of Signals summed up the evening in his closing address and reiterated our thanks to the Speaker for a detailed and clear exposition of the current state of procurement, and the way ahead in the new era of economic restraint.

The 2011 Royal Signals Institution London Lecture and Dinner will be held once more in premises of the Institute of Directors, 116 Pall Mall, London on 17 November. The dress is black tie, with no medals. RSI members desirous of attending should aim to secure an invitation to join one of the tables sponsored by industry. Details are available on request from the Secretary.

During the course of the evening, the Master of Signals presented RSI Awards as follows.

MEDAL FOR ADVENTUROUS ENDEAVOUR

Captain Rachel Thompson

Captain Rachel Thompson is an outstanding sailor whose exploits and initiative have benefited others at National, Corps, Unit and individual level. All her accomplishments have been achieved while maintaining a high output in the demanding post of Second in Command of 11 Light Brigade Headquarters and Signal Squadron (261). Like others in her unit, over the last two years she spent a year away from home on exercise or in Afghanistan.

A former National Champion, Captain Thompson represented Great Britain in the 2008 World Keelboat

Championships in Sardinia, and she took decided to reinvigorate the Corps dinghy racing team in 2008, after the Royal Signals had not won the Inter-Corps Championships in at least a decade. She organised, selected, coached and captained the team for two years, resulting in a hard fought victory in 2008 against the odds, and with a different team, retaining the title in 2009. In what was left of her spare time, she used her sailing qualifications to organise and lead adventure training for young soldiers from the Unit.

Captain Thompson was involved in The "Toe in the Water" charity initiative from its launch in August 2008 to inspire men and women who have sustained traumatic injuries, including the loss of limbs. Using her sailing skills, she has demonstrably turned lives around, and helped give injured servicemen and women hope for the future, in the process giving up much of her personal time during pre-deployment training. Her lead on a winning day during 2009 Cowes week gave an immense morale boost and sense of personal worth to the injured soldiers involved.

She inspired and motivated two Senior NCOs to complete a charity cycle ride from Lands End to John O'Groats in aid of this charity. This was no ordinary ride, as the team was split in half, with the actual route being completed in the UK and Captain Thompson with one of the Senior NCOs following the route on cycling machines in Lashkar Gah. Between operational commitments she maintained an average of 75 kilometres per day, primarily between 0500 and 0730, for nineteen days. Through force of sheer determination and personality, she successfully raised £4000 towards the team total of nearly £7000.

Captain Thompson's motives have been of the highest, that is to serve the Army, the Corps and its soldiers. For her outstanding contribution to enhancing the status and reputation of the Royal Signals, and for her adventure training and charitable achievements, she is presented with the Royal Signals Institution Medal for Adventurous Endeavour.

THE MASTER OF SIGNALS AWARD

Major (Retired) J Barrett MBE

In 2011 Major (Retired) John Barrett MBE completes 50 years unbroken service with the Royal Corps of Signals. Having been called up as a National Serviceman in 1959, he was commissioned into the Corps in 1961, and after service in Cyprus was a

member of the first course to be taught at Blandford after the School of Signals move from Catterick in 1967. He went on to serve in Berlin, the Ministry of Defence and with the US Army in Augsburg, Germany, before beginning his 30 year attachment to Blandford Camp in 1981. Employed initially as OC Radio Group, he was successively OC Officers Group and Deputy Chief Instructor, and became well known to generations of officer students passing through the Royal School of Signals.

On retirement, he was immediately appointed Mess Secretary of the Headquarters Officers Mess, where he supervised the organisation and staging of a multiplicity of formal events, sometimes involving Royalty, with capability, panache and consummate professionalism. This was harnessed to a sure managerial touch which ensured the smooth everyday running of the Mess, something which was fundamental in the successful implementation of contractorisation. The steady stream of complimentary remarks received by the 22 Presidents of the Mess Committee under whom he served bear ample testimony to his dedication, energy and abilities.

On his second retirement, after 13 years service as Mess Secretary, he overcame serious illness to continue running the HQ Mess officers second hand clothing shop, an activity from which many officers continue to benefit, as well as generating very significant sums of money for the Corps Benevolent Fund. He remains an enthusiastic supporter of Army and Garrison activities, including acting as the local SSAFA representative, and the Father of the Garrison Game Shoot. The officers benefiting from his advice and guidance over the years extend from the youngest subaltern to those of General rank. For his services to the Royal Corps of Signals, Major (Retired) John Barrett MBE receives the Master of Signals Award.

THE SILVER MEDAL

Sergeant JL Jennings

Sergeant James Jennings deployed on his first tour in Afghanistan with the newly-formed 223 Signal Squadron (Electronic Warfare) in command of a Light Electronic Warfare Team (LEWT) and as a Battle Group Electronic Warfare Adviser on Operation HERRICK 11, in support of 11 Light Brigade.

As a Communications Systems Operator, new to electronic warfare, he excelled throughout the tour, thriving in a series of complex and demanding situations. The improvement in the use and exploitation of electronic warfare was tangible wherever he was located. He spent much of the tour in the Sangin area,

which, as a result of widespread seeding of Taliban insurgent improvised explosive devices, was effectively a low-density minefield and was the most kinetic area of operations in Task Force Helmand. In October 2009, responding to a short-notice task and realising that no other electronic warfare soldiers were available, Sgt Jennings immediately deployed as a single-man LEWT, carrying 55kg of equipment, to provide intimate support to an infantry patrol in close contact with the enemy, a feat which was an inspiration to those around him.

In February and March 2010, while ISAF forces were fully engaged in Operation MOSHTARAK, the insurgents deliberately targeted Sangin in an attempt to divert resources away from the Task Force's main effort. For a sustained period, Sgt Jennings commanded his own LEWT, co-ordinated the efforts of two other teams in Sangin and simultaneously acted as the Battle Group Electronic Warfare Advisor. His efforts significantly improved intelligence collection and kept the Battle Group one step ahead of the insurgents. He was instrumental in building a compelling case for additional assets to be directed to Sangin and using them effectively once they arrived.

Sgt Jennings' out-of-trade professional excellence and leadership under pressure during a sustained period of highly dangerous operations created the conditions for successfully targeting the insurgent in Sangin. His actions were in the highest traditions of a Senior Non Commissioned Officer of the Royal Corps of Signals and he is awarded the Royal Signals Institution Silver Medal.

Staff Sergeant J Kemp

Staff Sergeant James Kemp completed a six month tour as a Signals Troop Commander in Afghanistan, where he enabled demanding and high risk operations in two geographically separated areas across the Joint Operational Area. With minimal previous experience in the role, operating without the support of a Yeoman or superior officer, he worked against a relentless operational tempo to lead a Troop of predominantly non-specialists in delivering technical solutions, demonstrating exemplary leadership far beyond that expected of his rank and experience.

His unit operated in a geographically dislocated and non-permissive environment. Leading a troop of 14 soldiers, his responsibilities were that of Yeoman, Foreman and Troop Commander combined. His technical portfolio included tactical through to strategic CIS, surveillance systems and a range of niche technical capabilities. With this technically complex and diverse portfolio, he demonstrated a rare level of technical

acumen, initiative and multi-tasking ability, and delivered a faultless performance to set the conditions of technical success in the future.

Demonstrating a rare mature understanding of strategic intent, on arrival he assessed that a weakness in strategic connectivity between key nodes was hampering operational command and control. Overcoming unnecessary bureaucracy and complex technical challenges, he personally planned and developed city-wide infrastructure to enhance the strategic connectivity to a number of FOBs. At the tactical level, he identified weaknesses in the secure covert communications infrastructure in the city which constrained tactical effect. He then planned and delivered a resilient talk-through network across the city using novel COTS equipment, meshing the devices, including satellite retransmission. Integrating covert radios and up-rated amplifiers in covert vehicles, he then led a team to install the capability in a covert profile in a hostile area.

Understanding the demands of the forthcoming deployment, Staff Sergeant Kemp had rigorously trained and developed his troop in novel CIS equipment and advanced military skills, setting and demanding the highest standards from his troop. They rose to the challenge, gaining the confidence to back themselves regardless of the challenges faced on operations. As a result, his well led and confident subordinates excelled throughout the tour.

Staff Sergeant Kemp has demonstrated a level of technical skill, maturity and leadership beyond his years and experience. His span of responsibility covered the panoply of technical disciplines in the Corps. He was presented a difficult leadership challenge, but he succeeded consummately, surpassing all expectations, and winning the unqualified admiration of his senior officers. For his selfless commitment during this operational tour and his technical contribution he is awarded the Royal Signals Institution Silver Medal.

Major Michael Solomons MBE

Major Solomons provided the core engineering expertise for the planning and development work required to deploy the new FALCON Tactical Communications System being developed by BAE Systems for the Ministry of Defence into Afghanistan. Having worked on the FALCON programme for over three years, he completed a detailed analysis of the communications architecture used in Afghanistan and demonstrated the user and engineering benefits of migrating to the FALCON all-Internet Protocol system. His focus on both the high level architectural issues as

well as the detailed technical challenges was instrumental in gaining MOD approval and funding to implement the migration programme.

Having been instrumental in developing the overall plan, Major Solomons became key to ensuring that the engineering aspects of the system were properly matured, and that the logistic and technical support for the system, including the repair and spares distribution plan and the engineering training, were all equally developed to ensure a coherent plan for the delivery of a robust and sustainable communications network.

He continued to monitor the changes to the networks in Afghanistan in order that the planned FALCON network would be appropriately configured. Until FALCON was delivered, no training capability support existed in the UK, and at short notice therefore, Major Solomons assumed responsibility for the design and build of Project SANDPIPER, a ten node meshed trunk network hosting an emulation of the Afghanistan Command and Control System terminals and Voice over Internet Protocol telephony. Although developed against a tight project schedule with limited funding, it was logically designed and thoroughly tested prior to delivery and installation on Salisbury Plain Training Area ready for a major Brigade level exercise. This complete activity was initiated and brought to completion in less than four months.

Major Solomons endeavours have significantly minimised the risks inherent in the introduction into service of a radical new communications system and will shorten the time to reach full operational capability. The impact of this system on the war-fighting effectiveness of our forces is fundamental, and its prompt and trouble free implementation will be crucial to our operational effectiveness and for ultimate success. His Communications and Information Systems engineering knowledge and extensive experience, hard work and dedication have been inspirational to those working around him. In recognition of his substantial contribution to operational Communications and Information Systems engineering in Afghanistan, he is awarded the Royal Signals Institution Silver Medal.

Staff Sergeant GP Wilman

In his recent tour in Afghanistan as an Information Systems Network Manager, Staff Sergeant Wilman was at the heart of providing management of the UK Mission classified command and control communications network, which enables all UK operations in Task Force Helmand and elsewhere in Afghanistan. Throughout Operation HERRICK 12, he was personally at the forefront of providing communications support to every major operation,

including the drawdown from Musa Qalah and Kajaki, planning and delivering the communications relief-in-place that enabled the expansion of US forces in Regional Command (South West) and Operation MOSHTARAK, the landmark operation to clear, hold and build in a former Taliban stronghold. In all these operations, his extensive technical knowledge was crucial in delivering and sustaining vital enabling communications for commanders.

Staff Sergeant Wilman played a crucial role in response to the single, biggest failure of communications since British forces had deployed to Afghanistan in 2001. Reported to the Chief of Defence Staff at the time as “a catastrophic failure of the United Kingdom’s command and control network in Afghanistan”, the disruption caused by the loss of services between Headquarters Task Force Helmand and its subordinate Battle Group and Company locations was intense, and for a time led to the suspension of all operations throughout Helmand. Staff Sergeant Wilman stepped into the breach, and quickly seizing the initiative, he gathered an ad hoc team of NATO specialists, US Marines and UK based contractors and set about leading a series of complex technical investigations to eradicate multiple faults and re-establish communications. Throughout the seven days that the system was down, the pressure and expectations placed upon his shoulders were immense, yet he worked tirelessly, showing the utmost dedication, intelligence and professionalism, until the situation had stabilised. His role in masterminding the restoration of Overtask to full functionality was pivotal, going far beyond that expected of his rank and experience.

Staff sergeant Wilman’s contribution to the success of Operation HERRICK 12 was exceptional. Were it not for his direct intervention and commitment, commanders within Task Force Helmand would have been unable to command and control operations for a sustained period, thus handing the initiative to the insurgent. His outstanding engineering skill, calmness under severe pressure and dedication to getting the message through are in the best traditions of a Royal Signals Senior Non Commissioned Officer, and he is awarded the Royal Signals Institution Silver Medal.

PRINCESS MARY MEDAL

Major Kevin Bolam

Major Bolam has served the nation for over 30 years. In that time he has risen from the rank of Signaller to Major, and now is responsible for the planning and delivery of specialised operational communications and information systems in support of key national military

commitments. He has contributed to almost every military operation during this period, from the Falkland Islands to Iraq and the current campaign in Afghanistan. Through his innate leadership skill, rare intellectual capacity and vocational commitment he has delivered remarkable results, and made an exceptional contribution to operational success.

In July 2006, he led the planning and delivery of communications to enable the evacuation from Lebanon. From this point on, he was at the forefront of enabling 43 concurrent operations at home and overseas, during a period of unparalleled operational commitment. Managing hard pressed men and communications assets which exceed the holdings of the three Army Signal Brigades combined was a seemingly impossible task, but his uncompromising drive, operational focus and passion for excellence allowed him to find the solutions.

Working under extreme pressure he has demonstrated the highest levels of stamina, moral courage and operational composure. He has enabled operations in Iraq and Afghanistan by personally leading the design of complex and cutting-edge technical solutions. He has driven the delivery of Force Protection capabilities to counter the threat posed by Improvised Explosive Devices. He has developed tactical capabilities to cue strike operations against the enemy. He has been at the forefront of inter-agency co-operation, from the delivery of communications support to indigenous forces to enabling Counter Terrorism operations in Northern Ireland and on the mainland.

For his selfless commitment and supreme technical contribution he is awarded the Royal Signals Institution Princess Mary Medal.

THE WHISTLER TROPHY

This was presented by the Signal Officer-in-Chief (Army), Brigadier Tim Watts OBE.

Lieutenant Mark Wilson-Ramsay

Lieutenant Wilson-Ramsay is a most proactive and hardworking Troop Commander of the highest mettle. He led the Regimental Athletics Team to triumph in the 5 Division Championship; pulled together a victorious Regimental team in the Stafford inter-service ‘Bergathon’ competition; planned, co-ordinated and delivered an excellent Squadron Level 2 Adventurous Training Package and, as Regimental Winter Sports Captain, did much of the groundwork and initial planning for a regimental skiing expedition. He has also led the Regimental Lanyard Trophy Team.

THE ROYAL SIGNALS INSTITUTION BLANDFORD LECTURES

His accomplishments have extended far beyond sport and adventurous training. Following the Regiment's transition from the General Support role to the provision of Command Support to Headquarters ARRC, he was assigned command of a composite troop during Exercise ARRCAD FUSION. The exercise came within weeks of the role change, which made the endeavour all the more daunting. His troop was tasked with the formidable challenge of delivering Command Support to a multinational EXCON headquarters staff numbering in excess of 500. He performed the role superbly. His drive, command skills and savoir-faire with the staff stood out, and ultimately earned him a COMARRC award for meritorious service. Since the exercise, he has maintained the momentum of his own troop's efforts to transition their skill base from Ptarmigan to Bowman Combat Net Radio and Reacher satellite communications. This substantial shift in focus has demanded a firm and focussed hand at the helm, and that is precisely what Lieutenant Wilson-Ramsay has provided.

His leadership ability has impressed on a number of levels. He is passionate about his profession and he has clearly relished Troop Command. Leading a Queen's Gurkha Signals troop, he has thrown himself into the challenge of mastering the Nepali language, realising the importance of being able to connect with his men on a personal level. He has selflessly put the interests of his soldiers first, whilst at the same time demanding high standards from them. There is no doubting the high regard with which they hold him.

Lieutenant Wilson-Ramsay epitomises Regimental ethos in every way; he is proud, professional and a genuine team player. He has achieved much – not because he is a specialist in one particular area – but because he leads by example. For his accomplishments, he is awarded the Royal Signals Institution Whistler Trophy.

THE ROYAL SIGNALS INSTITUTION SEMINAR FOR INDUSTRY

The event this year was held on 19 October, in the by now familiar surroundings of HQS Wellington, the floating Headquarters of the Worshipful Company of Master Mariners. The theme for 2010 was "Information Superiority - A Battle Winning Capability" and a near capacity audience of 100 gathered to hear a cast of distinguished speakers from within and outwith the Corps speak on a range of topics, covering the operational challenges, research directions and the applications to intelligence and logistics. Next year's event is planned for 18 October in the same location, and further details will be circulated in the New Year.

The tradition of organising lectures at Blandford Camp for the Camp community and local RSI members continued during the latter part of the year when we welcomed three celebrated authors to the Princess Mary Hall.

Proferssor Richard Aldritch gave a fascinating expose of the background to his acclaimed book on the history of GCHQ, his revelations being all the more startling when it is realised that he works exclusively from unclassified sources, albeit with access to the archives of other nations. He proved a knowledgeable and authoritative speaker, whose lucid and wide-ranging address could well have lasted longer than the time permitted.

Brigadier (Retired) Allan Mallinson is a successful writer of military novels centred on the life of a young cavalry officer of the early Napoleonic period, as well as an authoritative commentator on military matters for the quality press. He has also last year published a history of the British Army from the Restoration to the present day, which was the basis of his theme for the evening "SDSR - Do the Last Three Hundred Years have Anything to tell the Army?" His address was thought provoking, controversial and hugely enjoyed by a large audience. Our thanks are due to the generosity of Steria UK in sponsoring the costs of this lecture.

The final lecture was delivered by the famous broadcaster, author and speaker Miss Kate Adie OBE. Her topic of "Journalism, Reporting Wars and Women in Combat" gave her free rein to speak on topics close to her heart, and she took full advantage. The biggest audience of the year was held alternately in fits of laughter and moments of sober reflection as an accomplished speaker delivered a fluent, entertaining and thought provoking address.

All three speakers subsequently wrote to acknowledge the warm welcome they had been accorded at Blandford, and commended the informed and knowledgeable audiences they had encountered.

SUMMARY OF CORPS PRIZES AWARDED IN 2010

Princess Mary Medal

Major K Bolam

Silver Medal

Sergeant JL Jennings
Staff Sergeant J Kemp
Major M Solomons
SSgt GP Wilman

Master of Signals Award

Major J Barrett MBE
Colonel S Cartwright TD

Adventurous Training Award

Captain R Thompson

Whistler Trophy

Lieutenant M Wilson-Ramsay

THE DISTINGUISHED OFFICERS BOARD AT THE ROYAL MILITARY ACADEMY SANDHURST

The Corps maintains a Distinguished Officers Board at the Royal Military Academy Sandhurst on which are inscribed the names of those officers of Colonel rank and above who have made an exceptional contribution or achievement in the following: to the Corps, the art of signalling, for gallantry, sport or scientific prowess, service to the community or distinction in commerce, Government service or a profession.

No officer who has died in the present year can be included, nor can any officer who died before the last named on the Board. Officers are eligible even though they were not commissioned through Woolwich or Sandhurst, and former members of the Reserve Forces can also be considered.

The last names having been added to the Board in 2003, the Council of the Royal Signals Institution decided this year to consider additional names. After much deliberation, it was decided that the names of the following officers will be added to the Board :

Major General Sir John Anderson KBE

Major General AC Birtwistle CB CBE DL

**Brigadier CC Fairweather CB CBE KSTJ TD
JP DL**

A suitable ceremony will be arranged at the RMAS early in the New Year, to which the close relatives of these officers will be invited.

THE WAY WE WERE - REFLECTIONS ON THE PAST 90 YEARS

By Colonel (Retired) Tom Moncur

For some the exercise of researching through archives, old records and back numbers of Journals may be not the first choice of an absorbing pastime, but when looked at through the prism of one's own experience, and I suppose the older you are, the easier this is, it is fascinating to reflect on what must have been going through the minds of these gentlemen of bygone times when they accomplished the things they did.. Society, customs, attitudes and outlooks have all changed over these 90 years, but it is surprising to note the same logic and instincts guiding their actions as we would recognise today. The Royal Signals Quarterly Journal started in 1933, to meet the long felt need for a Journal to deal with subjects of a technical and military nature connected with the Corps. The first edition carried articles on carrier telephony, complete with circuit diagrams and graphs, the Signals Service in Palestine in 1916, foxhunting in India and some thoughts on the transportation problems of a divisional signal unit. Subsequent issues described tiger-hunting in the central provinces of India, and a day in the life of a telegraph officer in the Boer War in 1900. The technical theme was constant however, and subsequent issues saw treatises on the propagation of wireless waves sharing the pages with wonderful small advertisements for tailors, razor blades, banks, motor cars, blanco and a host of other necessities of life at the time. The following four articles have been chosen from past Journals to entertain and remind you of something of these times gone by.

*Reprinted from the Royal Signals
Quarterly Journal of October 1948*

CONTRIBUTIONS

The following tongue-in-cheek imprecation by the then Editor aimed at potential contributors to our predecessor Journal still has relevance, and is commended to our readers!

All who have journeyed in Normandy will have drunk her cider and eaten of her special fare....

“ Mais oui, Monsiuer! Un omelette? Et a suivre? Tripes a la mode de Caen. Et du Camembert. Parfait, Monsieur. Et comme boisson? Du vin? Du cidre, ah! Du vrai cidre de Normandie.”

“Parfait, Monsiuer, parfait.”

An omelette, golden brown, flecked with its herbs; the tripe, tender and delicately flavoured; the Camembert, fully and naturally ripened, yielding its gentle mellowness to the touch of a knife. Then coffee, a *fine champagne*, with a Maryland cigarette from its yellow packet. The bill of fare can show more costly and elaborate dishes, for what more can the hungry traveller wish?

So, what of our bill of fare? What dishes, plain or elegant, can we put before our readers, now that we have begun our Sixth Volume? Let us look it over and say what we shall set out.

The Royal Signals Quarterly Journal is to be a record of the doings of the Corps and its individual members; a place where the wider problems of Military Signals may be discussed; where will be found news of scientific and technical advances bearing on these problems; not least where all who care may feel the pride of getting into print. We shall have two kinds of historical article, the one dealing with the past, the other dealings with operations as they occur; the accounts

of expeditions which Signals Officers have accompanied; discussion of signals problems arising out of changes in tactical ideas and from new equipment; progress in research and design and indications where these may be thoroughly studied; tales of experience in travel and sport, and articles in a lighter vein.

It may be argued that the Official Histories will cover all the ground. These can give but the broad outline of Signal work; it will be for us to paint the more intimate picture. In the recording of current operations, we have a greater duty than for the past. May it be said, in fifty years time, that our accounts are interesting and accurate sources of Military History.

Reminiscences are not enough. The narrative must have an accurate skeleton of time and place. This is available in War Diaries and in the personal ones which some have kept. On this must be built the tale, compounded of personal experience and intimate record; of local colour and weather conditions; of routine; and of anecdote that makes the story live. A certain modesty may make it difficult to tell of personal doings, but it is the personal attitude that is of value and makes for interest. Routine is important; it is likely to be taken for granted, not described, and so lost. It will soon be a matter of hearsay how and when we watered and fed our horses.

*Reprinted from "Punch" of 17 November
1915, by permission*

Signal officers have had luck in recent years in being called upon as members of special editions. In some, such as the Sino-Burman boundary commission, they have taken a section and gone as Signal officers; in others, such as the Everest, Antarctic and Spitzbergen expeditions, they have gone as individuals with specialised knowledge. These opportunities will be certain to come our way again, and the Journal will offer a chance of giving a more personal account than may be possible, or desirable in the official narration. I hope all Signal officers will take this hint, and have their stories ready to go to press soon after they return.

The discussion of signal problems and accounts of progress in research and design are beset with the same difficulty, that of obtaining War Office permission. This is sympathetically given, and however disheartening it may be for contributors, it is better that some should be returned than that none should appear. As he is finally responsible, the Editor himself is most concerned with the Official Secrets Act.. It is all-embracing, like the text of Browning's monk in the Spanish Cloister

*"There's a great text in Galatians,
Once you trip in it, entails
twenty-nine distinct damnations,
Each one sure, if another fails."*

With this limitation, there is yet wide scope for discussion. The articles are particularly difficult to write. The stiff form of the official report, in which the writer may already have cast his subject matter, with its numbered paragraphs and headings, does not make a good Journal article. It is a sound basis, but the corners must be rounded off. The scientific and technical articles fall easily into a curious jargon; plain, terse English is best, with words of Greek and Latin kept for the technical terms. For a model of style, I recommend the Proceedings of the Royal Society. How deep they should go is a moot point. There must be no suspicion of writing down to the audience. The solution is to state the case in general, and relegate mathematical analysis to an appendix. The reader can then follow without interruption the trend of the argument and take up the mathematics in detail later if he wishes.

All these subjects have an intrinsic interest, but this is a poor excuse for dullness. There can be articles on sport and travel in a lighter vein. A writer is at once of the second oldest profession in the world; he is an entertainer. There is a simple test of his success: the reader must not lay down the story until the end. So in all we must interest and entertain. But if it is plain fare, let be well-cooked and well served. If it be but well, Tripe, then *Tripes a la Mode*.

THE TELEPHONE AT THE FRONT

By Norman Davey, sometime Captain RE (Signals)

A splendidly humorous vignette pre-dating the formation of the Corps. Even in the most difficult of times, humour was never far away....

Dear Mr Punch,

I have not yet received my second pip. I know fellows who were gazetted days after me who have two, while I remain, in spite of my peculiar qualifications, a mere Second Lieutenant. Clarence, for instance has two, and he merely lets out motor bikes. As for explaining how a telephone works to a red-hat, he wouldn't know which end to speak into, and I don't think he bumps into the Staff at all.

On the other hand, I suppose I know more about the ways of Staff Officers than they do themselves. Of course, that's my metier. You know the man at home who comes to the back door with a little black bag and a two-days beard, and says he's come to mend the telephone; and you say. "Oh very well, I suppose it's all right; let him come in, but keep an eye on the spoons!" Well, that's me out there.

I am the man who brings the telephone to the staff. They all want it – the DDMS, the APM the RTO – all of them, and I have to take it to them and show them how it works.

The other day I built a telephone line out to divisional HQ at _____. On the terrace of the chateau was a Staff Officer in full bloom – all gold and crimson in the October sunshine. I saluted smartly.

"Good morning, Sir, I have brought you a telephone."

"By Jove" said the Staff Officer, "splendid. That's just what we want – what? I say, can we talky-talky on it?"

"Yessir."

"I say, ripping; by jove – what?"

"Where shall I put it, Sir?"

He showed me where; I connected up the leads and rang up Corps. The Staff Officer was delighted.

“What a jolly little bell! And what’s that little handle for?”

“That’s to ring them up, Sir.”

Going to the instrument he worked the handle round in the wrong direction until he had unscrewed it. He turned to me pathetically, with the thing held up between his thumb and forefinger. “I say, I’m awfully sorry; have I broken it?”

I screwed the handle on again and showed him how to turn it. Half an hour later, when I left him, he was becoming quite proficient.

I am never technical with the Staff; they don’t understand it. A week or so ago I took a phone into an office – the Director or Deputy Director of something or other, at the moment I didn’t notice what. He told me to put the telephone on his desk. After I had joined it up, I explained to him how to use it.

“This end,” I said, “you put to your ear; the other end you speak into, and while you’re speaking you must keep the spring there pressed down. And mind, you can’t ring them up until you’ve put the receiver back here.” I also showed him how to ring the bell.

He seemed a little impatient. When I had finished he said, “Your excellent exposition in telephony has been invaluable to me. Good morning.” But there was that in his tone of voice that I did not understand, and as I went out of the office, I glanced at the little wooden notice board above the door. On it were the letters DAS.

I have not told these things, Sir, to any but you.

I have the honour to be, Sir,

**THE ONLY SUBALTERN WHO HAS INSTRUCTED
THE DIRECTOR OF ARMY SIGNALS IN THE USE
OF THE TELEPHONE.**

PS. I am still awaiting a second pip.

*Reprinted from The Royal Signals
Institution Journal 1956*

THE LEADER AND THE LED

By Major AR Wythe

This robust and provocative article by the future Colonel AR Wythe elicited a lively and increasingly sulphurous exchange of correspondence between the author and Journal readers, many of whom disagreed either totally or in part with his views, in the end necessitating editorial intervention to maintain the peace! This did not inhibit him from putting many of his theories into practice as CO 22 Signal Regiment, as many who were to serve under him will testify.

Reluctant as I am to delay you on your way to the Ministry of Supply and all those important staff jobs, I wonder if you could spare a moment to talk about the training of our soldiers? Those vast schemes of communication you are exercising your minds with will need men to turn the knobs, and if they are going to run away, you will look foolish. Within a week of the first shot, the Post Office will be told to do your job, but if the soldiers are rolled up, everything is finished right there. Have you ever realised how little of the vast amount of paper turned out about Signals concerns itself with the leadership of men? Have you noticed the crass inefficiency of our operator tradesmen, and do you realise it is due to a lack of instilled guts, which is discipline, which is your job – a very difficult job, the most difficult a man can have, and the only job which justifies the holding of the Queen’s Commission? You have been probably been thinking for some time that going to work with a furred umbrella is not really the proper ambition for an officer. If you have, good. If you have not, get out.

All is not well with our soldiers. They are poor soldiers and poor tradesmen with little pride, because there are too few to fire them with it. Leadership is the answer, and let us see it clearly for what it is, not rank, or the careful interplay of interests juggled by the careerist, not just ability, or that in mankind which gives plodding probity, but the high heart, confidence, and determination of the better man, recognised by those who follow willingly and accept driving because they feel its worth. Measurable only in terms of the power one man has over another, unsentimental in that it recognises the limitations of material with which it has to work, it is the sinew of the Army. That is the truth of it, and those who turn hurriedly away from its unpleasant implications or who in any way attempt to avoid its exactions are not leaders, and should not be officers.

To turn men into soldiers, willing or unwilling, there must be an acceptance of hard work and continued contact with untidy groups of inferior minds. That requires vocation, and realisation of simplicities hidden by the complicated difficulties of our time. We are in no worse case as a people than we have ever been, except that we worry more, and are softer, and require sound leadership. Leadership we must have, and where else will new leadership come from but the Services. Let the soldiers be tough and of good courage, and the people will follow. Our Army in the past has been an expanding wall inside which whole nations began. That was the measure of its leadership both within itself and, and those it served, and if, with the example of those who have gone before, we become an army of spiritless men led by bustlingly efficient civil servants, then we will deserve all we get. We cannot afford to waste the lesson of simple, iron-hearted Private Wheeler and his time, which is that the British soldier will accept discipline and fight like a madman no matter what the conditions, provided his regimental officer is his leader. Before books and cleverness, there has to be wisdom, feeling and enduring example in the business.

Why has the quality of leadership in the army fallen?

The nation is at a critical point in the cycle which begins with hardihood and valour and ends with material plenty and the softening of the spirit. The problems, as always, are those of leadership and discipline. Leadership as a concept offends those whose surly spirit resents admission of another man's superiority. Discipline, normally a product of stress, is unpopular at a time when living on the accumulated effort of the past has led to happy sloth. Those who should lead fail because their besetting weakness is self-interest, their cause damned by their example. Let one man in authority tell his fellow men of the harm being done by their laziness, spite and envy, and no matter what happens to his career, let him go on telling them, and in the end he will do great good. But no such man emerges. Sacrifice is not in the spirit of the age. These are great matters, and problems of empire and markets are their results, not their cause.

The army in the past has prevented any interference with its methods merely because those methods were unassailably upright. The mean-minded, anxious as always to pull down their betters for the comfort of their own conscience, could not succeed against the cold certainty of what was necessary. But the Army, probably for the first time since the Model, absorbed some of the mean thinking current after the Second World War, and by doing so lost its moral superiority. Service life, based as it should be upon the hard lessons of the past and the probabilities of the future, softened. The popularity-hunting politician, assisted by an irresponsible press,

surprised to find his inane interference treated as significant, encouraged the malcontent and held up good officers to ridicule. The spirit of leadership and discipline became hesitant in the face of raucous jeering by an irresponsible few who had the ear of irresponsible power. At the same time, and probably as a result of genuine effort to right the matter, emerged a band of retired very senior officers who were bluffly comforting about the "terrors" of Army life. Faced with this atmosphere, the Army officer modified his principles and the process has continued until his profession has become very much like other professions, its traditions and pride subordinated to what they can get out of it.

If many serving officers are asked to outline what they consider desirable careers they will choose those which treat service with troops as an unfortunate interruption. Taxed with it, the officers concerned will be surprised, deprecatory, vexed. After all, someone always does look after the chaps, but it is the "planning", the "supply", the "administration", which are the things to do, and which, of course, are neat and pigeon-holed, and without the detailed never-ending responsibility of training and looking after the other human beings – human beings who, if not properly trained, on the day of battle render fatuous all "planning", "supply" and "administration". There are several reasons given for reluctance to accept long periods of regimental service. One is the unending drudgery of paperwork which has to be done in addition to soldiering. Paper in the army is out of control, it is true, but whatever is promised it becomes worse as those who matter least in war get more control in peace, but greater difficulties than this have been overcome by determined officers in the past. Many officers say that staff work is more interesting. That may be so, but it is beside the point. If such work is so attractive as to make an officer want to leave troops, then he is in the wrong profession, because the leading of troops is his true function, not staff work. Staff work is something which helps soldiers to win battles, but however important, it is secondary.

The truth of the matter is that leadership is very hard work, and in trying to avoid it many officers are unrepresentative of their time. It is demanding, repetitive and lacking the glamour of clipped staffese and a briefcase. It requires a resolution to apply standards higher than those in civilian life, standards of integrity, loyalty and example, all suspect in a materialistic age. It demands that a man be moved by knowledge of what was done by those who went before, a determination that the chain of courage shall not be broken at his particular point in history. At a time when the mean and craven in their own defence rationalise all striving to the same mean compulsions, it requires of a man that he sees loyalty as its true value.

In this matter of leadership the officer must be objective in his thinking. There is no doubt whom we must fight if we fight at all. In assessing the task, we must not imagine we begin with a soldier of Peninsula quality. That is often the done thing, the jolly assumption that a British soldier is good enough no matter how he is trained. It saves a good deal of work, and is indicative of the growing and disquieting national habit of looking back to past glory. It is dangerous to expect past courage and hard work to be effective for ever. Before this, adversity has always produced in us an explosion of pride. If we are to remain great, we must be great in our own time. The officer must face the facts squarely. It is not a matter of doing sufficient work, but of doing the right kind of work. A day spent drafting a complicated exposition upon a nice point of administration is probably a satisfying intellectual exercise, but not one-tenth the worth of a day spent teaching soldiers to handle their weapons. Whatever the difficulties, however unpleasant repetitive training might be, actual teaching of soldiers their jobs on the ground is the first task of officers. It must be constant, accurate, painstaking and never left entirely to NCOs. It must take advantage of spare days, hours, even minutes and never slacken. The time factor is important, we have evolved one pattern of excellence in the Service which differs from the civil servant in that it wears a uniform. In justification of their lives, men of this type are pushing the centre of gravity of the Army further back from the front every day. The shifting of emphasis from the gun to the file has led to frenzies of unproductive work which fill the days of officers and men. In sheer exhaustion, officers are tending to accept as true the stupid axiom that a regiment can be judged by its paperwork. In doing so, they assist the mediocre, the tut-tutting fustian peering over his spinsterish spectacles, but what is far more serious, they accept the filling of their junior officers and NCOs days with useless labour. They must resist that as well as they are able. What paperwork is done must be very necessary and very accurate, and all other fought.

Many officers do not lead by example. That post-war phenomenon, the self-styled boffin, with dirty uniform, shoes, fingernails and teeth, patronising, blasé, studiedly eccentric, should never be allowed into the service in the first place. He hopes that his affectations will hide the fact that he lacks the most important attribute of an officer, leadership, and he blunders through the hated periods of regimental duty, avoiding every unpleasant task. Soldiers despise him. Why he is in the Service is not quite clear. He is rare. Nevertheless, there are many officers whose sharp edge has been blunted, who are slovenly, unpunctual, rather lazy, and apt to accept excuses from subordinates because that is the easy way. They have slipped from previous high standards of conduct, mainly because of that unnerving period after

the War when sneering at an Army officer and what he stood for became the great standby of the national press.

The result of all this is the badly trained subaltern. Compared with his predecessors, he has a difficult time. To start with, he is brought up in a society where any attempt at clearly defined leadership is tantamount to a call to revolution, and whatever his opportunities and education, he is not so tough-minded as his predecessors, and suffers from a common tendency to be conscious of rights. Basically, of course, he is as good as ever he was, and that is very good. He is not being given the carefully supervised, hard repetitive work which teaches method and mental toughness, nor is he being taught that his first task is detailed man-management. He is, to his detriment, receiving too much sympathy, and in many cases is being allowed to evade responsibility. Who has not heard a subaltern explain that he has not understood an order, when both he and his listener know that an uncongenial task has been avoided?

The Warrant Officers and NCOs of our Corps are probably more inefficient than they have ever been. There is a hollowness now about the shouting and the heel clicks. They know, and we know, they are not the men of iron and resource they used to be. No longer forced to learn the details of their jobs, they will calmly admit they do not know their unit weapons, will blunder through simple drill movements, making mistake after mistake, will own to ignorance of their trades. They have little pride except in a pathetic attempt to ape those splendid men who once made the army what it was. There is a tradition, a hope, that although standards have dropped, our NCOs are still the backbone of the Service they used to be. They are not. They are inadequate as leaders, and spiritless.

What must be done? First, the proper function of the officer, training and leadership of tough, able and resourceful soldiers and tradesmen, needs restating with such emphasis as to leave no doubt anywhere. There must be such a swing back to objective thinking as to make the leading of a Royal Signals regiment once more the goal of a subaltern's ambition, instead of, as at present, the prim righteousness and furred umbrella of military suburbia. The senior officer must honestly align his conduct with the requirements of the task, and strive to achieve efficiency in his own unit without "coasting" in wait for the next congenial job. He must be an example in all things. He must work hard. He must halt any tendency in himself and others to criticise his seniors, because the value of loyalty is self-evident, and disloyalty is a buffer for incompetence and degrading to all guilty of it. Loyalty, too, must be shown by considered behaviour and not confused with liking. The carefully impulsive phrase, checked halfway through, the

look of surprise upon receiving an order through a third person, the unnecessarily loud voice on the telephone, the pretended obtuseness when receiving instructions, all these are effective disloyalties and contemptible. There must not be a dependence upon mere form, with either its hearty saying of the right things or smooth clipped exposition of the trivial. There must be more than a reasonable interest in outside activities. There must be enthusiasm, good turnout, punctuality, an insistence that right be done in all things. The object of all thinking and action must be the training of inferiors for war.

This does not mean an officer has to be a clumsy boor, inflexible, hard-tempered, mannerless, slaving at work he should leave to inferiors, adolescent. It does mean that he should take his proper place as a leader in all things to those he commands.

Next, and of all things, this is the most important, the junior officer must be well trained. This cannot be done in a few months, nor is a matter of jabbing at the problem with mornings and afternoons of training loosely strewn over several years. It must be objective, planned, and combined with the training of NCOs and men. It should consist mainly of giving subalterns tasks which are a little beyond their capacity. It must teach them detachment, the ability to assess the job and the tools without sentiment. It must cut across modern thought by forbidding evasion of the difficult, by assuming from the beginning that young officers are honourable and tough-minded. Throughout they should be made to realise that their true function is the production and leading of hard, well-trained soldiers. The present attitude, that service with troops is a filling between Parts 1 and 2 Courses, University, Staff College or Shrivenham, must be eradicated with vigour. If a subaltern is no use as a leader, then he should be considered of no use at all. Not too much play must be made with such phrases as "He is a slow learner".

Warrant Officers must be more carefully chosen. Since the war, there has appeared a noisy, blustering type of Warrant Officer who acts and thinks only in the moment, blustering through his problems, trying to apply a hodge-podge of dogma he conceives to be regulations. He is out of his depth. The knowledgeable, eminently trustworthy WO who is feared and respected by his inferiors must be found again. He will have a decided effect upon the biggest problem that confronts the Corps today, the inefficient NCO. This inefficiency is the result of misplaced kindness. NCOs have gradually been led to believe that the Army will make any concession to keep them. Lowering standards and easy promotion have been eagerly taken advantage of by second-class men wanting an easy life and security. Vast sums have been spent on married quarters while the bachelors with a hint of

adventure in their veins, sound potential soldiers, are herded in overcrowded barrack rooms in double-tier beds. The responsibilities of NCOs which should be clear-cut, are fogged with domesticity and tolerance.

The whole matter of NCO training must be recast. If these men are not hard, resourceful and well-trained, they will fail in battle. Whether or not they have been happy throughout their peace-time service will not affect the issue. They must be driven to efficiency or broken, and no attempt made to distort the matter by a conscious or unconscious desire on the part of officers to be popular. Once standards of leadership are insisted upon, they will be accepted by the majority. Those who will not or cannot live up to them must be reduced to ranks nearer their ability, or at least not recommended for further promotion.

Provided these things are done, there is no need to worry about the British soldier. Shrewd as he is, he will both follow and be pushed more easily by men he knows to be knowledgeable and determined, and will accept discipline as necessary while weighing at its true value the interested interference of those who wish to sentimentalise him.

But above all, if leadership is to be effective, the trend towards easy thinking and evasion must be eradicated. Discipline must be geared to the requirements of the Service, and not to civilian thought. For that to be done, officers must see clearly that they are men apart, and act by the requirements of their task. It is not an easy one, just very honourable, and that for which they exist.

Prizes in the Journal

We are pleased to announce that the prizes for the best articles in the Spring 2010 edition of the RSI Journal have been won as follows:

£150 "Cyber Space and Cyber War" by Lieutenant Colonel Ian Buchanan

£100 "The Founding of C Troop" by Lieutenant Colonel (Retired) David Mullineaux

£50 "German Radio Reconnaissance" by Lieutenant Colonel (Retired) Dr Richard Skaife

Our congratulations go to them with the hope that other Journal readers will be inspired to send us more such high quality articles.

Reprinted from the RSI Journal Spring

CHANGING THE FUNDAMENTAL FREQUENCY OF CRYSTALS – A RATTY STORY

By Brigadier ES Cole CBE

The future Major General ES Cole CB CBE was an amateur radio enthusiast, and became Chairman of the Royal Signals Amateur Radio Society.

The technically minded of your readers will be aware of the difficulties attached to altering the fundamental frequency of the small piece of quartz crystal commonly used for controlling the frequency of radio transmitters. The operation involves careful grinding of the quartz plate under controlled conditions accompanied by meticulous physical and electronic measurements to ensure that the resulting rate and degree of change is known and controlled. There are however, ways and means of achieving change which, though somewhat difficult to control, are nevertheless effective. I refer to the use of rodents as frequency changers.

In Cairo in 1932 I was a keen radio amateur and had at that time just “modernised” my transmitter by converting it to crystal control. The wafer of quartz crystal was mounted in an open type holder between two brass plates. Its frequency was, if I remember correctly, about 7025 kc.

Now, over a period of a few weeks it became apparent that my transmitter was oscillating on ever-increasing higher frequencies. Forced into a more accurate check of frequency than my normal somewhat coarse calibration devices permitted, I found that the fundamental frequency of my crystal was now about 7050 kc, or an increase of 25 kc in a week.

That evening, after dinner, and after the transmitting heaters had been switched on for a minute or two, I turned on the 1400 volts HT supply for a test prior to transmitting. The flick of the HT switch was accompanied on this occasion by two most abnormal displays. First, a brilliant flash accompanied by the typical crack of a spark discharge, and secondly, almost simultaneously, the ejection at considerable velocity from the back of the transmitter of a dark furry mass.

Rapid inspection disclosed a large rat on the floor leaning against the wainscoting, panting and obviously perturbed, but apparently reasonably healthy after its sudden and disconcerting journey. I used a Number Seven iron to finish it off (I always used a Number Seven

for Cairo rats, although some of my friends swore by the Number Five).

My one-man court of enquiry, self-convened as a result of the above events, and a close examination of visible evidence in the form of rat droppings and dust scrapes, revealed that: the rat had been visiting my transmitter very frequently; it had used as a stepping stone from the main HT supply to the upper RF rack the two microfarad smoothing condenser connected across the 1400 volt output; I had arrived whilst the rat was actually on this stepping stone and it had presumably decided to rest there until it could escape, it was crouching snugly across the terminals when I applied the HT; the aim of the visits, confirmed by a somewhat heavier accumulation of droppings, was the quartz crystal holder.

I could only draw one conclusion, that the rodent had developed weakness for quartz, possibly finding that a kilocycle a day kept the doctor away. It can be confirmed, furthermore, that subsequent to the demise of the rat, the crystal was stable.

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FALCON DEPLOYMENT ON OPERATION HERRICK

By Lieutenant Colonel Simon Purser and Major Rob Salter



Lt Col Simon Purser was the SO1 Area Systems Group in Command Support Development (Networks) at Blandford. The team are based in Area Systems Group and are responsible for capability integration of FALCON.

Rob Salter was the System Design Authority for FALCON from 2001 through the Concept and Assessment phases as well as the early part of the Manufacture phase. He now has responsibility for the onward development of the FALCON solution to meet the needs of the UK and export customers.



FALCON is the British Armed Forces' new generation tactical trunk communications system. The Spring edition of The Corps Journal included an article that provided an overview of the FALCON systemⁱ. That outlined the plans to field FALCON in 2011 and deploy elements of the system to Afghanistan to support Operation HERRICK. This article provides a more detailed insight in to the enhancements and modifications to the FALCON system that have been initiated under Urgent Operational Requirement (UOR) funding, in order to optimise the FALCON system for deployment to Operation HERRICK.

When British forces deployed to Helmand in 2006, the trunk communications and information system (CIS) infrastructure system that was deployed was based on satellite communications bearers with pairs of Prominaⁱⁱ switches at each location, supporting "Red" UK SECRET and "Black" UK RESTRICTED domains, each switch hosting voice and a range of data systems. Much of the equipment had previously been procured and fielded under Urgent Operational Requirements (UOR) dating back to deployments in the Balkans and

there were a number of problems in achieving an integrated and efficient system. As Operation HERRICK built up, the need for coherence and interoperability with the coalition allies increased and UK started to field a "Coalition SECRET" infrastructure supporting voice and data under UOR procurement, known as Project Overtask. Due to the security requirement for separation of data from different domains, the UK domains and Coalition SECRET domain had to be kept physically separate. This has resulted in two physical networks being fielded to theatre, each with their own separate satellite communications bearers and support infrastructure. The problems of this complexity of systems was compounded by the UOR nature of the equipment, with inadequate repair and logistic support provision, limited or no reserves, lack of system training and difficulties with configuration control. The UOR equipment was largely Commercial of the Shelf (COTS) sourced, not designed to be transportable or provide the robustness in harsh environments and so the equipment has often needed to be housed in bespoke equipment rooms. This has limited the flexibility to rapidly deploy equipment as new patrol bases have become established.

Against this background, Permanent Joint Headquarters (PJHQ) J6 conducted an audit of Communications Information Systems (CIS) and directed that a more coherent and efficient architecture be developed and implemented against a rolling timeline. Directorate Information Systems Support (ISS) Solutions team developed a Deployed Technical Architecture (DTA) that is an attempt to meet the challenging multi-domain requirements and demand for ever increasing volumes of data. This architecture that emerged envisages an almost Everything Over Internet Protocol (EOIP) approach, with high grade accredited IP cryptographic devices providing separation between multiple security domains. The FALCON system is a modern all IP system that can support four separate security domains in a single deployment, with an integrated management system, so it was an obvious candidate for fielding to HERRICK to implement a DTA compliant infrastructure.

The Area Systems Group team in Signal Officer in Chief's Command Support Development (Networks) (CSD(Nets)) are responsible for supporting capability integration of FALCON and in the late 2008 started to investigate with the Solutions Team in ISS and PJHQ J6 what role FALCON could play in Operation HERRICK. An initial study in early 2009 by Area Systems Group demonstrated that FALCON would offer significant benefits in HERRICK and led to D ISS and PJHQ endorsing a Joint Planning Team (JPT) comprising BAE Systems engineers, CSD(Nets) and ISS staff, supported



Falcon deployed during trials

by input from Headquarters Land Forces and Air Command and other key system suppliers that contribute the deployed network. The JPT investigated in detail the HERRICK requirement and current CIS laydown and when it reported in October 2009, proposed a FALCON based architecture for HERRICK, including a number of modifications. A UOR for these changes and additional engineering and training resources received Treasury approval in March 2010 and BAE System's FALCON Delivery Programme was modified accordingly. The programme will now deliver Increment A and Increment C equipment with a proportion of these installations being deployed to HERRICK with additional new and modified assemblies being provided as a pool of equipment for the HERRICK deployment and a supporting training fleet. The FALCON system remains as a single interoperable system build.

The key modifications and changes to the FALCON fleet that will be deployed to Operation HERICK are summarised below.

Black IP Gateway. This is a new assembly that provides an encrypted IP Wide Area Network (WAN) output. This device overcomes the restriction on the number of "bearer of opportunity"ⁱⁱⁱ interfaces that a FALCON installation can support and enables those connections at speeds up to 100Mb/s. This allows

more efficient use of the extensive satellite infrastructure that is deployed to HERRICK as well as the commercial high speed IP radios that have already been fielded. FALCON stills retains its own link encrypted military radio sub system, capable of supporting speeds up to 34Mb/s.

UK Hubs are provisioned to improve the management and traffic handling efficiency of the system. This change does not introduce new equipment but provides racking and cabling for a properly engineered installation.

Single Mode Fibre Interfaces. Standard FALCON fibre Ethernet connections use multi-mode fibre interfaces, which has a transmission distance limitation of 2Km. A number of Ethernet Switches will be modified to provide Single Mode fibre interfaces, allowing connections at much greater distances.

Commercial Voice and Data Switches. The standard FALCON 6-port Desk Access Units (DAU), which are built to a robust Defence Standard (DEFSTAN), are designed to be daisy chained between staff cells inside tentage or rudimentary buildings. In the large HERRICK bases such as Bastion and Kandahar, many of the staff are working from more permanent Tier 2 or Tier 3 accommodation^{iv}. These building are normally flood wired with data cabling to "Cat 5" standard^v and



Setting up a VTC link

fitted with network equipment rooms. It is difficult to lay out DAUs neatly in such a layout and is also wasteful to use valuable ruggedised equipment where the environmental characteristics are not so demanding. Commercial standard Ethernet switches are being fielded to satisfy this requirement. The switches chosen are industrial specification 19 inch rack mounted, designed for operation in high temperature and dusty environments so still have a sufficient robustness if building cooling systems should fail. A range of adapter cables are also available for mixing military and civil pattern connectors.

Gigabit Ethernet Switches. The Standard FALCON Local Area Subsystem (LAS) runs over 100Mb/s Ethernet connections. Some of the infrastructure systems that are deployed to HERRICK are supporting high numbers of users and handling very large data files. This has led to a need to upgrade a number of subscriber groups to Gigabit Ethernet standard for the back bone. This also provides Virtual Local Area Network (VLAN) facilities to provide separation between discrete users groups.

FALCON Management System (FMS). The new equipment types will all be integrated in to the FALCON system so that it can be managed from the FMS, one of the key strengths of FALCON.

Alongside the equipment enhancements outlined above will be appropriate modification to the FALCON training packages that are being delivered as part of BAE Systems' contract. These changes will be common to the complete training solution so all FALCON operators and engineers will be trained, eventually providing a deep pool of trained manpower across R SIGNALS and RAF 90 Signals Unit. Logistic Support is also being enhanced with an additional spares scaling appropriate to the supply chain times. One of the most significant pieces of work is the interoperability and interconnection testing that is being carried out in preparation for fielding to HERRICK. The FALCON architecture envisages supported infrastructures being hosted on the LAS as clients dynamically taking their IP address from the FALCON address allocation for that particular subscriber group. While many infrastructure systems can be configured to connect in this way, some of the systems that are currently deployed will require modification. All of them need to be tested to ensure that the engineering team that will deploy FALCON to HERRICK and conduct the cutover of services to FALCON, have a clear set of instructions to configure each system. BAE Systems are providing engineering support to the testing programme.

The FALCON Programme has been updated to incorporate the HERRICK Theatre Entry Standard



Setting up a FALCON link.

(TES) modifications and the engineering and trialling work is already underway. The complete FALCON system will undergo System Field Trial (SFT) in early 2011. The intention then is to ship the HERRICK equipment to theatre and carry out the engineering installation and cutover of services while minimising disruption to the operational ICS provision. FALCON will be deployed to headquarters and fixed sites and provide data rich facilities and services to users, while Bowman and tactical satellite facilities will continue to be used to extend voice and data facilities to forward deployed troops.

The deployment of FALCON to HERRICK will enhance the CIS provision to British Forces in Afghanistan and provide a modern IP based network supporting four security domains on a single large capacity physical network. The deployment exploits the major investment made in FALCON capability and provides an increased communications capability in theatre in terms of bandwidth optimisation, technical consistency and tactical mobility. The leveraging of the investment in logistic provision and training are of particular benefit.

See:

<http://www.army.mod.uk/documents/general/JournalSpring10.pdf>

ii Promina is a “Multi Service Platform” statistical multiplexing system, manufactured by Network Equipment Technologies Inc (NET). This range of equipment was first fielded with British Forces in the Balkans

iii Bearer of Opportunity is a term to describe communications paths that are external to the FALCON system, not using FALCON’s integral trunk radios.

iv Expeditionary Campaign Infrastructure (ECI) classifies accommodation types in to “Tiers”. Tier 1 accommodation is typically tentage. Tier 2 accommodation is hard walled modular or portable buildings. Tier 3 accommodation are permanent buildings

v Category 5 or Category 5e are common titles for structured copper cabling infrastructure standards to support Local Area Network (LAN) protocols such as “Ethernet”. The Telecommunications Industry Association (TIA) / Electronic Industries Association (EIA), US trade bodies, have developed the standards but they are widely adopted internationally. The details are detailed in standard TIA/EIA 568-C.

SANDPIPER TAKES FLIGHT

By WO2 (Foreman of Signals) Andrew Dobson

WO2 Andrew Dobson is the Foreman of Signals at 202 Sig Sqn, in 3 (UK) Div Sig Regt. He joined Project SANDPIPER in April 2010 as the lead for the DTE (SP) team. He managed the complete communication estimate of DTE (SP), the architectural design, the training delivery, as well as the build and support of the network during its deployment.

Introduction

With the introduction of OVERTASK (the UK MISSION SECRET data network) into Afghanistan during Op HERRICK 7, a UOR was approved¹ to facilitate staff training to troops about to deploy on Operations on their confirmatory Field Training Exercise (FTX). The system procured was known as OTES (OVERTASK Emulation Suite) which initially was considered a valuable training asset but its success was found to be limited by its bearer network. As the dynamic changed in Afghanistan the bearer network and the voice solution used for training was discovered to be neither flexible nor scalable to be representative of the capabilities in Theatre².

The WAN bearer system used for the FTX was provided by BT's ISDN service, which was only available at 6 PoPs (Points of Presence) on Salisbury Plain. The use of ISDN meant bandwidth was limited as a Basic Rate Interface (BRI) could only provide 128 kbit/s, a throughput that could only accommodate four users and restricted when supporting simultaneous VoIP calls over the same channel.

After a workable but unsustainable bearer solution was deployed using Cormorant, it was identified that a more representative network which had greater training value for the deploying ICS enablers should be procured. On 5th February 2010 a new business case was agreed³ whereby the PoPs would increase to 10, with the 6 original Forward Operations Bases converting their existing ISDN lines to Asymmetric Digital Subscriber Line (ADSL), with the remaining 4 PoPs being extended using RADWIN IP radios. Secure voice would be provided by an IP Avaya exchange through a Promina node with cryptography over the PSTN being provided using MINI-CATAPANS, an encryptor capable of high grade encryption up to TOP SECRET. The project was named SANDPIPER after a native bird and had a budgeted cost of circa £800,000.

The official project start date was 14th April 2010 with a working solution needing to be ready for the first stage of 16 (Air Assault) Brigade's (16 (AA) Bde) FTX on 3rd July 2010. A viable solution to the initial concept had to be presented to Comd 11 Sig Bde on 14th May 2010, with CO 3 (UK) Div Sig Regt (3 DSR) accepting all potential risks. If this Project was to fail the only alternative would be to revisit the use of Cormorant, a daunting task considering the majority of the trained personnel were part of 2 Sig Regt, who were by now less than two months away from deploying on Op HERRICK themselves. Within an extremely tight 13 week window, encompassing many technical and administrative challenges, a system owned by 11 Sig Bde and delivered by 3 Division HQ & Signal Regiment had to be tested and accredited by Royal Signals soldiers. The system not only needed to be delivered but it had to be in a position post the FTX to be sufficiently handed over to 21 Signal Regiment (AS) as they prepared for their own mission specific training.

The Project Team

The Project was led by 11 Signal Brigade under the direction and management of the SO2 Plans Major Russell Edwards and three Foremen of Signals, they in turn headed three distinct work strands; comprising of a complete estimation of Defence Training Estate Salisbury Plain (DTE (SP)), the testing and integration of the WAN within a controlled environment⁴ and the refurbishment of OTES equipment and its ruggedisation. A core team was formed largely from 3 Division HQ & Signal Regiment with a few additional SMEs augmented from the wider Corps who were then broken down into the three teams. The trades within the core team were mainly CS Eng with the addition of an RSE and Inst Techs into the DTE(SP) team, with the majority being no higher than Corporal in rank. An important point to note is the Project Manager kept any civilian and contractor involvement down to a minimum to reduce cost, and retain skillsets within the Royal Signals.

It was decided that prior to the project start the network would not host the Promina or Avaya equipments, and instead the network would work entirely using IP, with a phone solution being provided by a VX VoIP Exchange using the same infrastructure as OTES. Initial estimations on DTE(SP) proved that the concept suggested by HQLF to use ADSL was flawed due to the unsuitability of the copper infrastructure across the Plain⁵. This, combined with the bandwidth requirement of a single VoIP call (64 kbit/s)⁶, meant that asymmetric services at 512 kbit/s would be restricted to one outgoing call, a service comparable to BRI ISDN when

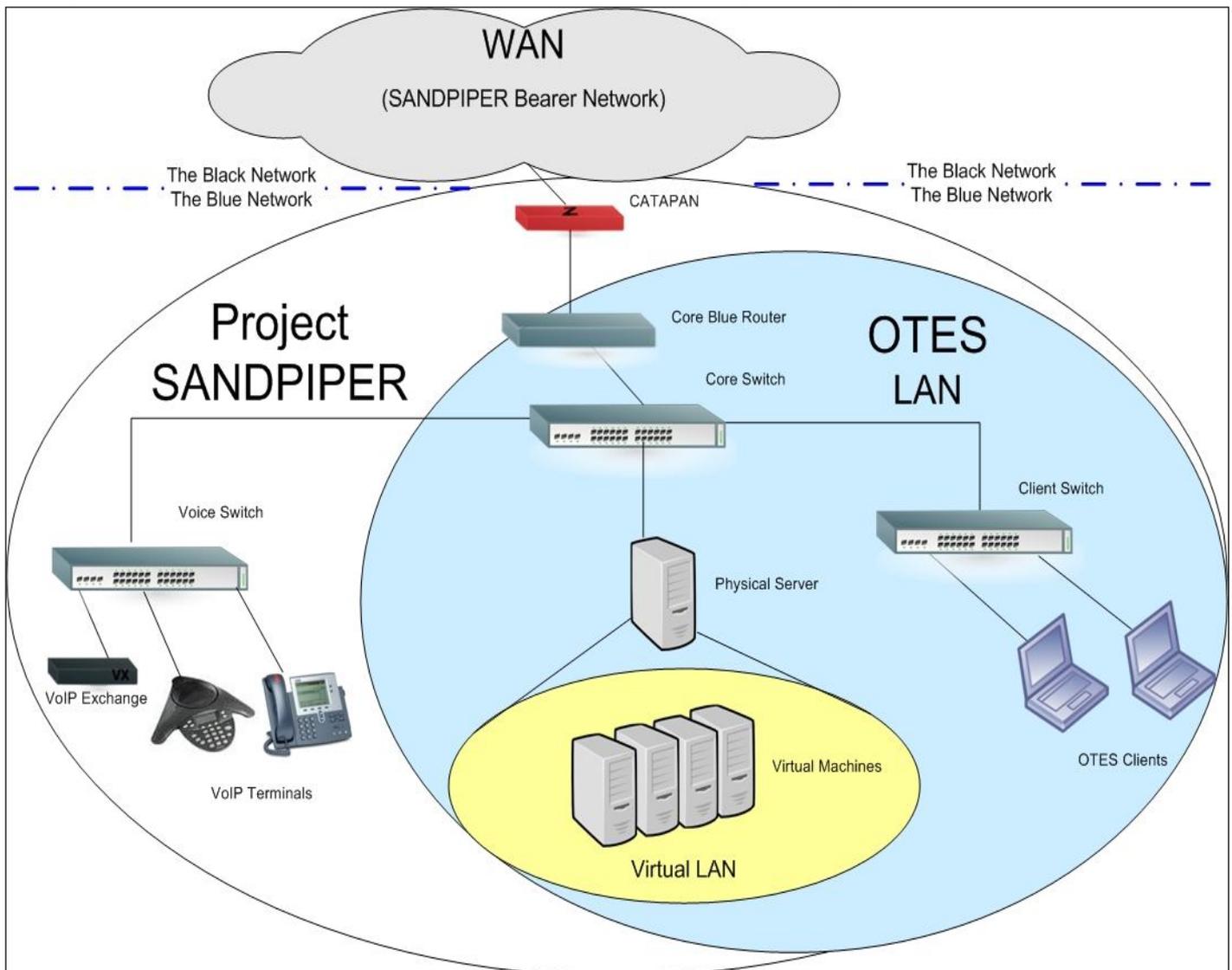
considering contention rates⁷. Prior to the critical decision point on 14th May 2010 there was an agreement with all the relevant stakeholders that the network architecture would need to change and a total IP radio solution was accepted.

Key Equipments

SANDPIPER equipment is often understandably confused with that of OTES. OTES equipment (the "Blue" network) was already in existence and is used to connect to the SANDPIPER cloud (the "Black" WAN) via the IP encryptor. The exception is the voice network which sits within the Blue network by means of a VX VoIP Exchange which connects to a separate Cisco 3750 Switch, which in turn connects to the OTES Core Switch. In order to prioritise the voice traffic over all other data services, Differential Services Code Point's (DSCP) Expedited Forwarding was set at every Router to prevent packet loss in times of congestion. Generic Routing Encapsulation (GRE) tunnelling was required for the CATAPANS to create secure virtual tunnels and to keep the circuit alive, with the tunnels further

configured to have a dedicated 30% bandwidth to all voice calls.

The bearer network (the Black UNCLASSIFIED bearer) comprised of a CISCO 2811 Router connected in most instances to multiple RADWIN IP radio links, the same Direct Line of Sight (DLoS) radios that were concurrently being trialled as part of Project KESTREL. The radios operate at Layers 1 and 2 of the OSI model, capable of 100 Mbit/s full duplex on a single carrier frequency, which far exceeds any bandwidths provided by FALCON or Cormorant radios⁸. These bandwidths are achieved by using Orthogonal Frequency Division Multiplexing (OFDM) which has a single frequency carrier with multiple sub carriers spread over a 20 MHz frequency band. This combined with a Multiple Input Multiple Output (MIMO) transmitters and receivers increase this further. The radios support a multitude of antenna arrays (monopoles, Yagis, reflector grid etc). In the instance of SANDPIPER, a parabolic dual polarised antenna is used to provide a gain of 28 dBi (advertised effective range of 120 km), with each polarisation effectively doubling the bandwidth. The radios can also



Sandpiper Configuration

be configured to form an aggregate simplex bandwidth of 200 Mbit/s, or configured with up to 8 radios inclusive of antennas to form a singular high capacity data link.

As broadcast storms are a problem with the RADWIN equipment, it is crucial to ensure that each radio has its own dedicated WAN port on the router to manage the flow of traffic. Frequency fratricide is another problem, difficult to test against early in the project as there were only limited quantities of radios available. This was overcome using traditional methods of spatial separation, frequency separation and when all else fails, a facility called Hub Site Synchronisation (HSS). HSS prevents mutual interference from co-located antennas by preventing a transmitter from overpowering the receiver when information is being passed. It does this by synchronising every co-located radio to transmit and receive at the same time, with one radio being configured to be the master which then provides the RFP⁹. This was extensively used during the Exercise phase where antennas could not be sufficiently separated.

The radios and their antennas are mounted together on the mast with a minimal spatial requirement of 1m. In certain locations (Westdown Camp and Copehill Down Village), fixed infrastructure was installed, with the equipment either mounted on the 46m mast at Westdown or using manufactured masts (designed by a Royal Signals soldier and built by 3 Division HQ & Signal Regiment LAD) on the Church tower at Copehill Down. All the remaining sites used deployable 12m Cormorant masts trialled during the Project and found to be the most suitable. Two locations were inaccessible by DLoS, therefore two 30m masts were ordered to allow them to be accessible to the network. They brought additional training value to the deploying squadron as it allowed recently qualified Riggers to gain experience of working at height under real time pressures.

The servers used in OTES are virtualised using VMware's ESXI as the hypervisor¹⁰, allowing 12 virtual machines to be added to a virtual LAN at each PoP. Apart from hosting the common servers, JChat, Wiseweb, JADOCs were all hosted locally and managed using VMSphere and unlike previous exercises this was installed and managed by CS Eng's¹¹. Prior to commencement of the Project there was much anxiety over whether or not Royal Signals soldiers would have the skill sets to build and administer the virtual servers, this however was unfounded and in fact it was the inverse, with the soldiers outperforming all expectations.

Training

Training the Campaign Signal Regiments (CSRs) was a priority and the training package delivered was designed to spread the knowledge base on both OTES and SANDPIPER, which would in turn ensure the smooth deployment for 16 (AA) Bde FTX. Two weeks were factored in to the Project for cascade training, with two days dedicated to each CSR for their CS Eng's and CS Ops. A classroom was created at Westdown Camp where a training suite containing 3 PoPs was established for training on the servers, the VX Exchange, IP Tunnelling through CATAPANS and the advanced configuration of the Routers. The CS Ops received practical training on how to engineer the radios in a controlled environment as well as in the field, over differing ranges. Training was delivered by members of the Core team who had only eight weeks prior experience and delivered the training from scripts and lesson plans, all written from scratch by Royal Signals JNCOs.

The Delivery

The build phase began only two weeks prior to STARTEX, with all PoPs being deployed in the first 11 days by 24 soldiers from 202 Signal Squadron, the future Helmand ICS Signal Squadron (HICSSS). This figure rose to 70 personnel during the exercise phase, a stark contrast to the 230 deployed on the 2 Signal Regiment MRX, whose delivery was not representative of Theatre. HICSSS provided nearly 200 terminals, 12 printers, 145 VoIP phones and 19 FEPS generators to form 10 LANs distributed over DTE(SP). Each LAN had a minimum connectivity of two radio links to the WAN with a bandwidth averaging 85 Mbit/s full duplex. For realism, this was later reduced during the latter stages of the FTX to directly relate to speeds available in Afghanistan.

The network was built to provide ICS services from Brigade down to Company, as well as providing a G6 presence from Joint Force CIS (JFCIS), HICSSS and FOB ICS Detachments. The latter meant that those deploying to FOBs could work alongside the other Arms and Services they will be deploying with, an opportunity OC 202 Signal Squadron, Major Mike Parke, was keen to exploit. This had not happened on any previous MRXs before, which allowed working relationships to form early between ICS detachments and BG and Coy HQs. This level of functionality was only possible due to the huge amount of planning and de-confliction with DTE (SP), Field Training Unit and the deploying Battle Groups.

JFCIS and HICSSS were able to manage their troops

and assets from afar, with real time geographic and movement constraints. HICSSS monitored the network using What's Up Gold, exactly the same as in Theatre. Any changes to the network or incidents were logged by the Bastion service desk and escalated if required. All faults were rectified at source in the first instance, logged at the local service desk and then escalated if required. Second Line support was then tasked using the Bastion FRT and in instances where they couldn't resolve the incident, it was passed to Third Line where it was tasked by JFCIS. All processes followed SOPs based on theatre and where possible in accordance with Joint ICS Operating Framework (JICSOF) methodologies.

Summary

SANDPIPER is a mobile, scalable and versatile system that can be deployed at short notice with a relatively small amount of resource. All these factors, together with high bandwidths, make it the perfect Bearer of Opportunity for future Exercises and Operations. When connected to OTEs with the presence of exercising troops, it forms a useful test and integration network for future applications as well as an outstanding system for CIS enablers about to deploy on Operations. The change in ability of the soldiers was visible, as they grew in technical ability and stature over the three weeks. The number of faults reported by the last week of the Exercise was far less than the first, indicating that the soldiers were becoming more competent and confident with the equipment. The Commanding Officer 3 Division Headquarters & Signal Regiment was able to enjoy the flexibility and training resource that it provided on a live network, where he could exercise his regiment without constraint and with realism.

The success of the project is due in no small part to the determination and enthusiasm of the Project Team, 11 Signal Brigade, 3 Division Headquarters & Signal Regiment and the continual support provided from across the Corps. The Project was owned by 11 Signal Brigade, delivered by 3 Division Headquarters & Signal Regiment, and designed and implemented by typical Royal Signals soldiers, who from their core skills delivered a successful product. SANDPIPER was delivered on time, within cost and to requirement.

Acknowledgments.

It is appropriate to give credit and thanks to individuals and organisations that helped shape, provided advice and offered continual support throughout the project; Colonel Cole and Major Toft at HQLF for providing the equipment and the funding at short notice, CSD-Nets for assisting in the design of the network and providing

professional advice, CISTAT and FTU for all their help on the Plain and liaising with the BGs, LICSG for advice on the IP schema and VoIP solution and finally the Installation Technicians at 10 Signal Regiment, for all their outstanding work.

¹ Business Case for Bearer System for OVERTASK Emulation in Sp of Op HERRICK MRX Dated 05 Feb 10.

² Introduction of VoIP in HERRICK 9 and the increase in available bandwidth through Reacher.

³ Business Case for Bearer System for OVERTASK Emulation in Sp of Op HERRICK MRX Dated 05 Feb 10.

⁴ Conducted at LSRC, Blandford and the Defence Academy, Shrivenham 01 – 26 May 2010.

⁵ Project SANDPIPER Checkpoint Report 002 Dated 24 Apr 10.

⁶ Bandwidth dependant on Codec. 64 kbit/s used as a planning assumption.

⁷ MOD Broadband services restricted to 512 kbit/s with a contention rate of 20:1.

⁸ FALCON can provide 54 Mbit/s using short range radios and Cormorant Medium Range Radios 8 Mbit/s

⁹ Radio Frame Pattern (RFP).

¹⁰ A hypervisor is a virtual machine monitor system that allows multiple Operating Systems to run on a single platform.

¹¹ C2BL built the Gold disks and created the templates for the virtual machines

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.

Original quality photographs and diagrams should where possible complement the text.

The can be sent as jpeg files by e-mail to rsi@royalsignals.mod.uk. Please note that the deadline for submission of articles for the Spring 2011 edition of the Journal is 21 March.

DII(FD) – A THREAT OR OPPORTUNITY FOR THE FUTURE?

By Lieutenant Colonel Richard Giles



Lieutenant Colonel Richard Giles is currently leading Deployable Information Systems Group within the Command Support Development Centre in Blandford Forum. The Group is responsible for the capability integration of DII(FD) and JC2SP, and advises on the maturity of DLODs at acceptance. He would like to acknowledge the assistance of Major Will Cramer in writing this paper, who leads on Concepts and Doctrine, and Experimentation within the Group.

BRIEF SUMMARY

DII (FD) is the deployable element of DII, which replaces the single and joint service Information System (IS): JOCS (GS), RAFCCIS (latterly DII (C/D)) and RNCSS. It provides a single IS that spans the fixed and deployable environments, enabling the operational Commander and his staff to seamlessly exchange data and work collaboratively with their contemporaries across Defence. In terms of the NEC Benefits Chain, it addresses many of the networking requirements which will enable commanders to make better and timelier decisions. However, this comes at a cost and there is a need to understand some of the “threats” or technological and procedural challenges that have to be addressed if those benefits are to be realized. This paper seeks to highlight those areas so that those managing and providing the services offered by DII are able to ensure that the “threats” are turned to “opportunities” for the end user.

INTRODUCTION

Nothing in life comes without a cost or consequence and the Defence Information Infrastructure (Future Deployed) (DII(FD)) is no different. The challenge to the Royal Signals is in understanding the challenges that the DII capability brings, so that the opportunities can be optimised. If these challenges are not understood, they will threaten the delivery of the capability we seek

to provide. Properly understood and addressed, they provide us with the opportunity to reap the full potential of the capability we are delivering.

I will begin by providing a brief summary of what DII(FD) is, the elements that make up the capability before examining the benefits and challenges in realizing those benefits. DII(FD) provides a single deployed information system, connecting the defence-wide fixed DII system to the tactical BCIP capability. DII(FD) will also link to coalition forces via UK-based gateways, and to Bowman through in-theatre connections. It plays a key part in achieving the “better networks” component of the Network Enabled Capability (NEC) Benefits Chain and facilitates the “better information sharing” component, leading in turn to “better decisions, actions and effects”. A single defence network will also provide the means by which Computer Network Defence (CND) Policy can be implemented more effectively and the network can be monitored more efficiently. In the following sections, the key elements of this architecture that impact Royal Signals will be highlighted before looking at the major challenges that must be addressed.

This paper will limit its scope to those challenges that lie within the current contract. Two areas which currently lie outside the contracted solution and are attracting significant interest are the debate over Mission Secret and SUKEO (DII(FD) will be accredited to the latter) and the weight and volume of the deployable node, which is too great for it to be a truly mobile capability. These are both the subject of further work by Cap CCII, and it is acknowledged that both play a significant role in achieving the overall success that the architects of the capability sought to provide. They will not however be considered further within this paper.

BACKGROUND

What is commonly referred to as DII(FD) is part of increment 2b of the DII programme. It will replace the deployed Joint Operations Command System (JOCS), RN Command Support System (RNCSS) and RAF C2 Information System (RAFCCIS)¹. Whilst the terminals will be replaced on a one-for-one scaling, MOD is not procuring equipment through Atlas, but services at agreed performance levels. In order to manage those services ATLAS provide a number of support organisations: the Deployment Planning Service (DPS), the Deployed Service Management Team (DSMT) and the ATLAS Service Support Group (ASSG). The DPS advises on the design of the IS network configuration for particular operations and Service Level Management. The DSMT acts as the single point of contact for 3rd and 4th line support to the deployed

environment and provides a link to 3rd party suppliers as required. The ASSG provides service support to the equipment in home bases.

Available services include core windows based Office Automation (OA) applications and an Application Hosting Environment (AHE) which can host the 3rd party applications (such as ICC, JADOCs, C2PC). Across the 3 environments (Fixed, Deployed and Maritime) these services will be hosted on a common kernel of software with a similar tiered architecture of nodes and User Access Devices (UADs). The ability of DII nodes to operate across the Transport, Network and Data Link layers allows the applications to exchange data directly across bearers of opportunity in theatre or back to the UK. This represents a significant opportunity over the legacy systems as shown in Fig 1.

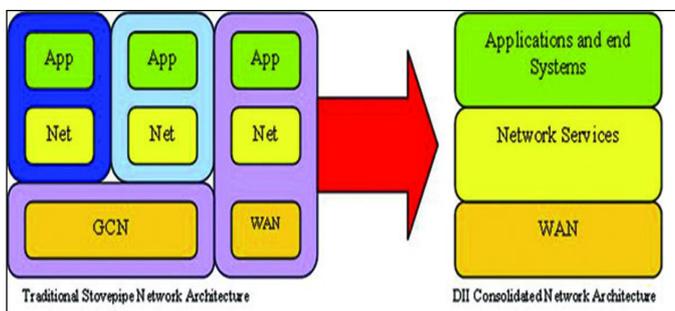


Fig 1. Legacy Stovepipes v. DII Consolidation

The wider DII programme is a modular tiered architecture scaled to suit different end-users. DII(FD) will use Type 2 and 4 nodes depending on the type of operation and requirements of the user. Type 2 will provide large deployable Local Area Networks (LANs) with system resilience, replication and disaster recovery. This will also give deployed users the ability to work autonomously. The DII(FD) LAN can be connected through a bearer of opportunity to provide Wide Area Network connectivity to other FD nodes and back into the fixed. Type 4 nodes as shown in Figure 3 will be allocated to support smaller numbers of users e.g. an Operational Liaison and Reconnaissance Team (OLRT).

DII (FD) will utilise Military Service Providers (MSPs) who will be trained military personnel acting as deployed technical support staff. They will be responsible for delivering DII(FD) capability into the deployed environment whilst also providing local maintenance and service restoration in line with the Joint Force Communications and Information Systems(JFCIS)/ Joint Network Centre (NETCEN) model described under JDP 6.00. In addition, Specialist Support Personnel (SSPs) will be trained to provide specialist support to hosted applications and services



Fig2. Type 2 Node

such as Collaborative Working Tools, Command and Control applications and tools providing Shared Situational Awareness.

In order to deliver MSPs into the field, specific units from all three services have been selected to provide Group Homes (GHs). The MSP GHs will be based at Fleet CIS Support Unit Portsmouth, 3 Cdo Bde RM, 1 (UK) Armd Div Sig Regt, 3 (UK) Div Sig Regt, 2 Sig Regt, 30 Sig Regt and 90 SU RAF³. Other Regiments (7, 16 and 21 Sig Regts) will be trained as MSPGs, which will provide them with the ability to deploy with DII nodes and UADs, but the equipment will not reside within their unit lines.



Fig 3. Type 4 Node.

OPPORTUNITIES

DII (FD), through its consolidated network architecture reaches across operational theatres and back into the UK. This facilitates the first 3 links in the benefits chain, shown in Figure 4, those of “Better Networks”, “Better Information Sharing” and “Better shared understanding” which then lead onto the “Better decisions , actions and effects”. The Main Gate Business Case highlights the key role DII plays in delivering these links within NEC and its success as a programme is being measured against its ability to realize these operational benefits, in addition to financial benefits. The first of these links is better networks, in the following sections I will examine in further detail the opportunities that a single defence network will provide.

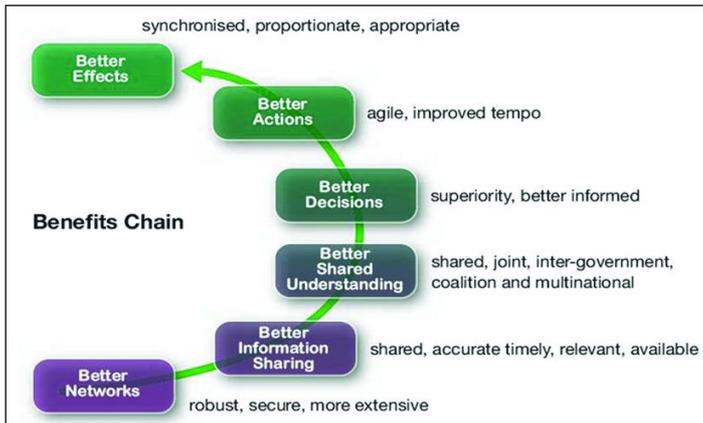


Fig 4. JSP 777 Benefits Chain

Increased Security

Cyber attacks, whether targeted or random, (the latter caused by viruses that are released indiscriminately onto networks) have the potential to cause considerable damage to Defence. This was illustrated with the LoveGate Virus in April 2003, which closed the Defence Procurement Agency⁴ at Abbey Wood for 3 days and required an estimated 10,000 hours of network cleansing and rebuilding. The Defence Concepts and Doctrine Centre, in their Strategic Trends Programme have highlighted the increasing threat that cyber attacks will play in the future⁵.

DII will contribute significantly to the way in which MOD is able to counter this growing threat. A single defence network will provide the means by which CND Policy can be implemented more effectively and the network can be monitored more efficiently. Two key tenets of CND Policy are central co-ordination and defence in depth. The advanced security protocols within Microsoft Active Directory 2003 mean that DII will have CND incorporated into its core architecture. The security configuration will now be key to the protection of information assets in each environment. A single network enables the Intrusion Detection System (IDS) to be monitored and responded to more effectively. The overall health of the system can also be monitored and maintained centrally.

In the past, across numerous different systems, with different application versions, patches and updates was an ad hoc affair and there was little understanding of which systems were up-to-date. This left the overall system very vulnerable, because the security of the system was determined by the strength of its weakest point. With a centrally controlled, defence-wide approach to applying patches, anti-virus signatures and updates, the system will provide a greater level of security, robustness and therefore be able to maintain a greater level of availability.

Service Support

The introduction of DII(FD) brings with it the harmonisation of Service Support and Service Management across Defence. These harmonised models (now represented in the JICSO paper⁶) are implemented through the relationship between the ASSG, MSPGH and DSMT as defined in the DII(FD) Operational Service Procedure⁷. These organisations, working together across the spectrum of Defence reinforce the robust nature of this new system.

MSP Training and Core Skills

A single network across Defence including both the fixed, maritime and deployed environments eases the training burden, particularly if there is commonality between the Restricted and Secret systems. It means the training can be focused on one system and the software version in current use, rather than multiple systems, which use different operating systems and applications at different version and patch statuses. When upgrades occur, training, if required, can be developed and implemented centrally.

Flexibility

A single infrastructure simplifies the way in which applications can be implemented. The IS services available to the user in the deployed environment are configured onto UADs prior to deployment. Further applications and services may be requested once deployed and downloaded from the node direct onto the UAD by the user. This facility comes with the premise of centralised control whereby all new demands must be agreed by the Authorised Demander who can make an assessment of the impact on the network. As the DII(FD) MSPs will be dual-trained to support the Applications, the J6 commander in the field has a more durable resource in theatre to resolve potential issues.

Collaborative working

“Better Networks” in turn facilitates “Better information sharing” through the wide suite of OA applications such as Windows Sharepoint Server (WSS), which it provides. The benefits of team site working have been recognised across defence and MOSS 2007, which provides greater functionality, is expected on DII(FD) in 2011. However the full benefits will only be realized through the hosted application sets such as JC2SP, which will provide the major set of military operational and collaborative planning tools.

REALIZING THE OPPORTUNITIES

These opportunities are achieved through 4 main elements. They are a single physical network,

commonality through a single Defence-wide solution, the collaborative working tools that are part of the core application set and MS Active Directory.

Single Network

A single “Better Network” is achieved by replacing multiple legacy single service deployable IS with a single DII (FD) system (Figure 1). This minimises the number for gateways and the interoperability issues that have to be addressed when different networks communicate with each other. Whilst the underlying physical layer maybe different, the experience of the user is common in each environment. DII (FD) will follow the same architecture as DII Fixed and Maritime. The ability to work in a low bandwidth environment, a key user requirement, is the main difference with the fixed system, and this requirement drives the design of the deployed solution.

“Better Networks” will facilitate “Better Information Sharing”. Minimising the number of gateways, ensures that, subject to bandwidth constraints, users can exchange emails, publish and access data across that network, whether they are sat in UK Regimental HQs, a Main Operating Base waiting to embark, in a deployed Operational HQ or a Forward Operating Base.

Commonality Through a Single Defence-Wide Solution

Regardless of environment the solution is the same basic build on common platforms albeit in different configurations. The common software base facilitates the configuration control of patch releases, and Anti-Virus (AV) updates that are centrally distributed and monitored. It also eases the training support requirements. This provides the user community with greater flexibility and mobility, in that they are able to utilise the same tools in any environment and there are greater opportunities for data exchange.

Application Hosting Environment

DII will provide an increasing number of core applications and an Application Hosting Environment (AHE) upon which 3rd party applications can be hosted. The core applications includes standard MS Office, email client, web browsing, and in later software drops collaborative working tools such as MOSS 2007, messaging (Medium Grade), document and records management etc. These applications will be available across Defence on the Fixed, Deployed and Maritime infrastructures.

The AHE, provides an environment within which specialist applications can reside. The benefit of them

residing in a single hosted environment is that they can all draw upon the same middleware services, interoperate with each more effectively and share common data. Support, maintenance and monitoring of these applications is also made more efficient and effective.

Microsoft (MS) Active Directory

DII supports the ability of users to log-on wherever there is a DII terminal. This is achieved through the MS Active Directory User Authentication and Directory Replication, which check the user-name and password with the Parent Node. In the UK, wherever you log-on, your user details are checked at the Tier 1 node in either Mitcheldean or Boddington. Once authenticated, DII then downloads your profile so that your desk-top is the same as when you last left it, wherever that might have been and whatever applications you may have had installed.

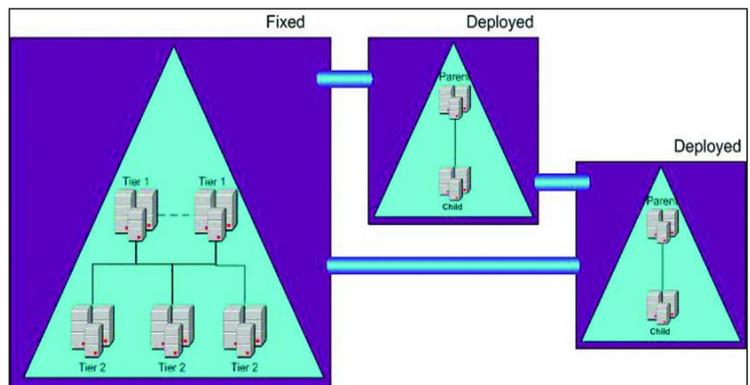


Fig. 5 Forest, Domains and Trusts

As shown in Figure 5, Active Directory supports what is termed forests (purple boxes) which consist of a single parent node and multiple child nodes, with the child node taking the permission sets from the parent. This construct provides the administrator with control of security throughout the forest and administration rights over the whole domain (blue triangle). Trusts can be established between forest to support the exchange of data between servers and users, but they have to be configured. As each forest is instilled with its own security boundary, the separation of Fixed and Deployed into their own forests provides an element of protection through which access must be actively granted.

CHALLENGES

Whilst DII brings significant benefits there are also challenges. If the benefits are to be realized, these challenges must be understood and addressed. These challenges will now be considered.

Complexity

In order to provide the user benefits described, there is a cost, and that comes in the complexity of the system

that is supporting these benefits. DII(FD) will be providing the same user services as that experienced by users of DII(F), but instead of fixed nodes that are built once and maintained by UK contractors, deployable nodes are built from 2-man portable modules, configured before deployment, broken down for transit and then rebuilt once deployed. The level of complexity is reflected in the build time that the system requires once the boxes have been physically plugged together. The expected requirement is 15 days. If however, there is a problem with the software build process, the whole process has to restart.

The complexity of the system will have an impact upon the ability to respond rapidly to changes in its physical architecture. Key areas of concern are: Forest Architecture, Node Designation and the Information Layer. This is because the Active Directory and WSS configurations are embedded throughout the node and it may therefore be simpler to clear down the hardware and rebuild from scratch than to attempt to re-configure on the fly.

MSP requirement

This level of complexity requires greater skill levels from our soldiers. Within Royal Signals, the Comms Sys Engr is the trade group that will support the capability. It should be noted that the support they provide to DII(FD) maybe in addition to support they are providing to other CIS (Communications and Information Systems). Their ability to master the skills required is being closely monitored throughout the trial process and the current indicators are that they are rising to the challenge. However we cannot be complacent and there is a need to both ensure that they not only receive the correct training through core Trade Training modules and equipment specific training, but that those skill levels are maintained in line with contract requirements. Having received the training, skill fade is then likely to be a major issue. As with Reacher, which is provided through Paradigm, the military operator must stay current or their administrator rights will be withdrawn. Once fully trained, our soldiers will be very employable outside the Army, retention could be an issue if their contribution is not recognised and they are not appropriately managed and incentivised.

Campaign Signal Regiments

The Regiments designated as MSPGHs was decided before the decision to form Campaign Signal Regiments (CSRs), and the number of MSPGHs initially rolled out has reduced from 4 to 2⁸. As a consequence only 1 of the 5 CSRs will be equipped as an MSPGH, the remaining MSPGs will have no equipment under command. They will need to make special

arrangements to maintain the currency of their MSPs and prevent skill fade.



Fig. 6. MSPs working on an early version of a Type 2 Node.

IM / IX

Information Management (IM) / Information eXploitation (IX) and its underlying data architecture requirements are poorly understood by all communities and there is a need for training and education in this area. This applies to both the user and enabler communities. Incorporating IM/IX training into trade and young officer training would remove much of the mystique. It would enable us to engage more effectively and deliver to the commanders and their staff the services they require, packaged in the way which best supports them.

DII(FD) has the ability to deliver the capability to effect “Better decisions, actions and effects” through a “Better shared understanding”, but the benefits will only be successfully realized if we are able configure the network to support those tools and we understand the users’ business such that the tools can be configured to support effective ways of working. These ways of working move us into the area of IM/IX, where there appears to be a stand-off between the Ops and CIS communities, with neither willing to take a lead, both seeing it as the business of the other.

This stand-off is a result of the lack of perceived value placed on the vast amounts of data managed on the combined network. Within the Signals community, we look to the Ops community to optimise the IM/IX tools and applications we are “enabling” in the way in which best suits their business. If this is done effectively it will invariably lead to a change in the way in which they conduct their business. However, the Ops community are fully occupied fighting battles, which is their core business, and configuring applications and IM/IX are often seen as diversions to that Main Effort. There is a need for engagement, I would suggest not by taking IM/IX into the “6” world, but for us to be

working alongside the “3” world to achieve some quick wins and then gradually growing the interest so that the full benefits can be realized.

Provisioning Requirement

In order to support the Active Directory sign-on requirements without overloading the available bandwidth, user names together with their permission sets will need to be configured onto the nodes prior to deployment. Identifying which user names have which roles and permissions is the responsibility of the i-Hub manager, and this information will be supplied to the DPS during the operational planning phase. Atlas use this to produce XML Schemas, which the MSPs will be responsible for implementing (provisioning) onto the node.

To work effectively i-Hub staff must understand the future requirements of staff users. In time, it is likely that templates will be produced but like many IMIX activities it often fails to compete effectively with the other demands being made upon busy staff officers. If this is the case with DII (FD), then staff officers and commanders will not reap the benefits that it could offer and instead they will become frustrated with constraints that are imposed upon them and its failure to deliver NEC benefits.

Architecting

If the applications are to work effectively, thought must also be given to the data architecture. Collaborative working tools are dependent on data and the ability to access that data in a timely manner. Whilst a single defence network addresses the requirement of access, thinking through the data architecture will ensure that it is accessed efficiently. There are ever increasing demands upon bandwidth and a poor data architecture will add to these problems. Where should data be stored if it is required by multiple applications over multiple sites? How much should be replicated in order to support autonomous working? When should it be replicated? Does all of it need to be replicated continuously? Many processes: medical, logistic, and administrative, as well as ops/plans require dependencies on UK data, which place greater demands upon SATCOM links.

Consideration of the application Information Exchange Requirements (IERS) and provision of a Data Architecture are therefore not by themselves sufficient to present an efficient system to theatre. As described earlier, the Fixed and Deployed environments will be constructed as separate Active Directory forests. This allows the system to support autonomous working within the deployed environment. To remove the need for DII(FD) to reach back to a UK parent node for

authentication purposes every time a user logs on, separate deployed user accounts will be enabled on the deployed node. This design relies on the physical layer being constructed to allow in-theatre hubbing rather than routing through the UK. Active Directory user authentication within a domain does not react well to latency, therefore Defence Line Of Sight is preferred to double satellite hops within a single forest. It is these dependencies and constraints across the OSI layers that demand we now acknowledge the importance of planning and the production of architectures for the complete system.

Security Accreditation

Whilst a single network enables security policy to be implemented more effectively it also increases risk by virtue of the size. There are a greater number of users, all of which potentially could introduce viruses either maliciously or negligently. Conversely they could also be victims of an attack and have their work disrupted. Large networks are also more complex in their architecture. All these factors have an impact on the security accreditation calculations. The issue is compounded further, because of the profile DII has and the media interest that would be generated if the nation’s Defence network was compromised. None of this is lost on the security accreditors who by their nature are risk averse. As a consequence gaining accreditation is a long process, particularly where new and innovative technical solutions are being pursued.

CONCLUSION

DII(FD) addresses many of the shortfalls of our multiple legacy systems and forms a key component in the “better networks” link of the benefits chain. It facilitates the “better information sharing” link through a single IS architecture and the collaborative working tools that it hosts. However this size and the complexity that delivers these services, introduce many challenges which if not overcome will prevent the benefits from being realized. Across the Royal Signals and particularly within the G6 Ops staff and MSPs, there is a need to master this complexity. The Ops staff need to understand not only the network architecture, but also the data architecture and application dependencies. Regarding the Comms Sys Engineer who carries out the MSP function, we should expect their role and profile to increase. We are likely to become increasingly dependent upon their technical understanding and skill in building and maintaining the IS networks. Ensuring that they receive the appropriate training and do not suffer from skill fade is vital. We must also be very aware that once fully trained they will be very employable outside the Army.

The role that IM/IX plays is a further area that we can

not continue to ignore. Whether or not Royal Signals wants to play fully in this area, we must understand the issues and how the capability that we are providing needs to be configured to support the IM/IX requirements. Debates surrounding Applications Specialists and IM/IX are discussions in which we need to be actively contributing so that even if we are not leading, we are able to shape the outcomes intelligently, ensuring that the technical dependencies are understood and optimised.

DII(FD) will begin entering service later this year. Whilst there are still many challenges to overcome the opportunities that it offers both to the user community and to the Royal Signals are significant. The immediate challenge to us as a Corps is to ensure that we understand the technical principles upon which it is built, so we are able to optimise the opportunities that it provides.

1 Since the Main Gate Business Case was first submitted, RAFCCIS has been replaced by DII(CD) which is an interim capability. The RAF will still receive a scaling which will replace this interim capability.

2 Adapted from **Barnes, I., Dexter, J., Kapasi, T., Brindley, K., QINETIQ/D&TS/COM/CR0610423/1.2** dated 20 Oct 2006.

3 The designation of MSPGH is included within the DII contract and was made before the introduction of Campaign Signal Regiments and over time these will be aligned. 1 and 3 Div Sig Regts roll-out as an MSPGH has also been delayed until Inc3b together with their scaling of UADs and nodes. This capability has been traded for an earlier roll-out of Restricted UADs and nodes to support an expeditionary SSFI requirement.

4 Now part of Defence Equipment and Support (DE&S).

5 DCDC; Strategic Trends Programme: Future Character of Conflict. DCDC; Strategic Trends Programme: Global Strategic Trends Out to 2040.

6 **CSDC** CI Joint Information And Communication Services Operations Framework CONEMP dated Jan 2010

7 **ATLAS SVC014-001-OSP-High Level Deployed v 2.0** dated 08 Jan 2010.

8 Only 30 and 2 Sig Regts will be provided with MSPGHs. 1 and 3 Div Sig Regts were to be designated as MSPGHs, but their capability has been traded for an early delivery of Restricted UADs and nodes which will reside at 30 Sig Regt. 1 and 3 Div Sig Regts will receive their scaling under Increment 3b, which is currently unfunded.

SPECTRUM IN THE EARLY TWENTY FIRST CENTURY: FROM MANAGEMENT TO DOMINATION?

By Major Paul Flavell

Paul Flavell was commissioned in 1988 into the Duke of Edinburgh's Royal Regiment. He has been a Regimental Signals Officer and instructed at the Signals Wing at the School of Infantry. As a Major, he acted as a Requirements Manager in the Bowman and Digitization Integrated Project Team. He transferred to the Corps in 2001, completed the CISM course, served in the G6 Branch of HQ Land Forces, commanded 237 Signal Squadron (Electronic Warfare) and appointed as Operations Officer of 3rd (United Kingdom) Division Headquarters and Signal Regiment. He is currently SO2 ISTAR/Spectrum Dominance in the Command Support Development Centre (CSDC), Blandford.

Introduction

It may be an understatement to say that Spectrum Management (SM) and the problems of avoiding interference between spectrum users both military and civilian are rarely exciting. It is only when something goes wrong that it makes the headlines; and inevitably they report the spectacular. This article summarises the main pressures on the use of spectrum, how it is managed globally and in the deployed space and how some of the issues are influencing current work.

Value of Spectrum

There has been increasing pressure to the Ministry of Defence (MOD) access to spectrum in the UK from a number of sources. The value of the spectrum in the market place has risen exponentially with the emergence and rapid growth of the mobile telephone industry. And whilst the MOD currently pays about £55m per year for the use of the military allocation, this is set to rise to perhaps £500m in the future.

Ownership of Spectrum

This is the backdrop in the UK where there is sovereign ownership of spectrum. In the deployed space there are additional pressures. In a warfighting operation conducted under the auspices of the United Nations (UN) or at the invitation of a host nation the right to use spectrum on foreign soil has legal standing. Where the civil authority is being established and civil infrastructure is being increased (such as the establishment of mobile networks and TV stations),

military access is likely to be subject to change as civilian users are given increasing access to spectrum. The way that the spectrum is divided between different coalition nations and the need for coordination as operations develop and change is a demanding requirement. The increase in the demands on the spectrum due to military surveillance devices, such as Unmanned Aerial Vehicles (UAVs), has been a marked in recent years on operations in both Iraq and Afghanistan.

Access to Spectrum

Military access to the spectrum and home and abroad is critical and complicated by the fact that it is often the same equipment is often used in both areas, whilst the access to spectrum will vary from country to country. The way that spectrum is allocated is by the broad slicing up of spectrum amongst types of users including the military into a series of non-uniform bands. Globally this is carried out by the International Telecommunications Union (ITU), a specialised agency of the UN. Proposals for change are considered at the World Radiocommunications Conference (WRC) held under the auspices of the ITU.

The next WRC is in 2011 where there will be intense competition for access to spectrum. Not least to support early warning of disasters and communications for disaster relief; particularly in the overall context of increasing disasters due to global warming. If called upon, the MOD has a role to play in assisting with disaster relief and the need to extract information from and inter-work with any new warning and communications systems will be critical to such operations.

There are six international regional groups that are the major players of which the European Council for Post and Telegraph (CEPT) is one. CEPT as the European grouping promotes European proposals. The UK normally contributes to these proposals under the guidance of Ofcom and for the MOD there is a small branch which argues for military access to the spectrum.

The WRC will be examining for the first time the need to regulate free space optical links. The MOD uses optical technologies, particularly for intelligence gathering, but it is an area that is being increasingly exploited for communications. The implications for the MOD of any regulation are hard to predict.

Scarcity of Spectrum

Spectrum in the UHF bands is scarce, yet the MOD would like more than the current allocation. Increased

use of UHF for UAVs and for data communications to support combat net radio and individual soldier communications are examples of recent new uses. However, perhaps the highest priority use for the UHF spectrum by MOD is for support to UAVs and there is a specific proposal to integrate UAVs into the same environment as manned platforms. This would mean that the MOD will need to abide by civilian regulations, including the use of standard frequencies in civil airspace.

A number of regulatory reforms are under debate intended to ease the introduction of new technologies. The convergence of radio technologies, such as that represented by Software Defined Radio (SDR), will present a wide range of new technology applications. This, in turn, will increase the challenge faced by the traditionally inflexible definitions of spectrum usage used by the ITU. SDR in particular is of great interest for potential future communications and electronic warfare (EW) systems.

Managing the Spectrum

Whilst more applications for new technologies are placing increasing demands on the regulatory framework, from a military standpoint our doctrine needs to be significantly revised to remain relevant. The term Spectrum Management (SM) has overtaken the narrower definition of Frequency Management (FM) and is used in an attempt to recognize the broader usage of the spectrum by non-communications users. However this has not really changed the traditional communications-centric approach to SM. Spectrum management essentially remains a process where allocation is from the highest level while de-confliction is conducted at the lowest levels in an almost exclusively reactive manner.

Spectrum Management is now enshrined in Joint Doctrine as a subset of Battlespace Management (BM) and is primarily a J3 function. It requires close liaison with key spectrum stakeholders including amongst others, the Frequency Manager (FM) in the CIS branch of the headquarters, Electronic Warfare (EW) and SIGINT (SI) and J2 ISTAR (Intelligence, Surveillance, Target Acquisition and Reconnaissance).

A New Spectrum Concept

Even Spectrum Management is too narrow a term if we want to understand how to dominate the use of the spectrum. Is 'Spectrum Dominance' (SD) the term around which we can coalesce? A new concept is required encompassing the full range of spectrum activities to include all the measures and effects of

Electronic Warfare (EW). And this comes at a time when there is broad recognition that our EW doctrine needs to be revised in the light of recent operations. There is a need to develop a concept that draws together all stakeholders in the battlespace (this suggests perhaps the term 'Spectrum Operations' (SO) or 'Spectrum Exploitation' (SE)). This would be to ensure synchronization of effects into a coherent campaign, where Spectrum Operations forms a line of activity in concert with overall operational planning. Development of this concept therefore forms part of our current work in the Command Support Development Centre in Blandford.

References:

1. *UK Defence Spectrum Management A Consultation on: An Implementation Plan for reform, dated 30 May 2008.*
2. *ABCA Spectrum Management Conference 4-8 October 2009*
3. *E-Tips article by Dave Eden and Kes Hughes (QinetiQ) 2008.*

¹ Joint Doctrine Publication 6-00 Communications and Information Systems Support to Joint Operations

STANDARDISED VEHICLE ELECTRONICS TERMINAL EQUIPMENT (SVELTE)

By Lieutenant Colonel (Retired) Dr Richard Skaiife



Following a first career in the Corps, Dr Skaiife is now an independent consultant and this article is based on his experience as lead systems architect responsible for designing an aeronautical information system for a major European airline. This article is copyright.

Introduction

Brigadier Steve Vickery's article in the RSI Journal Spring 2010 about disassociating platforms from purpose invites a response. This article uses the authors experience as Systems Architect for aeronautical network systems for on board information services to a major European airline to illustrate how concepts used in the civil aeronautical environment can be applied in the military environment - with the potential for far reaching consequences.

Background

The concept of standardised network systems on board aircraft has been used in the aeronautical environment for some time. One of the main drivers for this approach is the requirements for flight certification of hardware, firmware and software. Certification is a costly process and is required for each device used on board and aircraft. Furthermore each time a modification is made (to hardware, firmware or software) – recertification is required. The extent of certification depends on the criticality of the component and there are standards and certification criteria very clearly defined by the airworthiness certification authorities for each case. The concept of standard hardware platforms and virtual applications has been developed to reduce certification requirements. One hardware platform can be used for a variety of applications – therefore only the software application needs certification. The same hardware platform and software configuration is used on different aircraft types and only the installation kit is aircraft specific. If the application is not flight control related – such as cabin services (in-flight entertainment, passenger flight information services, on board mobile phone and internet access services to name a few) then the certification requirements are less stringent and in many cases where software upgrades are made – re-certification can be done by notification and does not

require a full re-examination and test. There are a number of implications of this approach, common hardware firmware and software components and migration of logistic and support requirements from a hardware environment to a software environment. The logistic requirement for purpose specific hardware is reduced by reducing the number of physical devices. The logistic load moves from application specific devices which have unique hardware, firmware and software to common hardware and firmware devices and purpose specific software. The hardware and firmware components are common to all platforms and in many cases software components have common elements as well. The aeronautical environment has a variety of industrial standards which come under the ARINC (Aeronautical Radio Incorporated) portfolio of standards. There are several ARINC accepted and draft standards which specify standards for aeronautical software management, security and airborne networks. The most relevant standards are listed below.

- ARINC 821 (Draft) Basic Services
- ARINC 830 (Work in Progress) Air Ground Information Exchange for IP Communication (AGIE)
- ARINC 429 Digital Information Transfer
- ARINC 664 Aircraft Data Network
- ARINC 615A Software Data Loading over Ethernet

This paper is a concept document which uses a vehicular environment to illustrate how the concepts used in the aeronautical environment might be applied to the terrestrial military environment. The paper has been submitted to the UK Defence Research Organisation under the name of Standardised Vehicle

Electronics Terminal Equipment (SVELTE).

Military Vehicles

Modern military vehicles have a wide portfolio of function specific processing systems; from vehicle electronics through to role specific systems (e.g. fire control, situation awareness, location management and communications). A significant proportion of these functions are implemented as software and there are many discrete components which support these software applications. These components vary by vehicle type and by vehicle role. The SVELTE concept is to virtualise these applications and run them on common processing platforms.

While the focus of this concept is on the individual vehicle, it is necessary to look at the wider system architecture to put the vehicle specific architecture into context.

System Architecture

The system comprises of

- a. Vehicles. Each vehicle will have a local area network.
- b. Area Communications System connecting the vehicles to each other and to appropriate functions. The area communications network would need to support (packet) data services (typically using Internet Protocol). The minimum functionality which would be required is a messaging function. It is assumed that the necessary confidentiality, availability and integrity capabilities are implemented. The extent of the area communications and connectivity boundaries are not

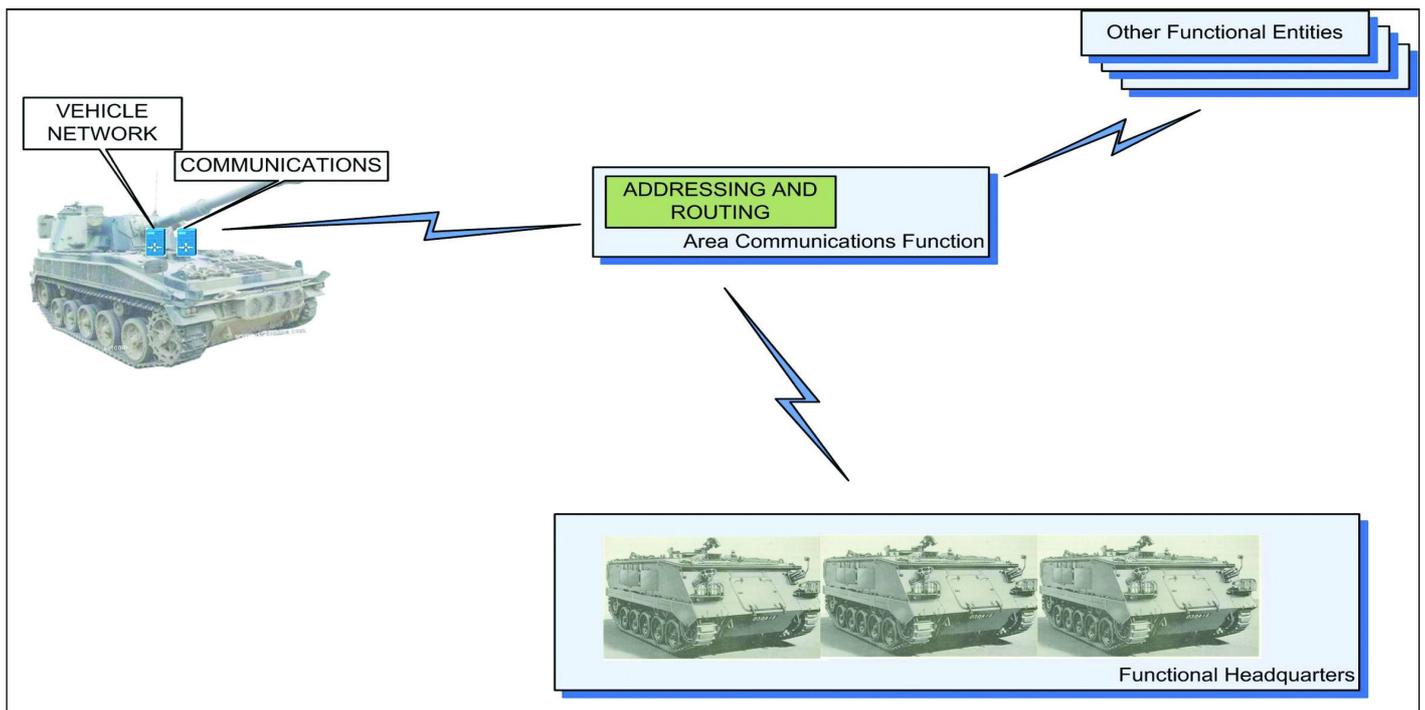


Fig 1 - Simplified SVELTE System Architecture. Vehicle Architecture

directly relevant to the concept although the article which provoked this response is specific to CIS platforms.

c. Functional Headquarters. For the purposes of this submission, the “Functional Headquarters” is generic, and the topic of indirect fire control is used as a practical example of a function.

Although Figure 1 shows a one to one communications link, in reality communications would cover a much wider scope with sessions being supported between many endpoints depending on the function(s) deployed. Figure 1 illustrates the conceptual system architecture.

Each vehicle, irrespective of role, would have:

a. A layer 1 and 2 vehicle local area network (LAN).

b. An Ethernet Switching Unit (ESU) connecting the local area network elements.

c. A number of standardised Host Processor and Storage Units (HPASU). HPASU is described later in the document.

d. A Systems Management Function residing as a virtual application on a Host Processing And Storage Unit (HPASU). The functions undertaken by the Systems Management are described later in the submission.

e. A communications function residing as a virtual application on a HPASU. The extent to which communications applications could be virtualised would need to be investigated. It is envisaged that there could be RF inputs and outputs as part of the HPASU interface. In addition OEM equipment could, subject of course to size, weight, environmental requirements and input output requirements, be repackaged to fit inside an HPASU case. The concept of virtualised applications hosted on standardised platforms is already employed in the aeronautical industry and one implementation of provision of GSM services on board aircraft uses an OEM base station controller repacked inside a standard 2MCU unit. (A “2MCU” unit is a standard aeronautical hardware case as defined under ARINC specifications).

f. Vehicle Electronics functions residing on a HPASU as virtual application(s). For example engine management.

g. Human and machine interface devices. These interface devices would connect to the virtual applications via standardised interfaces. These interfaces would be standardised at all layers so that the interface to the HPASU which drives the interface device is

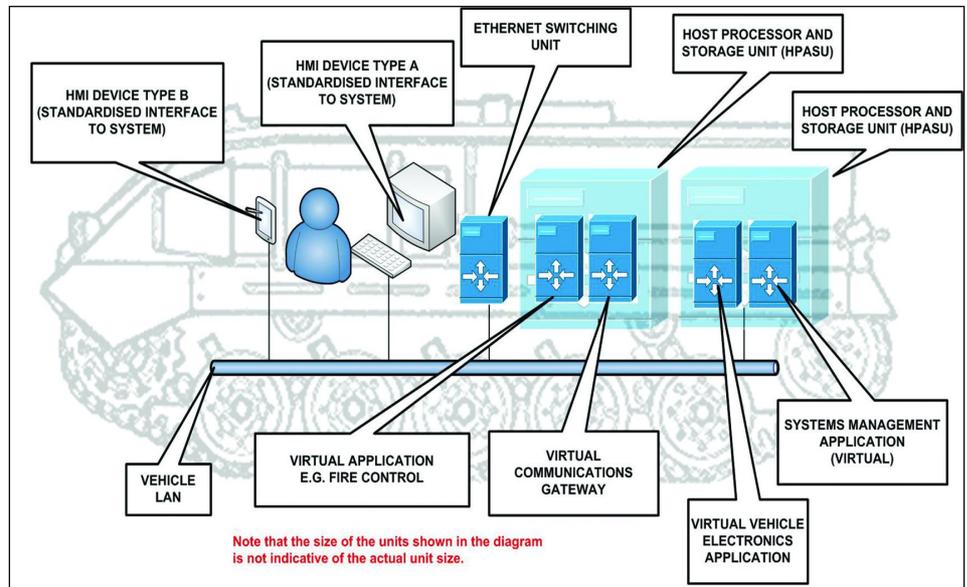


Fig 2 - SVELTE Vehicle Architecture. Host Processor Architecture

standardised.

Role specific applications would then be implemented as virtual applications as appropriate: Role related applications such as fire control, residing on the HPASU as a virtual application. The vehicle architecture is shown schematically at Figure 2.

The HPASU is envisaged to be a computational unit with data input and output via a portfolio of standard interfaces (e.g. 802.1 Ethernet, USB port, optical, power input, possibly RF input and output). It would have a base processing capability, volatile and non volatile storage (RAM and solid state discs). Resident on the unit would be a host operating system (HostOS). Each HPASU, before any virtual environment is loaded, is identical. The process for entering operation is outlined later.

Base operating unit services run on the HostOS; these would typically be unit BITE, SMNP, Configuration management reporting.

Virtual environments would be created on this Host OS (e.g. XEN environments) which interface to the host via virtual ports at layer 2 and above.

The virtual environment would host the function specific applications.

There is the opportunity to input information by a number of discrete inputs as well as analogue and digital interfaces. The specification of these interfaces requires further research and analysis, suffice it to state at this stage the concept that they comply with a standardised interface.

A concept for the HPASU is shown in Figure 3.

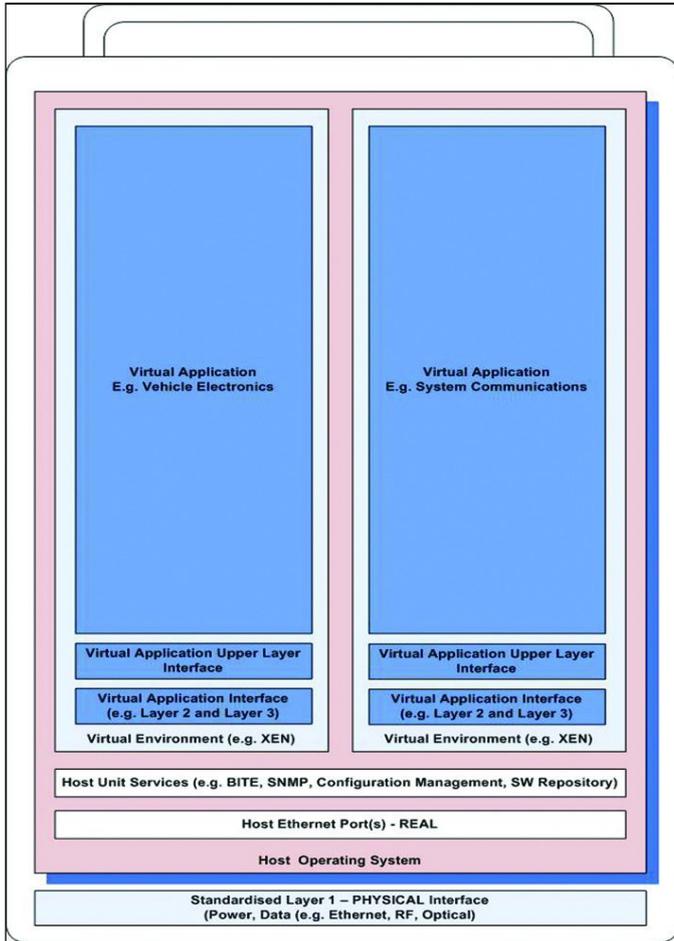


Fig 3 - Host Processor and Storage Unit Architecture

A fundamental point in this innovation is that the layout of the physical connectors on the HPASU would be common to all HPASUs, as would be the physical size, weight and environmental needs of the HPASU. Similarly mechanical mounting and power interfaces would be standard.

The mating interface to the HPASU on the vehicle would be common to all vehicles, and the vehicle wiring would be such that any HPASU can be fitted to any vehicle HPASU slot. The idea behind this requirement is that maximum flexibility as to fit and function is created. It is important to note that the vehicle wiring diagram and the system connectivity diagram for a specific role are two separate things. The SVELTE vehicle wiring schema is the vehicle wiring loom which connects the HPASU trays to each other and to other vehicle components; as such it would connect all possible connectors on the HPASU tray to

conform to a (to be designed) installation specification. The connectivity diagram for a specific role or fit would only connect those pinouts on the relevant HPASUs that would be required for that function. For example – the vehicle HPASU “tray” is envisaged to have RF, Optical, Ethernet and discrete interfaces; a particular implementation of an Ethernet Switching Unit may not require RF connectivity hence no RF ports would exist on the ESU.

System Management

A system management function would exist which takes care of

- a. System hardware and software configuration (typically MIB reporting over SNMP).
- b. System operational state through BITE
- c. Software repository for software upload, reset and upgrade.

Within each vehicle, the Systems Management Server would be responsible for these functions. Functions would, at vehicle level, typically cover performance management, security management, fault management, configuration management and accounting management. Within an entity of a “collection” of vehicles (or domain – whichever syntax is preferred), an entity wide system management function would be required. This entity support function would oversee and manage, at entity level, configuration management, security management, fault management, performance management and if necessary accounting management. Accounting management in this instance does not imply financial accounting, but any accounting necessary within the system such as message accounting, bandwidth usage. The level and structure of this entity would require definition but it is envisaged that the existing first second and third line operational support echelons would be used.

Addressing Concept

Each vehicle would have a unique IP address on its external gateway to the area system. This address would be allocated and managed at area level. However a standardised addressing schema is envisaged within the vehicle on the vehicle LAN. SVELTE envisages a standardised addressing structure such that for any vehicle type and role similar entities would have identical IP addresses. (Not all addresses would therefore be required on every vehicle – for example on a FV 432 chassis, all vehicle electronics would have identical IP addresses irrespective of role, but a FV439 communications vehicle would implement the necessary

additional addressing for the communications fit over and above the base vehicle addressing. Standard addressing within the vehicle enables third party application development to a standard environment and significantly eases operation, troubleshooting and fault diagnosis.

Conceptually it is intended that even with different vehicle types, similar functions would be able to adopt the same addressing schema, so for example the driver's display would have the same address irrespective of vehicle type. The vehicle communications gateway would carry out Network Address Translation, routing and security functions. Within the vehicle a network management function would exist which takes care of

SVELTE Operational Concept

The concept behind SVELTE is that the SVELTE virtual environment is totally defined (non exhaustive list) as:

- Processing capability
- Volatile storage capability
- Non volatile storage capability
- IO capabilities

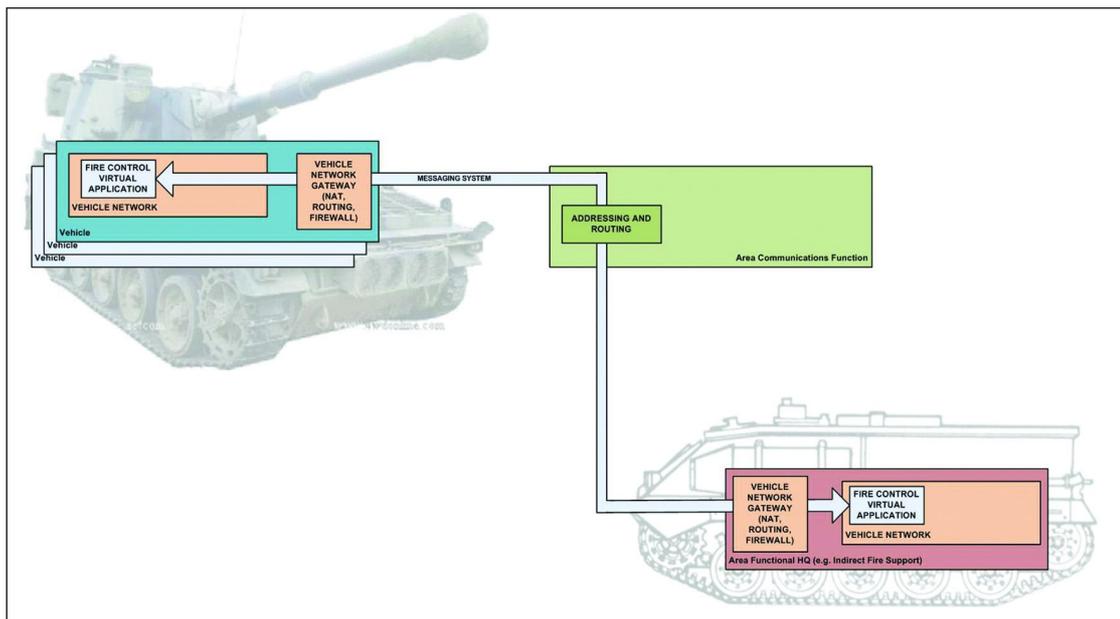


Fig 4 - System Virtual Functional Architecture

such functions as DNS and DHCP.

Area Virtual Architecture

Having obtained an understanding of the system composition, the virtual architecture should become clearer. Figure 4 shows a functional communications session between a fire unit and a headquarters unit.

This trivial illustration shows a communications session between a fire unit and a fire control headquarters with vehicles employing the SVELTE concept. The communications implementation at area level would require further study but might involve packet messaging, VPN, tunnelling or a combination of these techniques. Requirements including security, resilience and ease of reconfiguration all need to be taken into account when designing an architecture to support the SVELTE concept.

Physical environment

Power environment

APIs for applications residing on the HPASU and operating within the vehicle network.

APIs for applications residing on the HPASU and requiring to interoperate to other entities outside the vehicle. (These entities may be

within the same functional area or to entities in other functional areas). While these are fundamental issues it is not intended to explore these points in detail other than note their importance. They stray outside the SVELTE concept which is to create a standardised environment which can host “third party” applications. Vehicle manufacturers would be required to comply with SVELTE, as would special to role providers.

SVELTE System Operations

The initial state would be a vehicle with no HPASUs fitted. An HPASU ex factory would consist of the hardware box and the HostOS.

The first HPASU to be implemented would be the System Management and Configuration Server. After the System Management and Configuration Server is fitted to the vehicle it would be configured with a vehicle initial configuration using a maintenance device (e.g. laptop) with an initial vehicle type generic software load. This initial software load is a configuration item and turns the “empty” HPASU into a System Management Server. The functionality enabled by such a software load would enable the vehicle electronics and

basic vehicle communications. A software repository would also be enabled so that further specific software can be uploaded. At this stage the vehicle is a “generic” type specific vehicle – e.g. FV 432.

In order to equip the vehicle for specific roles, further software packages would be loaded into HPASUs as necessary. It is envisaged these uploads can be delivered by a variety of means such as USB memory Devices or over the air. The vehicle would then become a role specific vehicle e.g. PTARMIGAN Radio rely FV439. Finally the unique vehicle data would be loaded to enable the vehicle to join a communications system – this unique data would typically be communications and information system specific data.

In concept, MMI devices can be informative (read only) or interactive. An informative HMI might be the driver’s display panel.

The system architecture to drive these HMIs would need to be designed but it is envisaged that they would be based on web browsers driven by HTTP.

Several machine to machine interfaces would need to be implemented. These can be virtual interfaces or discrete interfaces and would be the subject of further research and specification.

It is envisaged that the traditional first second and third line maintenance support would be employed.

a. First line support would entail system actions entered on an existing HMI such as a touch screen. Basic system actions would be enabled such as device restart and identification of faulty line replaceable unit (LRU).

b. Second line support is envisaged as requiring specialist skills and support/diagnostic tools on a maintenance laptop or similar device. Second line support would be confined to replacement of LRUs, system software reload or total system restart. It is envisaged that system upgrades would take place under second line maintenance control.

c. Third line support would entail repair of LRUs and their internals.

The processes for system upgrade, system restart and software reload require definition and the following factors require consideration:

a. System Security – including system integrity. This implies a software QA function for build release and build management.

b. System Configuration management.

c. System Boot sequence constraints.

Further Considerations

This concept invokes numerous issues and the author is

aware of many of these, having been lead system engineer for this concept as applied to the aeronautical environment where configuration management, maintenance and operational support regimes are strictly controlled. Equivalent and other requirements need to be captured in order to specify a realistic SVELTE system, and some topics for further study are outlined below, as is the wider concept for using the virtual environment concept to support multi security domains.

- a. Formal Requirements capture for a SVELTE System
- b. SVELTE System Specification
- c. Research into using the virtual application concept for multi security domains, running the host processor at BLACK and hosting RED applications.

THE ARMED FORCES COMMUNICATIONS ELECTRONICS ASSOCIATION (AFCEA)

The prestigious annual Technet International event held in London in October was the venue for a presentation to Captain Muz Murray of the AFCEA Medal for Meritorious Service. Muz is an active member of the AFCEA (UK) Southern Chapter, where his energies in organising and staging Chapter events have now been rightly recognised. In his professional life, Muz holds down a busy SO3 post at Blandford, although he is now reportedly a front runner for the golden suitcase award for frequent travel to the United States and elsewhere!



Mr Kent Schneider, the President of AFCEA International, presents Captain Muz Murray with his award.

THE CORPS PIPES AND DRUMS

A good start to the performing season saw five of the Pipe Band members selected for promotion. Our picture shows the happy group looking forward to their new ranks.



Newly promoted! Rear L to R: LCpl Tam Coleman, SSgt (PM) Jimmy Scott. Front L to R: WO1 Duncan Lamont, Capt Billy Wardrope, Sgt (DM) Phil Stillie

Another busy period for the Corps Pipes and Drums saw them being invited back once more the annual Basel International Military Tattoo, this time as the central band, with Drum Major Phil Stillie leading the massed bands onto the castle esplanade, and Pipe Major Jimmy Scott featuring prominently in the solo and supporting events surrounding the occasion.

This had been preceded by a long weekend tour to Denmark with the Corps Band under Director of Music Dave Barringer. This was another highly successful engagement which saw the bonds between the two bands strengthened and the joint musical repertoire enhanced. Plan are already afoot for a repeat visit in 2011!



SSgt (PM) Jimmy Scott and LCpl Tam Coleman with the Scottish First Minister and some of the Scottish Commonwealth Games team in New Delhi.

A more unusual engagement was a request from the Scottish Office for PM Scott and LCpl Tam Coleman to accompany the Scottish team to the Commonwealth Games in New Delhi. This was a great experience, marred only slightly by the inevitable tummy upsets, countered by the spectacle of the Games and being on hand to meet so many of the dignitaries in attendance.

Colonel Garry Hearn continues to represent our interests on the career front in his role as Pipe President, and is frequently to be heard around the quarters area as he spreads the word (and music) of the Band to the local inhabitants. PM Scott has the training sessions and the tune lists organised for the coming year, and we all look forward to a great 2011.

To any serving officers who are reading this, we are always looking for new recruits; the Pipes and Drums are moving up the rank scale (no great surprise in that, reckons the Pipe Major) and we need to get some fresh recruits in at the younger end to redress the balance. For any of your young soldiers, from the foregoing it is evident that the scope for travel, interest and enjoyment is impressive. The following contacts can provide more information:

Col (Retd) Tom Moncur (Band Secretary) on Blandford Mil 2647 or 01258 482647 and SSgt (PM) Jimmy Scott on Blandford Military 2986 or 01258 482986.

BRIGADIERS ON BICYCLE: BY PEDAL POWER FROM JOHN O'GROATS TO LANDS END

This year saw a notable first when both the Signal Officer-in-Chief (Army) and the Commandant DCCIS separately undertook to cycle from John O' Groats to Lands End. Brigadier Tim Watts chose to take the fast route and powered his way down the country in impressive style, all in aid of the Army Benevolent Fund. Aching limbs, abrasions and some weight loss were judged worthwhile when weighed against an excellent total raised for this military charity.

Meanwhile, Brigadier Ted Flint had resolved to mark his departure from office by visiting all Corps units the length of the country, necessitating a rather longer trip. Accompanied by his DCOS and the Corps RSM, he overcame a nasty training accident to complete the course with no further mishap, encouraged by many Corps members who turned out to accompany him on various stages.

EUROPE TO ASIA ... WITHOUT MECHANICAL ASSISTANCE

By Colonel Alan Blackwell

In 1810, Lord Byron attempted to swim from Europe to Asia, across the Hellespont. He succeeded on his second attempt, completing the iconic crossing first swum, in mythology at least, by Leander as he swum across at night to visit his lover Hero, daughter of Aphrodite. Whilst the motive for Leander's swim are easy to guess, Byron apparently did it 'because it was there'. I decided to attempt the swim this year, partly on the same basis as Byron (but not Leander) and also to raise money for Help for Heroes.



Conditions on the day could not be described as a flat calm!

The Hellespont is the channel that runs between Europe and Asia: it is the second busiest shipping channel in the world, handling over 100 large cargo vessels and tankers daily. The tidal flow is strongly north to south, as the contents of the Black Sea and Sea of Marmara empty into the Aegean and onto the Mediterranean. Once a year the Turkish authorities close the lane to shipping for 90 minutes, which provides the opportunity to swim across.

When I applied to do the swim a year ago it appeared an excellent idea: articles about the crossing wrote of an iconic swim, across a relatively calm sea in warm conditions, attended by open water swimmers from around the world. Indeed, an idyllic way of passing a bank holiday weekend. The distance is about four and a

half kilometres, assuming the 'perfect arc' is followed to allow for the strong tides. We arrived on the 28th of August and saw a flat, calm sea. Excellent conditions. Sunday 29th was the same and we had a very pleasant acclimatisation swim in the sea. The day of the big swim - Monday 30th - dawned windy. By midday the wind was up to force 6-7 and the organisers cancelled the event because it wasn't safe for the safety boats to go out. By that stage we were all in the water at Eceabat (on the European side) ready to swim, and indeed had been standing there for 15 minutes being buffeted by the strengthening wind whilst decisions were changed and made. The decision was changed one minute later to a 'non-recommendation' to swim (more disclaimers!) but with permission to go ahead if we

wished at our own risk: the shipping channel would remain closed for 90 minutes. The urge to 'just do it' took over at that stage and we did just that.

The swim was hard - very choppy and no markers were out to ease navigation. Guidance was to aim for a radio mast on a hill on the Asian side, until you passed a very large and obvious yellow buoy moored to a navigation boat, at which point you picked up the second aiming point on the far coast. I never saw the yellow buoy ... only after the event did we hear that it had been too dangerous to send the navigation boats out. Presumably that got lost in translation at the start. The sea was extremely choppy and most of the time was spent in effective isolation: there may have been other swimmers

or even a safety boat nearby, but the chances of being at the crest of waves at the same moment meant that very rarely did I see anything. In any case, taking on air (as opposed to salt water) and maintaining the right direction were higher priorities.



Diagram, showing the effect of the North-South tidal movement.

After about an hour I saw the finish line, a mere 400 yards or so away. I passed it – in the sense of being on the same latitude – shortly afterwards as I was being rapidly swept by the tide south towards Cyprus and the Mediterranean. Having seen the

finish line go past, and still being out at sea, was a worrying time. I struck out for the shore – where I assumed the current would be less severe – and eventually made it into calmer water. The next half hour was spent fighting back up-channel and I crossed the finish mat and heard the satisfying ‘beep’ of my electronic tag as it registered in just under the 90 minutes allocated. The shipping lane was reopened to much larger traffic shortly afterwards. Over half the swimmers were brought in by various Coastguard and rescue boats, in almost all cases as a result of being swept out by the strong current. So it was very satisfying to have competed the swim, even if it was considerably longer than I had expected. The achievement started to register a few days later, just as the jellyfish stings and persistent taste of salt started to recede. The fundraising website is still open for those who wish to donate towards Help for Heroes, at: <http://www.Bmycharity.com/blackwells>.

THE INDIAN ARMY CORPS OF SIGNALS CENTENARY

The Indian Army Corps of Signals (The Information Warriors) officially mark their Centenary on 15 February 2011. This year has been designated their celebration year and a number of commemorative events in India and overseas have been arranged leading up to the main parade and reunion at the Signal Training Centre, Jubbulpore in 2011. As part of this celebration year, ten members of the Indian Army Signal Corps

motorcycle display team (the Dare Devils) departed New Delhi on 20 August by motorcycle to travel to the home of the Royal Corps of Signals.



The Dare Devils with the Signal Officer-in-Chief (Army) and Major (Retired) Tom Bewsey.

Their route took them from New Delhi through Mumbai, Istanbul, Gallipoli, Thessalonika, Athens, Cassino, Rome, Bologna, Verona, Lyons, Paris, Calais and Folkestone to Blandford.

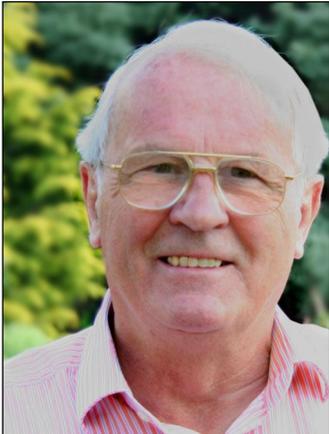
The Dare Devils undertook this symbolic trip to connect with their history, and make a presentation to their affiliated Corps. They arrived at Folkestone on the morning of Friday 17 September, and travelled to Blandford to a welcome reception at RHQ Royal Signals, Griffin House that afternoon. They were escorted for the final part of their journey by the White Helmets, and were welcomed at Griffin House by the Signal Officer-in-Chief (Army), Brigadier TJP Watts OBE ADC, to the background of a fanfare by the Corps trumpeters.

The senior member of the team, Lieutenant Colonel VKS Tomar presented a flag and time capsule to mark the event. Also attending was Brigadier Anil Mehta, the Military Adviser at the Indian High Commission in London, Lieutenant Colonel Patil, the Indian Army Liaison Officer based at HQ Director of Infantry at Warminster, and Major (Retired) TW Bewsey OBE, the last Chairman of the Indian Army Signals Association.

The riders were treated to an evening of well deserved relaxation and reminiscence before once again mounting their 250cc Royal Enfield motorcycles to watch the White Helmets undertake their last performance of the current display season at the Royal Berkshire Show. The Dare Devils went on to complete a number of wreath-laying ceremonies in Brighton, London and Camberley before returning to India by air on 29 September.

THE ASHANTI EXPEDITION 1873-74

By Lieutenant Colonel (Retired) David Mullineaux



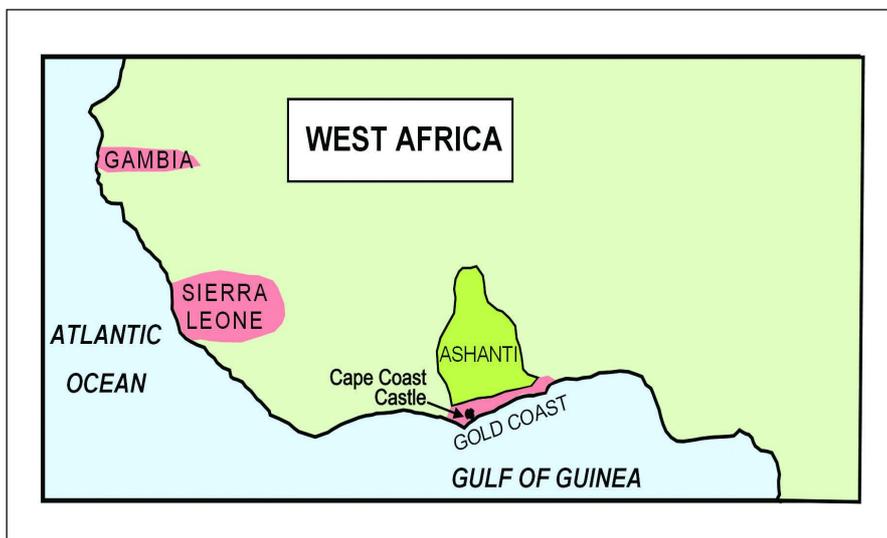
Lieutenant Colonel (Retired) David Mullineaux spent a second career in industry before pursuing his interest in military history, especially signalling. He has been a regular contributor of high quality articles to the Journal, of which this is his latest

Introduction

In 1873, when the Ashanti expedition was launched, organised military telegraph communications were in their infancy. 'C' Telegraph Troop had been formed in 1870, but it was a mounted unit, intended for a role in European warfare, and was consequently unsuitable for an operation in West Africa. Because of the unique nature of the mission, an *ad hoc* detachment was quickly assembled from the two recently-formed Postal Telegraph Companies and was sent instead. Their experience, and their contribution in introducing telegraph communications to a generally unaware mid-Victorian army, is described in this article.

Historical Background

In the second half of the nineteenth century Britain tried to get rid of its colonies on the west coast of Africa – at that time the Gold Coast, Sierra Leone, and Gambia - acquired variously by Britain during the seventeenth and eighteenth centuries. They were unprofitable, but the efforts of the government to divest them were countered by traders who wanted protection of their interests and humanitarians trying to stop the slave trade.



The Gold Coast settlement was limited to a strip of country near the coast, about forty miles wide. This coastal strip was inhabited by a people called the Fantis, who were generally unwarlike, useless in any fighting role, and even when employed as unskilled labour were unreceptive to discipline and organisation. Inland were several native states, the principal one being Ashanti. The King of Ashanti, who in 1873 was Koffee Kalkalli, had his capital at Coomassie, about 145 miles inland from Cape Coast Castle.

The Ashantis first came into contact with the British in 1806, and in 1824 defeated a British force, killing the Governor of the West African settlements and eight other British officers. Peace was arranged in 1831 but was broken in 1853, and 1863 when the Ashantis invaded the colony of the Gold Coast. In 1873, following the withdrawal of other European countries which had dabbled in West Africa and then thought otherwise, the British were left in control of the entire coast of what today is Ghana, as well as the hinterland to a depth of about forty miles. Fearing that the British would interfere with their domestic slavery and slave raiding, the Ashantis attacked the British settlements and trading posts in force.

On the news of this uprising reaching England, assistance was given by ships of the Royal Navy, and parties of marines and naval ratings were landed. The 2nd Battalion of the West Indian Regiment from Barbados was dispatched to West Africa, arriving at the Gold Coast in July 1873. With this reinforcement the local forces were able to prevent the enemy from reaching the coast but the marines and naval detachments suffered severely from fever.

The possibility of the dispatch of a force from England was discussed and, in August 1873, the ambitious thirty-eight years old Colonel Garnet Wolseley, later to be Field Marshal Viscount Wolseley and C-in-C of the army from 1895 to 1901, was appointed Governor and High Commissioner and sent out in October to report on the feasibility of military operations. He concluded that in the pestilential climate of West Africa – 'the white man's grave' – military operations could only be undertaken with any safety by European troops in the so-called dry season during December, January, and February. An expedition would have to be a quick dash in, overcome the Ashanti army, and a rapid exit. On his recommendation a force of about 1,500 men was sent from England. This included two battalions of infantry, a detachment of Royal Artillery with four guns, and part of the 28th Company, Royal Engineers tasked principally with opening the route to the

interior. Major Robert Home RE was the CRE.

Wolseley took with him staff officers who were to become members of his so-called 'Wolseley Ring' – a clique of selected officers he trusted, and whose careers he developed. They were an interesting lot, some of them to be well-known names in the coming years.

It was only as an afterthought that a telegraph detachment was added to the force, when Colonel Wolseley applied to the War Office for 200 miles of telegraph line and an officer and twenty-five linemen and operators. The delay in sending for them, and an inadequate appreciation of the detail of the operational requirement, led to problems that were to have a detrimental effect on the contribution they were able to make. It was a mistake to be repeated, with similar effect, in several further operations over the next decade, namely the Zulu War of 1879 and the Egyptian Campaign of 1882. Staff officers were slow to grasp the need for the newly available communications facilities to be included in operational planning procedures at an early stage.

The detail of the operation does not concern this narrative. In outline, the main force advanced inland through dense jungle from the coast to Coomassie, the Ashanti capital, which they reached and destroyed on 4 February 1874, although many of the enemy escaped by

retreating further into the jungle. The evidence of human sacrifice was everywhere visible, thousands of skulls being piled in a sacrificial grove. Unfortunately the Ashanti army, having scattered, was not destroyed; the king and his symbolic golden stool were not captured; and there was no formal surrender of the Ashanti forces. According to plan, the force then withdrew quickly, their mission only partly accomplished, and many of them racked by fever. There was to be more trouble later, in 1896, when a further expedition involving a detachment of the Telegraph Battalion was undertaken.

The Telegraph Operation

Communications for the expedition were provided by a detachment made up from the 22nd and 34th Postal Telegraph Companies RE, formed in 1870 and 1872 respectively. 'C' Telegraph Troop, the regular, mounted unit formed in 1870, was not deployed because the country was completely unsuitable for their horses and wagons, although it is surprising that they did not contribute any personnel. Placed in command of the detachment was the twenty-seven year old Lieutenant Herbert Jekyll RE of the 22nd Postal Telegraph Company, the unit normally based in London and employed on work for the Post Office. His name appears on the list of original members of the Society of Telegraph Engineers, formed in 1871. The detachment

The Postal Telegraph Companies

The early development of the electric telegraph in Britain had been in the hands of private telegraph companies, and in consequence there was no coordinated planning, a lack of standardisation, and inefficiency. London was becoming a sprawl of unsafe and unsightly wires over rooftops. It was decided to follow other European countries, where the national telegraph system had always been under government control, and in 1868 the private companies were bought out and the network 'nationalised' under the control of the Post Office.

Matters improved and use of the telegraph network increased, but this expansion caused skilled manpower problems. Colonel Gosset, who was at the time Commanding Royal Engineer at Woolwich, saw this as an opportunity for getting good, practical telegraph training for the officers and men of the Royal Engineers, who up to then had only limited theoretical training. When he proposed the employment of Royal Engineers with the dual advantages of getting a body of well-trained military telegraphists, at the same time reinforcing the overworked civilian telegraph staff of the Post Office; the offer was eagerly accepted.

The 22nd Company RE, based at Chatham, was re-roled and placed under the command of Captain Charles Webber. Some of the men forming this new Company had had experience in telegraph work during the Abyssinian Campaign of 1868, and others had passed through the telegraph course at the School of Military Engineering, but the great majority of the NCOs and men were volunteers, unacquainted with the work they were about to undertake, although all were skilled artificers or clerks. After a brief training at Chatham, the Company, consisting of three officers and eighty NCOs and men, was moved to London. Their duties were twofold: as operators in telegraph offices including the use of the instruments, and the maintenance of the lines throughout the country.

In September 1871, the 34th Company was also converted into a Telegraph Company RE, and attached to the Post Office. All ranks drew the regimental pay of their rank, but instead of army Engineer pay they drew Telegraph pay provided by the Post Office. As this was always higher than Engineer pay, there were always sufficient candidates! The two RE Postal Telegraph Companies became technically skilled and very familiar with Post Office practice. Together they formed the 2nd Division of the Telegraph Battalion when an organisational change took place in 1884.

consisted of twenty-five NCOs and men but of these only six were clerks (as telegraphists were then described), which was to prove far too few for the number of telegraph offices that were needed and the work involved, the rest being linemen responsible for constructing the line but not operating it (although some could, and did).

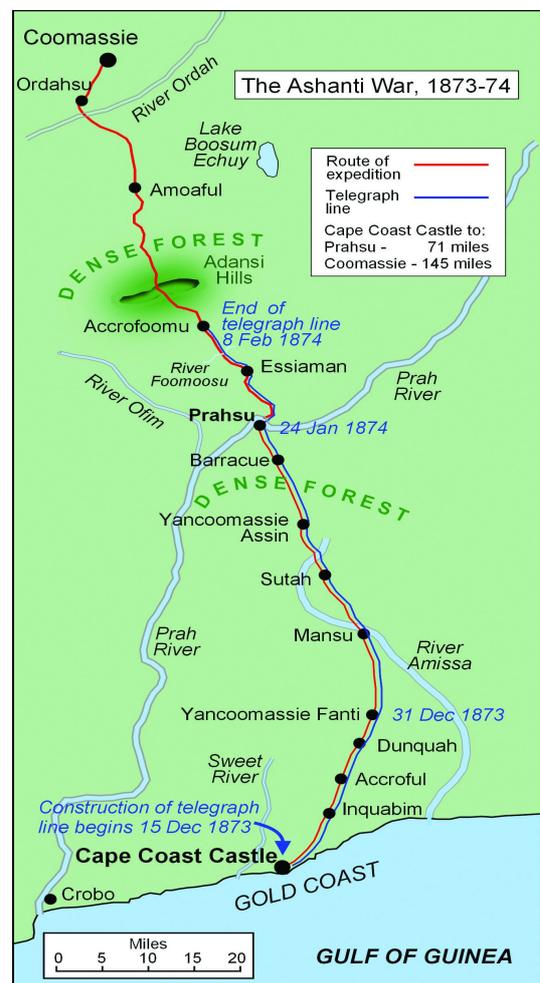
They arrived at Cape Coast Castle on HMS *Himalaya* on 9 December 1873, but carrying with them only part of their hastily assembled stores. Their task was to provide telegraph communications along the route taken by the troops advancing from Cape Coast Castle inland to Coomassie. There was not yet any submarine cable to West Africa, so there was no strategic rear link to consider.

The telegraph detachment had many problems to contend with, due partly to the belated request for them and partly to the local situation they encountered. It had been decided to land as few of the troops as possible, until the road - a euphemism for what was mostly a track hacked through the jungle, fit only for human portage - being built by the engineers to Coomassie was well on the way to its destination. As part of this plan, which was adopted for the preservation of the men's health, only part of the telegraph detachment had been sent ashore. Moreover, the telegraph stores ran short, as the remainder of them were aboard another ship, HMS *Dromedary*, which did not arrive at Cape Coast until 31 December. These stores were landed as soon as that ship arrived, but no sooner were sufficient men and stores available than there were transport problems, and they could not be conveyed up country. The cause of this was that on 1 January the infantry battalions had arrived on troopships and landed at the same time as the *Dromedary*, and were given movement priority to the front, absorbing the available transport for some time. Jekyll tried to recruit his own native porters, and in the course of the eight days which followed the arrival of the *Dromedary* succeeded in collecting and despatching three gangs of twenty-five men, each under intelligent headmen. "There was much difficulty in getting these men", he said, "as I had to compete with the Control Department, by whom, apart from their special facilities, large rewards for men were being offered." These, together with the problems of construction, meant that the line could not keep up with the troops advancing to Coomassie, and it eventually terminated about fifty miles short, at Acrofoomu. As with the Abyssinian expedition five years earlier, the problems of the field telegraph in these early days, which were to prove recurrent, were transport, stores, and manpower, and above all a lack of integrating the communications into the operational planning from the start. Easy to say so now, with hindsight!

On arrival Jekyll's first task was to procure telegraph poles. These were available at Beulah, nine miles west of

Cape Coast Castle, and there he went immediately on landing. 1,500 bamboo poles, green and freshly cut, each about 16-18 feet long and three inches in diameter, were bought at two pence each. The next job was to transport them to the telegraph hut at Cape Coast Castle and a sapper was put in charge of fifty local women to accomplish this task - something he might not have foreseen as one of his future duties when he joined the army. There, at Cape Coast Castle, various methods of fitting the insulators to the bamboo was tried, and Jekyll describes the solution that was adopted:

The top of the bamboo was sawn off square, 6 inches above a joint. Four turns of No 11 wire were twisted tightly round the top, and a plug of soft wood was driven into the cavity to fill it completely. A hole was bored down the middle of the plug, into which the insulator was screwed.



Next a gang of fifty unskilled local labourers under a headman were engaged, some preparing the poles as just described, some helping to transport the poles from Beulah, and some helping with constructing and fitting out the hut for telegraph office. Jekyll described the limitations of his local work force:

Light work, such as preparing bamboo poles and fixing insulators, they soon got accustomed to, and with supervision did very well; but when it came to digging holes, stretching wire, and cutting trees, a

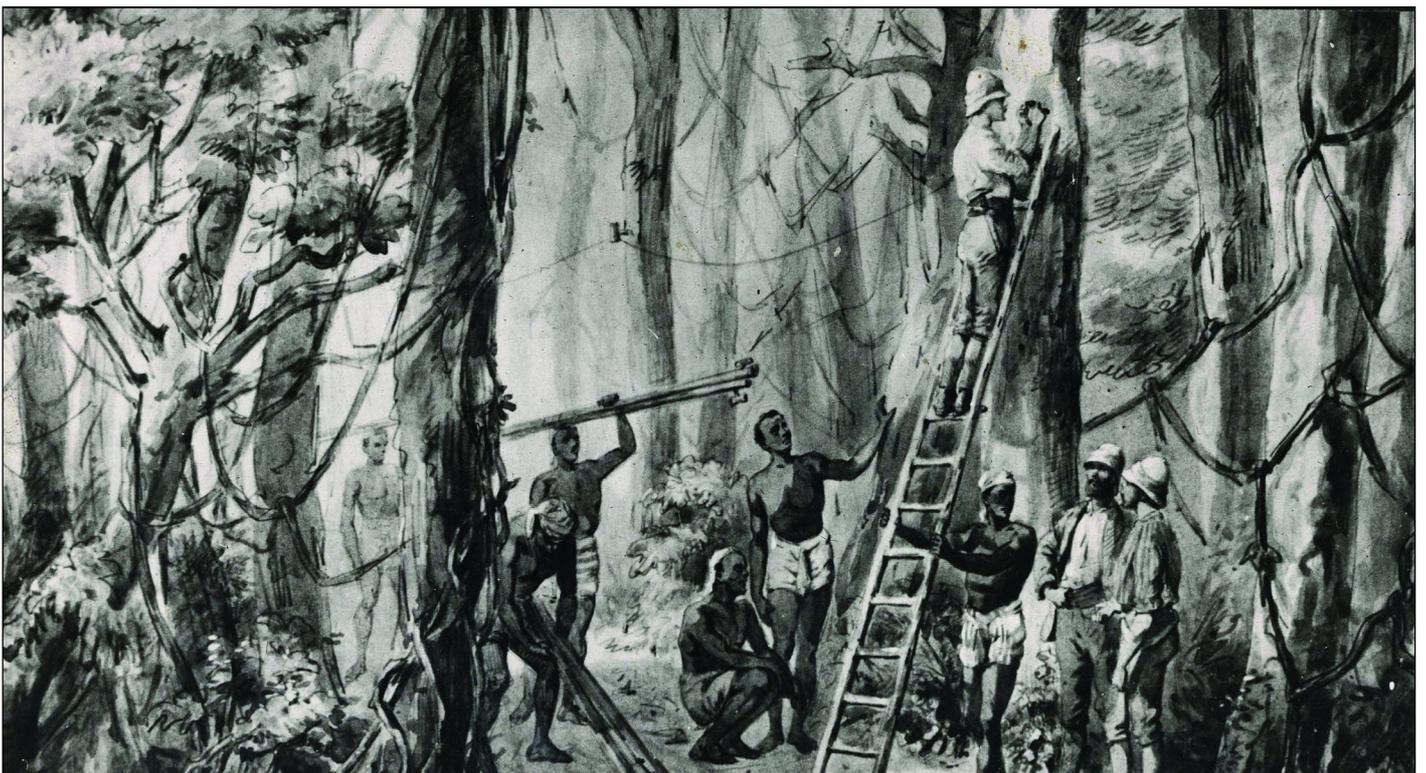
great deal of persuasion had to be used, and the constant presence of white men was necessary to keep them at work. In digging holes they soon gave up spades, and preferred to use pick irons, with which they loosened the earth, removing the loose soil with their hands. While working, the man sat on the ground, and worked between his legs till the hole was as deep as the length of his arm. They were slow to learn any kind of work to which they were unaccustomed, even the simplest operation, such as uncoiling wire along the ground, they were unable to perform for a long time. In carrying loads, they greatly objected to weights in excess of what one man could conveniently take on his head, such as the coils of wire, which weighed upwards of 100 lbs a-piece. The coils were always slung on bamboos, each coil being borne by two men, but they disliked this method of carriage, and would sometimes take it in turns to carry the whole load, whilst at other times the coils would be laid down and abandoned by the road side. None of the skilled or delicate work could be entrusted to them, and their aversion to ladders was such that they could seldom be employed off the ground. They were, moreover, extremely timid. Many deserted after seeing some old bullet marks in a tree, others after being knocked down by lightning shocks when handling the wire. This incident was productive of some good, inasmuch as it inspired great respect for the wire, which was henceforth regarded as fetish, and never molested by the natives.

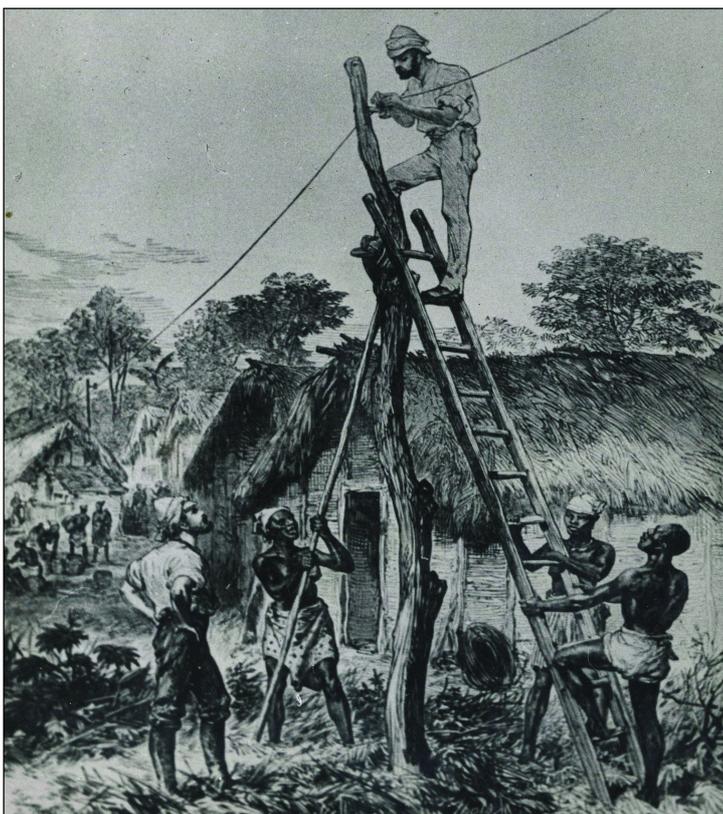
Meanwhile, Jekyll confirmed the operational plan for the telegraph with the Chief of Staff (Colonel G R Greaves), and construction of the telegraph line began, Jekyll noting almost immediately that “a few large orange trees

in the street interfered with the course of the wire, and had to be cut down.”

Building the line out of Cape Coast Castle was not easy, due to the crooked road, steep hills, and dense undergrowth up to twenty-five feet high which had to be completely cut down. The country for a while became a bit more open and a faster rate of construction was attained temporarily, then became more difficult again as they entered the jungle. Some care was necessary in selecting trees to act as telegraph poles. Those that were swayed by the wind were unsuitable, as this broke the wire. Either they had to be so large that they stood firm, or so small that their tops could be cut off and the trunks left as poles. Some trees were so covered with creepers, parasites, and ant's nests, that clearance became very difficult; others were soft and spongy and afforded no hold for the spikes attaching the insulators.

The line itself was No 11 BWG (Birmingham Wire Gauge) galvanised iron wire, which proved very satisfactory and was used for many other purposes as well as the line itself. Jekyll wished he had brought some insulated cable so that the difficult stretches of bush and jungle could be bypassed by cable laid on the ground. From late January and through February seasonal thunderstorms were frequent and violent, constantly making the line unuseable, the lightning splitting the insulators. Two patterns of insulator had been taken, and one of them proved very defective in design, causing problems. The storms caused many trees to fall, again damaging the line. They also caused electric shocks to those handling the wire, the induced current staying in the wire for some time afterwards. In an attempt to speed





from what was saved it seems that several thousand messages were passed.

Like the rest of the force, the telegraph detachment suffered greatly from disease and fever. A month's exposure to the heat and humidity in an area where tropical disease was prevalent, together with the hard physical work, led to many cases of fever, usually requiring a few day's rest. Several of the clerks found it difficult to undertake their work, unable to get up, or to read or write coherently and legibly. Quinine, which they took to combat malaria, caused deafness, although fortunately Morse sounder instruments were not being used in the telegraph offices. Sometimes the linemen had sufficient knowledge of the equipment and operating procedures to stand in for the indisposed and under-staffed telegraphists. Jekyll, in his post-expedition report, remarked that "great as were the advantages of having clerks employed in Post Office telegraph offices for the experience they gained, such sedentary work was detrimental to the robustness of their health and the level of general fitness needed on military operations." He suggested they should be rotated for three or four months a year into the regular military environment.

things up the labour force was increased to eighty, but only with difficulty as many applicants were unsuitable. They seldom achieved a construction rate of more than two miles per day, although Jekyll had planned for five miles per day.

As construction of the line progressed, telegraph offices were opened along the route, some only temporarily due to shortage of equipment and clerks to operate them, reaching Prahsue on 24 January and Acrofoomu on 8 February. The line was operated using the single current method of working, the simplest and most reliable method. The offices were equipped with Morse recorders, with which the telegraphists were perfectly familiar, the particular instrument being known as Military Direct Writer, and it proved to be very satisfactory. Another type of office instrument was also taken, but was never used, as it was known to be susceptible to the thunderstorms that were prevalent – the Magnetic Alphabet Instrument. They also brought flags and signalling lamps, but in the local conditions these were never used.

There was great difficulty in manning the telegraph offices properly because of shortage of clerks, compounded by health problems. Six clerks, as already related, were quite insufficient. They had to man their telegraph office entirely on their own for twenty-four hours a day, and Jekyll later reported that he really needed at least sixteen clerks to man the offices properly, as well as orderlies for delivering received messages and other supporting duties. Several offices had to be closed because of lack of staff. Details of the traffic passed were incomplete as a number of office diaries were lost, but

All the delays to constructing and operating the telegraph line prevented it advancing as rapidly as the road that was being built by the engineers and the advancing troops. Ultimately it did not reach further than Accrofoomu, a distance of eighty miles from Cape Coast Castle, but fifty miles short of the intended termination at Coomassie. This distance was worked with five offices. Linemen, with some native labourers and tools, stores, and test equipment, were posted at intervals along the line ready for any repair and maintenance tasks. The frequent thunderstorms from late January onwards caused much damage to the line, so their services were in constant demand.

Towards the end of the campaign, on 26 January, Jekyll himself, having suffered repeated attacks of fever, contracted malaria and was invalided back to Britain. His duties in command of the telegraph detachment were taken over by Lieutenant Cotter RE, attached from the 28th Company RE which was also involved in the operation.

By the end of January the construction work was over. Then the troops withdrew, and the telegraphists closed the telegraph offices on 23 February, taking instruments, batteries, and unexpended stores with them, but leaving the telegraph line standing. Remnants of the line and coils of wire were found and used over twenty years later by the subsequent 1896 expedition – a testimony to its construction and the quality of No 11 BWG galvanised wire.

Lieutenant Cotter and the telegraph detachment, the last

of the engineer forces to withdraw, embarked on the S.S. *Manitoban* on 4 March 1874 and returned to England, reaching Portsmouth on 20 March 1874.

Summary of Telegraph Work

1873

12 Dec: 15 men of telegraph Detachment landed. Poles bought at Beulah. Stores landed.

13 Dec: Poles brought in. Stores arranged.

14 Dec: Office prepared at Government House. Cape Coast Castle.

15 Dec: Commenced line construction

22-31 Dec: Offices opened progressively at Inquabim, Accroful, Dunquah, Yancoomassie, Fanti.

31 Dec HMS Dromedary with further telegraph stores arrived at Cape Coast Castle.

1874

1 Jan: Remainder of Telegraph Detachment landed. Stores from Dromedary landed.

1-24 Jan: Offices opened progressively at Mansu, Sutah, Yancoomassie, Assin, Barraco, Prahsu.

7 Jan: Stores sent to Mansu now that transport available.

2 Feb: Office opened at Essiaman.

7 Feb: Working party fired on near Accrofoomu.

8 Feb: Office opened at Accrofoomu. Essiaman closed. Five offices now working.

23 Feb: All offices closed. Instruments and batteries brought back to Coast. Line left standing.

was supported by the CRE on the expedition, Major Robert Home, who said: "Too much praise cannot be given for the way in which this line was made. Lieutenant Jekyll fully guarded against all accidents over which he could possibly exercise any control." Jekyll praised the work of his men and made several comments on their performance. Sergeants Longstaffe and Dowie, the two senior NCOs in the telegraph detachment had performed exceptionally well. The linemen had been well trained in the Post Office and were extremely competent at testing, fault-finding, and repair, and were even able to use and operate the instruments, although not at the speed of the clerks.

From another viewpoint, perhaps the greatest unsung benefit of the operation was that the newly formed army telegraph organisation operated alongside the 'Wolseley Ring'. The influential 'Ring' began to acquaint themselves with, and to use, the telegraph in the field, to break out from the extreme limitations of 'gallopers' carrying messages on horseback and visual signalling, and to exploit the new method of communication now available to them. Wolseley himself, always striving for efficiency, and not constrained by the Victorian army officer's usual aversion to adopting technical innovation, quickly developed a very good understanding of the uses and capability of the electric telegraph in field operations - and exploited it to its best advantage in later campaigns.

The Ashanti Medal



A medal was struck and awarded to all who had participated in the expedition between 9 June 1873 and 4 February 1874, with the clasp "Coomassie" awarded to those who were present at Amoaful and the actions between there and Coomassie, as well as those north of the Prah "engaged in maintaining and protecting the main communications of the main army.

Conclusion

It was the first operation undertaken by the newly formed telegraph units, and they returned to England having gained much in experience, although many of the problems found in West Africa were unique to that area. In terms simply of the telegraph operation, it was in no way remarkable. That it failed to keep up with the advancing troops was understandable in the circumstances, and Jekyll explained that he had preferred to build as reliably as possible rather than rush the construction, which might possibly lead to failures difficult to repair at vital moments of the operation. This

Endnotes:

Back in England, while recuperating in his house at 2 Morpeth Terrace, London, SW1, Herbert Jekyll wrote a detailed report of the work of the telegraph detachment. It will be found in the *Professional Papers of the RE*, Vol XXIII, New Series, RE Library, Chatham.

A contemporary description of the operations, *The Ashanti War (1874)*, in two volumes, was written by Capt Henry Brackenbury RA, Wolseley's Asst Mil Sec (and one of the Wolseley Ring). A reprint is available through the Naval and Military Press (www.naval-military-press.com).

Both the line construction sketches reproduced above were drawn by the artist Orlando Norrie and originally published in the *Illustrated London News*.

PTARMIGAN RETIRES

By Colonel (Retired) Tom Moncur

On Friday 9 July 2010, items of the PTARMIGAN communications systems were officially handed over to the Corps Museum, thus marking the final element of the decommissioning process of the network which has served the British Army since March 1985.

The event was marked by a series of presentations in the Princess Mary Hall, Blandford Camp from personalities involved in the procurement, management and enhancement of the system throughout its lifetime.

Mr Allan Jones of the Defence Equipment & Support Organisation had been a PTARMIGAN Programme Manager, and was now charged with its decommissioning. He related something of the early procurement activities, and its subsequent operation, underlining that the still significant stocks of spares were eloquent testament of the reliability of a system which was the best in the world at the time of its fielding. Colonel Garry Hearn, the Commandant of the Royal School of Signals, then gave a soldier's view of having to contend with a whole new lexicon of terms in moving away from the BRUIN era, as well as a more flexible and challenging way of operation. Lieutenant Colonel (Retired) Mike Butler as the then senior Corps TOT had the responsibility for PTARMIGAN operational deployment planning, and explained some of the principles which were to govern the scale and allocation of equipment.

The early trials of the PTARMIGAN system were described by Colonel (Retired) John Doody, the Trials Team Commander, and how the system even in these early stages was impressing users and potential buyers, as well as no less a personality than the Colonel-in-Chief. Mr Peter Jenkins, formerly of the Defence Research Agency at Malvern, then explained something of the technical thinking behind the design of PTARMIGAN, and how the system had to be developed to meet changing operational and user demands throughout its life history. The PTARMIGAN satellite bridge was a good example.

The role of the contractor was discussed by Mr

David Ward of Selex Communications, the eventual inheritors of the original Plessey contract, and Colonel Neil Fraser recounted how as Commanding Officer of 22 Signal Regiment he exchanged the final system closedown signals with the Signal Officer-in-Chief (Army) in July 2009.

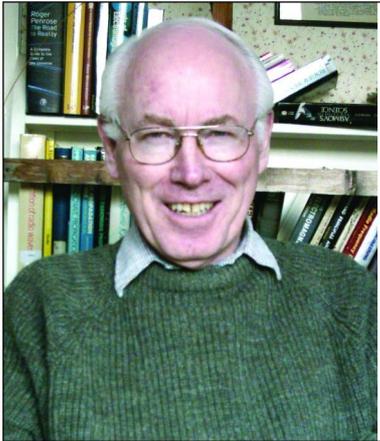
Originally a replacement for the interim BRUIN system, which was in the event to last many years, PTARMIGAN provided secure and survivable communications to 1st British Corps as part of NORTHAG. Over the years, this requirement grew to be a mobile, fully interconnected, software driven network that provided voice, telegraph, facsimile and data communications. Secure UHF and SHF radio relay links were used to provide a grid of interconnected digital trunk nodes, with Major Access Nodes supporting Main Corps HQ, and lower formations served by Secondary Access Nodes. Connection to the system for smaller units was afforded through Extended Loop Groups or Single Channel Radio Access (SCRA). The SCRA Central could also provide an independent static and mobile subscriber network in an out of area mode.

After successful deployment on OP GRANBY, a need for satellite trunk bearers was identified, and an enhancement was duly fielded in 1997. Increased demands for data communication led to the Mobile Access to the PTARMIGAN Packet System (MAPPS) development in December 2002. Other notable modifications included the PTARMIGAN Extended Loop Access, Direct Line of Sight Radio, the IP Network and the UK Fixed Bearers equipment. The last ever use of the system took place in July 2009 when 22 Signal Regiment, the last provider of PTARMIGAN, supplied support for troops on exercise. This was attended by many contractors and MOD staff past and present who had been involved in the support of PTARMIGAN throughout its lifetime.

Truly a significant occasion, as Museum Director Nick Kendall-Carpenter acknowledged in accepting on behalf of the Corps the equipment intended to provide a permanent PTARMIGAN exhibit in the Corps Museum. Following the series of presentations, the PTARMIGAN exhibit in the museum was formally opened by Colonel Garry Hearn, the Commandant, Royal School of Signals, and is now set up for all to see and experience.

EWB GILL – TAKING WIRELESS TO WAR.

By Dr Brian Austin.



Brian Austin is a retired academic from the Department of Electrical Engineering and Electronics at the University of Liverpool. Prior to that, he worked both as an academic and as an electronics engineer in South Africa where he was born and educated. He has an abiding interest in radio communications having led the team at the Chamber of Mines Research Laboratories that developed a medium frequency, single sideband portable underground radio system. More recently, antennas and the vagaries of the ionosphere became something of a passion. Following many years of service in the Citizen Force (TA equivalent) of the South African Corps of Signals, from which he retired in the rank of major in 1984, he became an enthusiast for military history and especially those aspects involving wireless communications. In 2001 he published the biography of Brigadier (later Sir) Basil Schonland, scientific adviser to Montgomery's 21 Army Group. Major E W B Gill Royal Signals, the subject of this present article, was a key member of Schonland's scientific entourage.

In 1934, an Oxford don by the name of Ernest Walter Brudenell Gill (1883 – 1959) wrote and published an amusing and very insightful account of his experiences as a wireless intelligence specialist during the First World War. Called 'War, Wireless and Wangles' [1], this little book of a mere 90 pages tells of Gill's first encounters with the way the military does things and of his frequently very inventive methods of bypassing some of them or at least of bamboozling the process. As was characteristic of the man, his own achievements at a much more technical level were always played down, but they were many.

During the next war he volunteered again, despite his age, and resurrected his rank of major. Once again with great flair and considerable skill Walter Gill played a

significant part – though always in the background – in the astute use of science and engineering to defeat the enemy. Looking back now at the many reports he wrote between 1940 and the end of hostilities reveals an acute scientific mind able to grasp the significance and subtleties of a vast array of radio communications problems as well as a rare ability to provide practical solutions that the soldier in the field could implement. And before doing all that he'd also played no insignificant part in launching what would become, at Bletchley Park, Britain's remarkable code-breaking activities.

Gill was educated at Bristol Grammar School and then at Christ Church, Oxford where he took a first in physics. His first university appointment, in 1909, was as a demonstrator in the electrical laboratory. This was followed soon after by being made a Fellow of Merton College. Other than his service in the army during both World Wars he was to remain at Oxford until his retirement as an academic in 1949. Between the wars, and then again until his final retirement from the university in 1954, he also served as Bursar of Merton College. In this latter role he brought to bear all the dexterity he had acquired for wrong-footing bureaucracy whilst engaged in the business of monitoring and DF-ing enemy wireless traffic during the Great War. During the

next encounter a quarter of a century later, first in MI8c, the Radio Security Service, and then as the senior officer

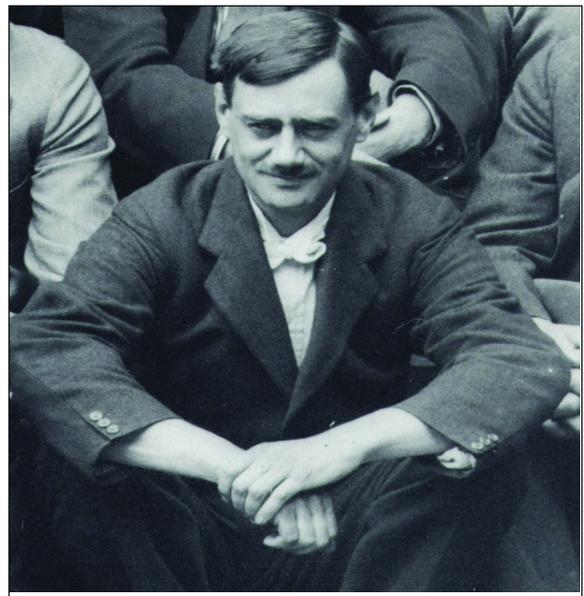
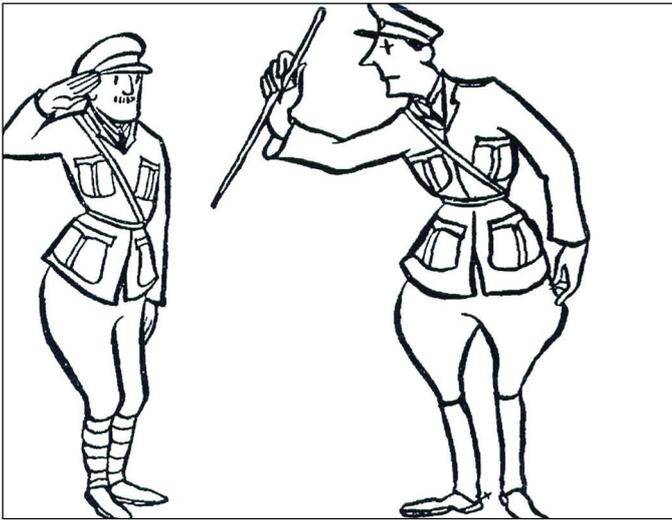


Photo of Gill at Oxford in 1922

in AORS3, the section within the Army Operational Research Group (AORG) responsible for 'Signals in the Field', all Gill's talents were much in evidence. He was also a most humble man. His mortal enemies were those human failings of pomposity and humbug and he deflated many an ego with a precisely aimed barb always tinged with a nice touch of humour, as will become apparent.



Take the battery on, Gill!

Kitchener's 'Older' Army

Soon after the declaration of war in 1914, Gill's suggestion that he might be of some use to the army as an officer was declined because at 31 he was deemed to be too old. Nothing daunted, he immediately joined up as a private in the 9th Hants. [2]. Promotion to sergeant followed rapidly as did his posting to the Isle of Wight where he was set to supervising the digging of trenches. Their purpose was to forestall what was seen as an imminent invasion – at that very spot – by the Kaiser's army. By December, when no such massed landings had occurred, he found himself in receipt of a letter from the War Office rescinding the previous age limitation and offering him a commission in the Royal Garrison Artillery, which he accepted and with it a posting to Woolwich. But at that stage of the war Woolwich hadn't yet received its guns, nor much else, and so life there with the gunners involved much 'bull', seemingly perpetual horse grooming (and riding) and, inevitably, route marching. The latter activity frequently saw Gill, as the junior officer in 20 Heavy Battery RGA, relieving his CO as soon as the going became more than just a stroll and the senior man commandeered a taxi for the journey home. After six weeks of such diversions interspersed with lectures on all manner of subjects, Lieutenant Gill was posted, yet again, to the Royal Engineers to be turned



Devising schemes which any child could unravel

into an expert in 'special wireless intelligence work'. This turned out to be a rather more inspired move by the Army in its utilisation of resources. At least and at last Gill was able to apply his scientific training to the problems of using 'the wireless' in a war now assuming major proportions.

But one must not be left with any thoughts that the RGA did not add to Gill's already impressive store of knowledge. They did and he looked back with much pleasure to the lectures on such subjects as the workings of a field telephone. To suggest that one already understood how a field telephone worked would have been 'unsoldierly', according to the Gill, especially as knowledge within the Army goes according to rank. He illustrated this as follows: 'no one under the rank of major could be allowed to speak of atomic theory; colonels might mention radio activity; but only field-m Marshals could cope with Einstein'. He and his colleagues therefore adopted a stance of 'well-simulated



Great Pyramid at Giza with the author's father aboard the camel on the right in 1941.

interest' whilst the lecturer performed such arcane acts as rubbing ebonite rods with dead cat's skins. After this display of feline electrostatics questions naturally followed but since many of Kitchener's New Army were men of some scientific substance, and since those questions were almost always loaded, the lecturer soon became suspicious and further questions were not invited.

The Teutonic Mind

In his book Gill describes the earliest wireless intercept activities of the British Army. Its purpose then was no different to today, just the technology has changed rather more than somewhat. Roughly speaking, the work of wireless intelligence fell into two categories: first, the interception of the enemy's radio messages; and then, from their content as well as the bearings from which

they came, the determination of the position of his transmitting stations and the deployment of his forces. Implicit in this was the ability to decipher the messages and in this cause it appears that the Germans were their own worst enemies by reason of what Gill called 'the orderly Teutonic mind'. Apparently, the wireless-equipped Zeppelin airships that lumbered in over southern Britain on their nightly bombing missions all used call signs commencing with the letter L, thus LA, LB, LC and so on. When their radio transmissions were intercepted they were then immediately identifiable as having come from the Zeppelins. Apparently this blunder in elementary communications security did dawn, eventually, on those responsible for such things within the German High Command and so the call signs were changed. However, the orderly mindset still persisted since the change involved nothing more than moving the previous letters on by one. Thus LA became MB and so on and, to make things worse, every three months this procedure was, in Gill's phrase, solemnly repeated. To add to this near-suicidal obsession with tidiness and order the Zeppelins, when aloft, would report their positions on an hourly basis to the flagship of the High Seas Fleet under whose command they fell. Needless to say the wireless monitoring stations across England were presented – every hour – with the new positions of every readily identifiable German Zeppelin long before they even crossed the British coastline!

Since these examples of electromagnetic naiveté ran counter to everything one expected from the German nation, Gill offered a possible explanation. Apparently Baron von Lepel, a renowned German expert on wireless telegraphy, had visited England shortly before the war and was taken to see the Army's experimental wireless station at Aldershot. To Gill this was a 'master move of superhuman cunning' because the station had no air of modernity about it at all, rather it was just a 'collection of antediluvian junk'. The good baron no doubt returned home and informed those who were interested of England's considerable shortcomings in the area of wireless telegraphy. Any slovenliness on the part of those devising the system of Germanic call signs could be excused – or so it seemed to them – because the British were clearly incapable of receiving them anyway. In fact the very opposite was true, at least in some respects. Work by such pioneers as Captain H. J. Round and C. S. Franklin, both of whom were numbered amongst Marconi's earliest assistants, led to the design and installation of sophisticated wireless direction finding apparatus on the Western Front. Its performance there saw similar stations set up across England with immediate success as both the Army and the Royal Navy made considerable use of the technique. The observation in May 1916 by a RN DF station of a 1.5 degree change in German naval wireless bearings suggested that its

High Seas Fleet was putting to sea. Based on this intelligence, the Royal Navy's Grand Fleet was committed to action and the Battle of Jutland that saw the crippling of the Kaiser's sea power followed shortly thereafter.

Egypt and Beyond

In 1916, much to his satisfaction, Gill was posted overseas to Egypt where he was involved in setting up a number of wireless intercept and DF stations. The latter used a four-mast array of vertical antennas, possibly in the Bellini-Tosi configuration, while the intercept stations usually required just a single vertical conductor since omnidirectional coverage was needed. Both types of aerial required suitable supporting masts and their construction and erection occasionally posed difficulties when left to local expertise. Gill's description of some catastrophes makes for memorable reading! His own resourcefulness often overcame such problems, however, especially when he informed his CO that he had found both an ideal site near Cairo for a wireless station as well as a most suitable support – already in situ – for its antenna. Needless to say the CO felt he was being taken for a ride but before he could react adversarially Gill assured him that a wire attached to a short pole atop the Great Pyramid at Giza, with its lower end terminating on the roof of the so-called Egyptian palace below, would serve the purpose admirably. Duly impressed by his junior officer's ingenuity the man in command gave the project his blessing. The antenna turned out to be exceedingly effective with the one-valve receiver, the pride and joy of the Army at the time, being well able to receive Zeppelin transmissions when those craft were somewhere over England.

Incidentally, it will be apparent to those familiar with the subtleties of radio receivers that prior to the existence of the thermionic valve (and even for sometime thereafter) the process of detection was facilitated by the electrical non-linearity inherent in certain types of crystalline material such as galena, a form of lead sulphide. This involved carefully probing the surface of the crystal with a spring-loaded wire, always known as the cat's whisker, in order to find the 'hot spot'. When this magical region was so discovered the receiver burst into life. Needless to say, any mechanical juddering within yards of the receiver was likely to lose that most precious of crystal locations. Heavy footfalls were forbidden anywhere near the wireless set. When Gill arrived in Cairo he discovered that not only were all the Army's receivers totally reliant on such a crystal for their success but also the only one worth using, according to the RE captain in charge, was the Gam-Jam sold by Gamages, the department store in London, for the princely sum of sixpence per dozen. But the Army's Ordnance Department refused to countenance

the purchase of these because they were not the Army's agreed standard type. The captain in question so treasured his one remaining Gam-Jam that he locked it in his safe when it was not in the receiver.

The Codebreaker

It was while he was in Egypt that Gill, with the assistance of a fellow officer, decided to attempt to decipher some of the many German wireless messages received by the intercept station in the lee of the pyramid. This was contrary to official policy which decreed that all enciphered messages received were to be cabled to the War Office to be deciphered by experts. However such challenges were but grist to the Gill mill and so he and his colleague duly pressed on. Success soon followed and they deciphered a fair number of messages. As always, Gill maintained that this feat was due not to any special skills that they possessed but, rather, because of shortcomings in the German's processes. Evidently, the action then taking place in the eastern Mediterranean was regarded as something of a sideshow by both protagonists in the Great War. The Western Front and its demands and priorities dominated and therefore much lower grade cipher methods were employed out east. As Gill noted, such shortcomings on the part of those involved in enciphering messages for transmission by wireless would lead to major developments a quarter of a century later.



To his surprise, when he forwarded the deciphered messages to the War Office he received not a rocket but their approval. This was followed by the arrival of a senior WO expert to instruct the two intrepid officers in the latest techniques of this dark art. Such skills as he gained then would be put to good use in the next war.

Gill's next posting was to Cyprus to establish a wireless intercept station at a point predetermined by 'the higher authorities' close to the coast. Though there was no particular merit from an operational point of view of positioning it there, its presence in full view of any passing maritime traffic (and periscopes) caused the local

military commander much bother. He feared that this latest acquisition to fall under his command would become a certain target for the German U-boats known to be extremely active in that part of the Mediterranean. Its protection and that of the citizenry nearby therefore required the presence of some fire-power. This was to be provided by a gun whose vintage suggested it had last seen service under Kitchener in Khartoum. But more of a problem was the contingent of men designated to man the weapon, for their accommodation only added to the ever-growing profile of military activity perched above the sea – and particularly at night! The local Commissioner, of Levantine extraction but who claimed long genealogical roots in England, then imposed a total black-out and enforced this with vigour and his native police force. Unfortunately for him his jurisdiction did not extend as far as the Royal Navy's base with its promenade of pier lights almost immediately below the offending wireless station. These provided the perfect bearing any submarine commander might desire as he targeted Gill's wireless masts silhouetted against the night sky. Captain Gill, for he had by now been promoted, left the island for Salonika with his task completed while those other matters were still under discussion

Malaria and Mudros

On arriving in Salonika, like St Paul before him, Gill was not overly impressed. Evidently the Apostle paid only one visit to the place after which he 'contented himself with writing epistles to the inhabitants'. Gill's major concern involved communications of an electromagnetic kind and especially the fact that there wasn't any. Throughout long periods of stalemate, the 'Bulgars' evidently used their German-supplied wireless sets to broadcast for the benefit of their British antagonists news of German victories on the Western Front.. But this attempt to undermine morale failed dismally for the simple reason that the British wireless sets, dependent as they were on crystal-set technology, were not up to the task of receiving much at all and certainly nothing from much beyond their own lines. Malaria and not enemy action was generally the major problem confronting British troops and strenuous efforts involving a variety of preventative measures were adopted by the RAMC. Quinine was the favoured pharmaceutical but as medical science grappled with the problem its frequency of ingestion varied from daily doses administered at formal parades to none at all until one had almost succumbed to the illness. Then an evil smelling ointment more akin to gear-box grease was prescribed. It too was applied with military precision but Gill was unconvinced of its efficacy especially when the RSM asked whether he 'should remove the mosquitoes which appeared to be eating the grease from the tin before it was handed round to the men'.

The island of Lemnos and particularly its port of Mudros have achieved some notoriety in British military history. It was from there that Churchill's ill-fated raid on the Dardanelles was launched in 1915. Gill's task, after arriving there sometime later, was to set up what turned out to be the last Army DF station in the Near East. With him was a detachment of Royal Engineers whose task was to erect it. Initially they were thwarted by the Staff who in their omniscience (yet again) had decreed that such facilities must be positioned on a hill and the highest one at that. Since this particular promontory happened to be well-nigh unsurmountable, Gill's arguments against its use eventually hit home. He selected the site he wanted on level ground near the Naval camp but even that encountered a degree of Senior Service hostility because, he was solemnly informed, the last Zeppelin raid on Mudros had seen a bomb dropped on that very spot. The logical conclusion of that remark continued to intrigue him well into the subsequent years of peace.

Before being demobilized in July 1919 Major Gill, having returned to England the previous year, was put in charge of the wireless intercept station at Devizes which had been moved there just before the outbreak of war from its original home in Slough. There, the six high antenna masts originally intended for the Imperial Wireless Chain were used in a very different role as part of MI 1(e), the wireless intelligence wing of the War Office. Whereas such stations had devoted all their energy during the war to monitoring enemy wireless traffic they were now charged with listening to that from their allies as well! A busy time ensued.

On leaving the Army— with the OBE (mil) as well as having been twice mentioned in dispatches – Gill immediately resumed his position as demonstrator (now known as a university lecturer) in the Electrical Laboratory at Oxford. He recommenced scientific research almost immediately and one of his earliest papers, written jointly with a colleague by the name of J H Morrell and published in 1922, established important principles in the design of ultra-high frequency oscillators [4]. The discovery they made was soon named after them. Two years later, in December 1924, Gill



VIs with some of the RSS officers in 1945

played a small part in what was to become an extremely important experiment when he provided facilities in his laboratory in Oxford for receiving equipment used by E V Appleton and M A F Barnett in their successful attempt to detect what soon became known as the Heaviside layer (the E region of the ionosphere) on this side of the Atlantic and eventually the Kennelly-Heaviside layer when the coincidental American contribution to this discovery was recognised [5]. Gill's own practical bent was always well to the fore in everything he did and he soon helped drag Merton College into a more enlightened age by setting up the first electrical lighting in the College quad using a hydroelectric generator of his design on a branch of the river [6].

Merton's Bursar

As will probably have become evident from the general tenor of Gill's book [1] frequently cited above, his personality and manner, as well as his mental vigour and clarity of mind, made him both an entertaining and endearing companion. His dry wit, especially when it was directed against cant or humbug, was memorable to all who knew him. It is reported that soon after taking off his uniform and resuming his academic duties he had occasion to telephone a colleague in Balliol College. When the porter answered, Gill asked to be put through to Mr Hartley. 'You mean Brigadier-General Hartley sir?' said the porter. 'Oh yes, I suppose I do. Would you please tell him that Lance-Corporal Gill would like to speak to him?'. But his generosity of spirit knew no bounds when he saw meritorious situations and none is more typical than his recommendation when, as Bursar of his College, he suggested to the Fees Committee that a research student should be paid nine and a half guineas rather than ten pounds for helping with tuition. He had no intention of saving the College exchequer sixpence but simply wanted to keep the poor student out of reach of the taxman [7].

Gill's research for the next decade involved theoretical and experimental studies of the effects of high frequency electromagnetic fields on the discharge phenomena in various gases. He collaborated closely with J S E Townsend, Wykeham Professor of Physics at Oxford, and they published widely. As is so often the case in scientific research, progress depends on the work of others – sometimes decades earlier – and one notes that some important work on the magnetically polarised helium-neon laser, a key component of modern telecommunications systems, published in 1976, drew heavily on Gill's work of the late thirties [8]. And always while engaged in such pursuits, Walter Gill maintained an air of almost detached stoicism with humour, an almost Edwardian vocabulary, his substantial moustache and

pipe, and a trench-coat that he never discarded [7].

At the outbreak of Second World War Gill, now aged 56, immediately volunteered his services to the Army in whatever capacity was felt appropriate. In December 1939, with his previous rank restored but now as an officer within R.Signals, he was appointed head of the 'discrimination section' of the Radio Security Service or RSS (more formally MI 8c), that had been formed in 1938.

The Fuhrer's Wireless

The purpose of the RSS was to 'intercept, locate and close down illicit wireless stations operated either by enemy agents in Great Britain or by other persons not being licensed to do so ...'. Gill's job as the chief traffic analyst clearly followed from the success (and not a little notoriety) he had achieved when deciphering German messages off his own bat during the previous conflict. The RSS also set up a number of direction finding stations situated at the furthest extremities of the country to assist in pin-pointing any such illicit transmitters but despite his considerable WW1 experience in that area of work Gill was not involved with DF-ing this time. To function, the RSS required a significant number of radio operators whose purpose would be to listen across the HF spectrum for suspicious signals and to report their content, should any be heard. Since it was expected that those transmissions would be in Morse code that skill was vital and the most obvious source of suitable radio telegraphists were the ranks of amateur radio operators. Recruitment of suitable people commenced immediately and they became known as Voluntary Interceptors of VIs. Their task was to ignore known commercial and military transmissions but to concentrate on all the others they might encounter.

By May 1940 it was clear that there were no enemy agents within the country – made evident by, amongst other things, the bearings from which those 'other'signals all arrived. Over the months, the VIs had intercepted hundreds of transmissions containing five-letter code groups. These generated considerable interest at Wormwood Scrubs, one of London's most notorious prisons, which had been commandeered for use by the RSS after the usual inmates were accommodated elsewhere! There Gill and one of his assistants shared a cell and their assessment of the characteristics of the incoming radio traffic led them to think that it was important. The assistant in question was Hugh Trevor-Roper, an Oxford historian (who subsequently became Lord Dacre), and he and Gill made an admirable pair due to Gill's obvious experience in the black art of cryptography, as well as his all-round savvy, while Trevor-Roper contributed his considerable analytical

skills as an historian as well as his fluency in German. Initially, material they thought to be important was sent to Bletchley Park, then just beginning to function as the Government Code and Cipher School (GC & CS) in what would later be seen as a place of quite immeasurable importance to the Allied war effort. But Bletchley showed little interest and the RSS were all but rebuffed. As one might expect, Walter Gill, who was never overly partial to the bureaucratic mindset, saw this apparent disdain as nothing more than the spur to action.

Exposing the Abwehr

Gill and Trevor-Roper immediately set about working on the material themselves during the evenings in the flat they shared in Ealing. They soon broke the German hand cipher for the simple reason that it was by no means of the highest grade and it succumbed easily to their disciplined attack on it. The contents revealed, as Lord Dacre subsequently described [9], a 'great treasure': coded messages from the Abwehr, the German Secret Service, transmitted from its stations in Madrid and Hamburg. In addition, there was a station in Wiesbaden engaged in training spies whose frequent incompetence in the encipherment process provided many clues to assist the duo who'd been spurned by Bletchley Park. After reporting their discovery to their commanding officer, Trevor-Roper was ordered to write a report on their analysis and this was then duly circulated up the line. The reaction from SIS (MI 6) was immediate and explosive. Trevor-Roper – the obvious miscreant since he was the scribe whose signature appeared on the document – was threatened with a court martial and all and sundry about him were roundly reprimanded. They had clearly trodden rather heavily upon the corns of the GC & CS.

Needless to say the dust soon settled and the output from the RSS was eagerly sought up at Bletchley. However it was also felt that there was clearly a need 'to get a grip on RSS' [10] and so, in May 1941, MI 6 now took direct control of the RSS whose headquarters had been moved to Arkley View, a large country house near Barnet in north London. In the take-over process, as so often happens, some of the existing incumbents were unceremoniously dumped, including E W B Gill himself who, according to Trevor-Roper, was the 'real genius of the affair'. He described Gill's sacking in prose befitting the renowned historian he was soon to become: 'After all', he wrote, '[Gill] had thrown them a lifebelt which, after they had run their own ship aground, enabled them to be winched to safety, and afterwards, on dry land, to congratulate themselves on what they should claim as their achievement' [9].

If Gill felt bruised by his treatment he never said anything

to anyone, for that was his way. In March 1942, after a detour via the Signals Training Centre at Catterick, he joined what would soon become the Army Operational Research Group (AORG) under the command of Colonel (later Brigadier) B F J Schonland. How this move came about is unknown but one must presume that Gill's achievements in the first war in the application of what is called the scientific method to wireless-related problems, as well as his most recent achievements, made him ideal material for Schonland's rather strange conglomeration of soldiers and civilians all of whom had backgrounds in the sciences even if some were radio engineers while others were ornithologists. In a remarkable report he wrote near the end of the war on his activities within the AORG, Gill described the workings of AORS3, the Section charged with all manner of issues associated with 'Signals in the Field' [11].

Signals in the Field

From what had originally been part of the Air Defence Research and Development Establishment (ADRDE), with a primary responsibility for assessing and improving the performance of Army radar, the AORG blossomed into a body with a much wider remit encompassing such fields as anti-aircraft defence, radar and searchlights, to battle analysis and time and motion studies as applied to the Army. Major Gill was appointed Military Technical Officer (Class II) within AORS3, the Section responsible for 'Signals in the Field' under the direct control of Major (later Colonel) N H Edes, a regular officer in R.Signals. However, even before the AORG formally came into being, Gill was tasked with looking into the jamming of Army radar by the Germans, and also at radar counter-measures in general. It should be pointed out at this stage that the Army had responsibility for all the radars around Britain that were linked to the various anti-aircraft batteries. Airborne radar naturally fell under the RAF and, similarly, the Royal Navy was responsible for radar at sea, of course. Until 1940 when the term radar was first coined by an American naval officer, it was known in Britain as RDF. This is frequently taken to mean 'radio direction finding' but that is incorrect. RDF was the code name given to the British technology by Robert Watson-Watt, its pioneer, and it had no specific meaning at all [12]. Since it could so easily be misconstrued as nothing more than conventional DF-ing by radio it clearly suited the British, from the point of view of security, to allow that loose description to become part of the modern lexicon.

Radar was vulnerable to jamming and this was starkly illustrated by events in February 1942. The German battle cruisers *Scharnhorst* and *Gneisenau* broke out from the port of Brest, where they'd been attacked unsuccessfully by the RAF, and made their remarkable dash up the

Channel and through the straits of Dover to refuge in the home port of Hamburg. Their escape left the British stunned. Though detected by the 10cm wavelength Coastal Defence radar near Hastings, the 150cm CD radars, by far the predominant equipment guarding British shores, were jammed by a sophisticated German effort that ramped up the intensity of the jamming transmissions over many days beforehand so as not to rouse too much suspicion of the major event about to happen. Following this calamity, recrimination flew through thick and fast at a stormy inter-Service meeting in London before it was agreed that the investigation of all forms of jamming would cease to be an Air Ministry matter and would pass to the War Office and thus to the AORG and hence to Gill.

Radar Countermeasures

Gill examined all the factors involved and discovered that one of the British GL (gun laying) radar frequencies was the same as that used by the enemy for aircraft navigation purposes. As a result, it was avoided by the radar operators for fear that their presence might precipitate retaliatory jamming. However Gill pointed out that this was probably the last thing the Germans would do since that would seriously affect their airborne navigation and so it was therefore probably the ideal frequency for the low-frequency British RDF equipment. But little else could be done; the only effective solution would be to introduce the new microwave (10cm) radars as widely and as soon as possible since the cavity magnetron on which they depended was, as far as all the evidence suggested, a device unique to the British electronic armoury [13].

A very significant development during the war followed shortly after this incident. The Germans had radar too and were using it to devastating effect against the RAF bombers on their nightly missions into Germany. Countermeasures were urgently needed and one was to be able to jam enemy radar by passive means, in other words without actually transmitting a jamming signal. This soon led to the development of what was called 'window' by the British and, subsequently, 'chaff' by their American allies.

Thin strips of metallic foil whose length was such that the strip was resonant at some selected radar frequency would be dropped in vast quantities by invading bombers with the effect of causing multiple returns and thus severe 'clutter' on the radar screens on the ground. The principle was simple and the results could be devastating because the clutter reduced significantly the possibility of the aircraft being detected by enemy radar. Gill himself had actually suggested this technique to the RAF some 18 months before he joined the AORG, and long before he

was aware of the workings of radar for, as he put it: 'I was then outside the charmed circle of those who were allowed to know about this "very secret" device and could only guess what it was from effects I had noticed on my shortwave broadcast receiver when aircraft went over my house'. His most important contribution was to suggest that the size of the metallised strips (about 15cm by 10cm), as proposed by the Telecommunications Research Establishment (TRE), would lead to excessive weight when considering the vast numbers of these things, all suitably packed, required on each aircraft. Instead, Gill proposed cutting very thin strips of foil to resonant length thereby increasing markedly the effectiveness of every kilogram carried. Trials were clearly called for. To achieve the Herculean task of producing the 10 000 or so strips required per trial he came up with a most novel solution: 'The situation was saved by the ATS telephone girls each of whom was armed, as all women, with a pair of scissors. These devoted women produced the daily 10 000 and started the art of deception by "window" on a proper scientific basis' [11].

This saga of 'window' rumbles on and its ramifications are too many to be discussed here. Suffice it to say that much confused thinking about its use persisted within the higher echelons of power (even at Cabinet level!) until Churchill himself intervened and said, in typical style, that 'the window should be opened'. It was and Bomber Command soon reaped the benefits. Gill summed up it all up in his equally pithy way: '... the RAF, who appreciates scientists more highly than the WO, promoted a flying officer to Group Captain to continue the work; but doubtless, in time, as a tardy War Office recognition we may find the ashes of "the unknown scientist" in Westminster Abbey'.

Once settled into the routines of AORS3, Gill initially saw little scope for operational research into the daily lives of signallers, their equipment and the whole process of communication by wireless. It seemed to him to be a mature activity some thirty years after wireless had originally been used in earnest in warfare, and that little might be achieved by studying its more arcane features. He felt too that the AORG's intervention would only make them unpopular with the fighting troops leading to constant rows and a spate of often incomprehensible memoranda from the injured parties. 'Wars', he wrote, 'would end more rapidly if all concerned make it their main object to put things right instead of to prove it wasn't their fault'. However, he soon discovered how difficult it actually proved to get reliable information about the sets in the field; every statement made seemed to be contradicted by every other and he cited examples to make his point. The only way to resolve it, he believed, was by personal contact with the men in the field and to

do so most effectively required NCOs to go out among the actual operators to get their views. Neither officers nor civilians were as likely to elicit the facts as they were seen by those men on the ground.

The HF- VHF Imbroglia

Possibly no other technical issue would have such long-term implications for the way the British Army communicated than the subject of whether it should be on HF or on VHF. Again this is not the place to discuss the technicalities involved as they are well covered in any modern textbook on the subject. However the operational implications were vast and required attention. This problem had come to AORG's (and hence Gill's) attention through reports from the front, once from North Africa and once from Italy in late 1943. Both indicated that signals communications had, on occasions, 'failed completely' and were only kept going by what Gill called 'agents' operating so-called suitcase sets used by spies and others dropped behind enemy lines. Those HF radios were intended to operate solely by means of sky wave propagation and not the ground wave as was the prevailing Signals policy (and was almost predetermined by the short whip or rod antennas used) for short-range Army operations in general. Though Gill was probably unaware of it at the time, this was precisely the situation that prevailed at Arnhem in September 1944. However, in the circumstances, there was little AORG could actually do or even recommend until Gill himself looked at the problems much more closely.

The opportunity arose when some US Army VHF sets were acquired by the AORG. Though the American forces had been using VHF ever since they came into the war – and with considerable success too – the prevailing view in England (and to which Gill admitted he subscribed at the time) was that VHF was 'no good' since its range was limited to line of sight. But then Gill happened to see some tables prepared by the Royal Navy which showed that this US equipment should achieve a range of nearly 40 miles over the sea and this set him thinking. With the ready approval of Brigadier Schonland, trials were held with the equipment up the Bristol Channel and they showed that the RN figures were indeed correct. Then a visit made to the police in Birmingham, who had been using VHF equipment for some time, provided convincing evidence that the line of sight restriction was wrong and that VHF signals propagated surprisingly well around street corners despite the existence of numerous high buildings. These findings then led Gill to conduct a series of rigorous comparative trials using HF and VHF sets in various parts of England and Wales, all chosen for their varied topography and degree of forestation. Their natural beauty and air of absolute peacefulness were not

disadvantageous to those conducting the tests either, so Gill noted!

The results were astounding. Forests and mountains – even Mount Snowdon – introduced few obstacles to VHF signals. Their assumed similarity to optical waves, such as light, was not only unjustified but, as Gill pointed out in a remarkable report he wrote in August 1943, it was fundamentally wrong [14]. He explained too that VHF offered even more advantages over HF for short-range working because of the greater signal-to-noise ratio it produced due to the almost total lack of interference, either natural or manmade. And, the relatively short range also made VHF more secure from the point of view of enemy monitoring of radio traffic. Finally, the number of channels available at VHF far exceeded those within the narrow HF spectrum presently used. Taken together these conclusions presented an almost unassailable case for the use of VHF by the Army. The only problem was that the British Army had put all its eggs into the HF basket and no suitable VHF equipment existed in its inventory.

Gill's summary of the reaction his report received as it migrated up the hierarchical line is interesting. It is also revealing. He wrote as follows, no doubt with much frustration, in November 1944: 'The AORG suggestion was not well received and nothing was done till Sept. 1943 [see 15] when Sir Edward Appleton's communications committee decided that some action must be taken. The present position is that it is hoped that in a few months sets will be ready for comparative tests of HF and VHF'. He then concluded: 'If future generations want an instance of how not to treat scientific work they cannot get a better example than the above' [11].

In Conclusion

Walter Gill was a man of many parts but a very private individual too. This is made evident not only by the style and quality of his writing but also by his seeming reluctance to be photographed. The various military and academic archives contain no photos of him at all – except for that of 1922. His contributions to military communications (and even to code-breaking) during both world wars have also largely gone unnoticed. But they were many and significant. Much more could be written of his work within AORS3 but space won't permit this except for a brief mention of his clear-headed thinking about wire aerials, either in the air or lying on the ground, and how they could be optimised for particular applications whether involving HF communications or for guiding men and tanks across uncharted desert. He was, as Churchill said in another context, one of the few.

Acknowledgements.

In writing this article I have lent heavily on the various sources listed below. For permission to use extracts and illustrations from Gill's book [1] I thank the publishers Wiley-Blackwell. Likewise, Dr Mary Davidson, daughter of Sir Basil Schonland CBE FRS, for use of the wartime radar photograph. I am also indebted to Mr J P (Pat) Hawker MBE for his most useful correspondence over many years on the subject of wartime clandestine communications. His service as a 'Voluntary Interceptor' (VI) of the Radio Security Service and later within the Special Communications Units (SCUs) of Section VIII of SIS/MI6 during the war, as well as his subsequent writings on so many aspects of clandestine wireless communications, made him the expert to consult on such matters. I also acknowledge the permission to use the photographs of Arkley View and of the VIs so willingly granted by Bob King, another of those VIs.

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This date is a little surprising given the date just a month before of Gill's report [14] above. From the tenor of his comments it would seem that Appleton's committee probably only reacted to it – very belatedly – a year later in September 1944, the month of the battle of Arnhem.

CORRESPONDENCE

Multilevel Security

From Major (Retired) DA Williams OBE

I refer to Lt Col Bob Valieant's article "Multilevel Security – Is it the Future?" in the Spring 2010 edition of the RSI Journal.

Whilst I do not disagree with the article I would say that we have to do more than just "stay engaged". Let me explain. For any of the Multi Level Security (MLS) solutions to work there needs to be three things in place:

A description of the access rights of every individual on each of the connected systems.

A description of what access rights are required to access each item of information in each part of the system. This may well vary in terms of granularity – for example at the TOP SECRET level you will have "need to know" boundaries, closed user groups and nationality sensitive items, whereas at the RESTRICTED level there will be little or no requirement for such detail.

Thirdly, some form of taxonomy to connect the two together – i.e. the rules by which we determine which individual can access what information.

From experience, the more you try and understand this the more difficult it becomes. This brings us into the realms of data ownership as it should be the owners of information that set and control the access rights. There is clearly a need to engage with the data owners as well as the IT technical people and those who specialise in data management as there will be a lot of detail to establish on what is achievable and acceptable.

As Bob Valieant rightly points out there is a requirement to share information not only between people in one nation but to cross national boundaries as in the case of coalition activities. Also, there are sensitivities crossing other boundaries such as the G2/G3 boundary.

The point I am making is that we need standards for these three sets of attributes which not only cross system boundaries, but also Government departmental ones and national ones to the level that interoperability demands. We need these standards today because as soon as a MLS system becomes a reality users will want to load data and use it and, typically, historic data currently has no security labels. We need to label our data as we generate it (which will require tools to make it easy for users).

*David Williams
Croydon*

May 2010

Engineering Training

From: Major (Retired) R Castle-Smith CBE

Having read the SO-in-C(A) report in the April 2010 retired Officers' Newsletter, I felt so strongly about one point that I thought I would like to endorse it. My heart sank a little when I read ". . . . and the Defence Systems Approach to Training is biased towards training for very specific roles and equipments." But my sense of despondency evaporated when I read the next sentence "Nevertheless I am determined to fight to preserve the depth and quality of the training and education that we give our people and I see the need as increasing rather than decreasing over time". Whilst it would be impractical to give everybody a broad technical education, the officers' Telecommunications Engineering course and Foreman of Signals course of yesteryear gave a really excellent breadth of theoretical and practical knowledge. After retirement I became the Chief Engineer of the FCO Communications Engineering Department, and strongly resisted attempts to make training too equipment specific. But that did not preclude top-up training on newly introduced complex technology.

In order to highlight the importance of broad training I would like to do so by, hopefully, raising a smile. When I was the Chief Systems Engineer in the Singapore COMCAN squadron, we had an encrypted single channel telegraph radio link to Bangkok, first using the historical Marconi SWB-8 transmitter and then, later, a Marconi H1103 autotune transmitter. The latter was a complex beast, by the standards of the day, but with my degree training and a good Foreman, we coped with many initial design faults without too much difficulty. The Americans wanted 3 telegraph channels to Bangkok but did not wish to set up their own radio system. So an amicable arrangement was reached whereby they would supply 8 channel telegraph equipment and maintain it; we had 3 channels and the Americans the remaining 5. This all worked well until the American equipment at the Singapore end, designated ANFGC/3, developed a fault. A Signal Corps technician arrived and looked back and forth between me and the equipment. Eventually he said "Sir, do you know what ANFGC/3 stands for?" I ventured to suggest Army-Navy and then a type number. "No Sir" he said "it stands for ANother F***** Grey Cabinet". The unfortunate technician hadn't a clue how to start; he had only been trained on specific equipments rather than being given a rather broader training on telegraph principles.

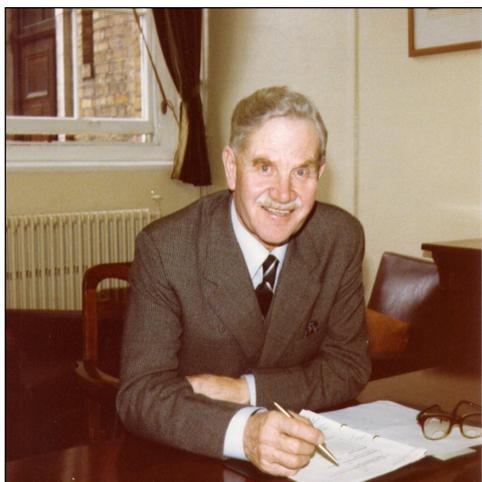
So let the Corps keep up the good work with broadly based training which will, in some cases, lead to qualifications to satisfy the IET as suggested in the article.

*Roger Castle-Smith
Hanslope*

July 2010

REMEMBRANCE

MAJ GEN PEM BRADLEY CB CBE DSO



Peter Edward Moore Bradley was born in December 1914 the son of Lieutenant and Mrs E de WH Bradley who was at that time seconded to the RE Signal Service. Peter Bradley was educated at Marlborough and the Shop and joined the Corps in 1934. During 1936 to 1938 he served with Divisional Signals in Palestine and the UK. In 1938 he moved to India and was seconded to the Indian Signal Corps in that year. He spent two years on the North West Frontier serving with Peshawar District Signals and then joined 8th Indian Divisional Signal Regiment and served with them in India, Persia and Iraq, as well as seeing active service in the Middle East and Italian campaigns. While he was with this unit he served successively as Adjutant, Company Commander and then as Second in Command. On returning to the UK and service with the British Army, he first served as Second in Command of 59th Divisional Signals in the UK and North West Europe. He then became Commander Royal Signals of 6th Airborne Divisional Signals and received a DSO for his service during the Rhine crossing.

In 1947 he attended Staff College, which was followed by both second and first grade staff appointments. He also spent a spell as the Corps representative at Sandhurst. He commanded 1 (BR) Corps Signal Regiment from 1952 until 1955 and then moved to the USA where he served as a Colonel on the Standing Group in Washington, which proved to be a good introduction to international soldiering. He then spent two years as Colonel (GS) of 1 (BR) Corps in Germany. In 1961 he was seconded to the State of Singapore and served as Commander, Singapore Military Forces and subsequently as Commander of 4th Federal Infantry Brigade, Malaysian Army returning to the UK in February 1964. He was appointed a CBE in 1964. From March to December 1964 he was the senior Army Liaison Officer and Military Adviser to the British High Commissioner in Canada, but had to relinquish this appointment prematurely in order to take up the post of Signal Officer in Chief (Army) in the Ministry of Defence with the rank of Major General. He was appointed a CB in 1968

His final appointment as a serving officer came in 1968 when he became Chief of Staff, Allied Forces, Northern Europe. He retired from this post in 1970. Prior to this he had been appointed a Colonel Commandant Royal Signals in 1967 and in the same year he was made Colonel Gurkha Signals a post he held until 1974. In August 1970 General Bradley was appointed Master of Signals by Her Majesty The Queen. During his time as Master of Signals General Bradley visited all Commands and a vast number of units of the Corps, often accompanying members of the Royal family. As Master of Signals, he always made time to talk to individual members of the Corps, serving and retired, which contributed to the high regard in which he was universally held. He died on 2 June 2010

COLONEL PT INNOCENT

From memories supplied by Major General (Retired) KJ Drewienkiewicz CMG.



Peter Thomas Innocent was born on 26 December 1947 in Meriden, Warwickshire and joined the Army in 1964 as an apprentice tradesman, training to be an ammunition technician. He was selected for the Royal Military Academy Sandhurst in 1966 and commissioned into the Corps in 1968. His early career was spent at regimental duty, including two tours in Northern Ireland, and as a troop commander with 24 Brigade HQ and Signal Squadron and 22 Signal Regiment.

After JCSC he joined 16/5 Queen's Royal Lancers as an armoured recce squadron second in command, and then as Regimental Signals Officer during a further tour in Northern Ireland. Following an appointment as second in command of 7 Armoured Brigade and HQ and Signal Squadron, he was attended the Army Command and Staff course at RMCS and Camberley. On promotion to Major, his first staff appointment was as S02 (W) CD/BD/OR at School of Signals, where he wrote the Ptarmigan Management Concept. From here was selected to command 249 (UK) Signal Squadron (AMF(L)), where he is remembered for setting very high standards, and managing to become a very good skier. His second staff appointment was as S02 MS5 in the MS Directorate, responsible for all Grade Two staff appointment selections, including "Black Bag" appointments.

On promotion to Lieutenant Colonel, he joined the directing staff of RMCS as SO 1 Communications, with responsibility for future radio and communications techniques and technology. Appointment as Commanding Officer of 22 Signal Regiment followed, during which period the Regiment deployed during the Gulf War on Op Granby to provide trunk communications in support of 1 (UK) Armoured Division. Post command, he was appointed COS 15 (UK) Signal Brigade/ SO I Communications Plans in HQ 1 (BR) Corps. During this appointment the reorganisation into HQ ARRC took place, and he was instrumental in formulating the ARRC Comms Concept which was later utilised by HQ IFOR. He went on to serve as the ARRC LO to SHAPE/ AFSOUTH/ UNPROFOR.

On selection for promotion to Colonel, he was posted to the MOD as Head of Signals 34, dealing with all communications policy and implementation matters for both tactical and fixed communications systems. On reorganisation and the advent of DCIS(A), he became Col (W) Communications Policy with sole responsibility for all aspects of Army communications policy. He wrote the Future Communications Strategy for the Army, and was instrumental in developing the Communications Concept for JRDF and the CIS Support Concept for the SH Force. He was also a member of the PJHQ Implementation Team.

In 1996 he was selected to attend the NATO Defence College in Rome, after which he was appointed to HQ LANDCENT as DACOS and the Senior British Staff Officer. He was deployed to Sarajevo with HQ SFOR then later as project adviser to the OBN. Within HQ LANDCENT he was responsible for all CIS support to the HQ including the development of the Deployable Communications Modules concept and for formulating and implementing the CIS spt for the JHQ(Centre). He was key to the restructuring of the CJF element of the new HQ. He was also responsible for setting up the international television station for Bosnia.

His colleagues from this time remember him as a highly professional, knowledgeable and effective staff officer, but at the same time a good companion, coping cheerfully with a heavy workload and enjoying a high reputation among the international community.

He married Avril in 1990, had two children from his previous marriage, Méline (deceased) and Luc, and three grand children. In retirement, hobbies were gardening, reading, painting water colour landscapes and keeping fit through golf, skiing, swimming, cycling and the gymnasium. He died on 5 November after an illness bravely borne, a great loss to the Corps, and remembered with affection by all who worked with him.

BRIGADIER TGH JACKSON OBE



Thomas Graeme Hogarth Jackson was born on 15 October 1921 in a Military Hospital at Sidcup, Kent where his father was serving as one of the original team of plastic surgeons. He later moved to Cheltenham where for a short time he was one of a small group of boys at the Ladies College. He later moved to the College and joined the Army in 1940. He was commissioned into the Royal Corps of Signals and a year later joined 9th Armoured Divisional Signals in the UK. In late 1943, on the disbandment of the division prior to D Day, he was posted abroad on the Staff of CSO Persia, Paiforce and then GHQ Middle East in the then specialist appointment of Communication Security. (Arising from the capture of Rommels Radio Intercept Company in the Desert which demonstrated the poor standard of 8th Army communication security.)

Shortly after the war he returned to the UK to join the group of instructors at RMAS, where he was employed in the Fitness Training Wing in charge of games. Arising out of this, he became a member of the Organizing Committee for the Modern Pentathlon in the Olympic Games of 1948, where using Staff of the

Army Physical Training Corps and Officer Cadets, he was responsible for the organization of the scoring system as well as the selection and the organisation of the Cross Country Event. He then moved to 1st Training Regiment Royal Signals where he continued to put his outstanding sporting abilities to effective use. He was awarded his Army Colours in Athletics, Basket Ball, Fencing and Rugby in which he was capped twelve times for Scotland as well as being invited to the final hockey trial for the same country. This logically led to a posting to the Army School of Physical Training as an Officer Instructor.

In 1952 he joined 1st Commonwealth Divisional Signals in Korea where as Adjutant he was mentioned in dispatches, and then to Australia on exchange to the Royal Australian Corps of Signals. It was here that he achieved the unusual distinction of being appointed MBE in the New Years Honours List under the special Australian List. The citation stated that though a stranger to Australian conditions he displayed such outstanding initiative, power of command, willingness to accept heavy responsibility, endurance and devotion to duty that he won the admiration and unreserved cooperation of all Australian Troops associated with him as well as that of the Civic authorities. With flood water up to the first floor of the Maitland Town Hall, he organized military line and radio communications with an Australian Brigade HQ on dry land, making use of the DUWKS allotted to him. Finally, in the absence of any firm leadership, he planned the evacuation of some 2400 people in the disastrous floods in the Hunter River Valley, New South Wales in early 1955.

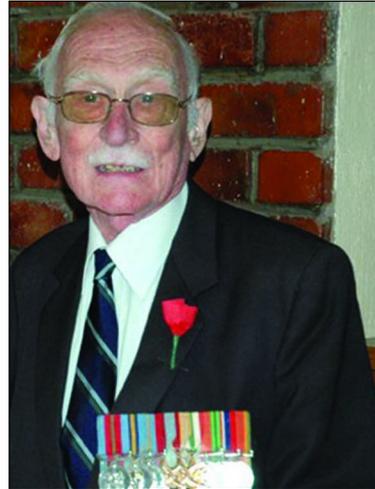
Whilst serving with 2nd Signal Regiment in BAOR he was responsible for carrying out trials to evaluate the use, in a military environment, of communication and office equipment designed for civilian use. It was on the success of this that some aspects of the successful Bruin Communication system were eventually designed. He later was responsible for introducing the system as Chief Signal Officer 3rd Division (UKMF) and Commander 11 th Signal Brigade(V).

Graeme showed great enthusiasm In all he did whether on the rugby field or in providing communications. He had a special affinity for training the young which was recognised in that over ten years of his service were spent at the RMA Sandhurst, Junior leaders Regiments, the Army School of Physical Training and in command of 11 th Signal Regiment in the training of young recruits where his services were recognised by the award of the OBE. He was nevertheless at heart a “Signaller” though he never attended the Staff College or a technical course.

He retired in 1976 as Deputy Assistant Chief of Staff, Communications and Electronics, SHAPE and took up residence in Devon where he was selected as County Director British Red Cross Society, later moving to

Buckinghamshire and carrying on this association in a voluntary capacity. He developed new interests as a DIY, cooking and a computer enthusiast, but never achieved the same satisfaction in civilian life as in his thirty six years as an Army Signaller.

COLONEL AHG MUNRO DMM



Gordon Munro was born in the Eastern Cape, South Africa, in 1925. After matriculating, he volunteered for service in the Union Defence Force (UDF) and spent the last two years of WWII in the South African Artillery where he served with the 6th SA Armoured Division in Egypt and in Italy. After the war he joined the Transvaal Scottish, a part-time regiment, before signing on in the Permanent Force in 1952. He was posted to the Signal Training Wing of the School of Artillery, then based in Potchefstroom, south west of Johannesburg. Lieutenant Munro became the first adjutant of the School of Signals (SACS) that was formed on 1 July 1953. At the end of August that year the School of Signals moved to Voortrekkerhoogte, the large military base outside Pretoria and previously known as Roberts Heights. It is now known as Thaba Tswane, such name changes being a common feature of South Africa as the country’s history evolves. The transfer of all troops, stores, etc from ‘Potch’ to Pretoria took place under the command of Gordon Munro.

In 1955 he resigned from the UDF and moved to Southern Rhodesia where he joined the Rhodesia and Nyasaland Staff Corps of the Federal Army (in the rank of sergeant!). He was re-commissioned the following year and in 1957 was posted as GSO3 to the Signals Directorate in Salisbury, the capital of Southern Rhodesia. Gordon Munro was one of many former UDF officers who decided to join the Rhodesian armed forces during the early 1950s as a result of the negative effects on their careers of many politically-inspired changes within the UDF implemented by the then South African Minister of Defence, F C Erasmus.

In 1960 he was posted to Lusaka in Northern Rhodesia (now Zambia) where he ran the Regular Force Signal Training Troop as the only Signal Corps officer in the country. Between July 1961 and April 1962 he attended the Subalterns' Part II course in Catterick prior to being appointed OC 4 (L of C) Signal Squadron at King George VI Barracks in Salisbury.

With the break-up of the Federation in 1963, the Rhodesian Corps of Signals came into being under its first commanding officer, Lieutenant Colonel O D Matthews, who had previously been OC of the School of Signals in Voortrekkerhoogte. In 1965, when Major Munro was OC 2 Signal Squadron, he was the chief technical umpire for a Rhodesian military exercise called LONG DRAG. His report summarised the many communications shortcomings that had occurred, and strongly advocated the use of so-called 'high band' VHF for use by the army.

This turned out to be a most prescient move, because it allowed for excellent inter-service communications with the Rhodesian Air Force – a major factor contributing to their joint operations in the bush war to come. Concern, though, was expressed that this decision to use the aeronautical band would mean that the Rhodesian Army's equipment would not be compatible with that of their South African allies who had followed the NATO standard of using 'low band' VHF (26 to 76 MHz) for all ground-based VHF communications. However, the pressing need for good communications between ground and air in Rhodesia was made all the more urgent by the onset of military operations against the guerilla movements of ZANLA and ZIPRA, and so the Rhodesian forces continued to use frequencies above 122MHz.

The protracted negotiations required to bring this about in 1975 were all handled by Lieutenant Colonel Munro when, as Director of Signals, he was chairman of the Joint Signals Board. During this period he received excellent support and cooperation from Colonel (later General) G L Meiring, then Director of Signals of the South African Corps of Signals, and subsequently Chief of the SADF.

Gordon Munro was the complete signaller. His career took him from NCO to full colonel, from artillery radio operator to Director of Signals and from signals training officer to Director of Plans (Army) on the Rhodesian Joint Planning Staff. His final appointment in the Rhodesian Army was Deputy Commander 3 Brigade and Commander Salisbury area. He retired in March 1978 in the rank of Colonel having been awarded the Defence Forces Medal for Meritorious Service (DMM) in 1972. In retirement, and after moving back to South Africa, he was a prolific writer of letters to South African newspapers focusing mainly on the foibles of politicians. In 2002 he

was persuaded to publish many of them in a book entitled *Dear Africa ... Oh dear, Africa!* that encapsulated his deep love of Africa and his despair at the profligacy of so many of its rulers. He also co-wrote, and published privately, a fascinating history of the Rhodesian Corps of Signals called *Bush Telegraph*.

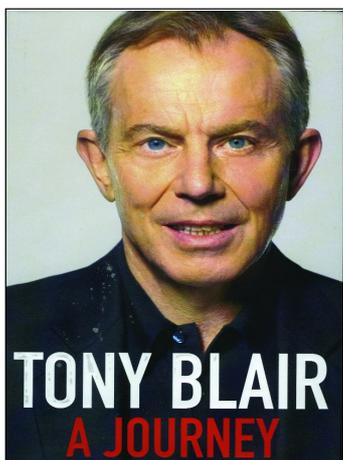
Gordon Munro died suddenly in Randburg near Johannesburg on 10 July 2010.

BOOK REVIEWS

A JOURNEY

The Years in Office and Beyond

By Tony Blair



The income from sales of this book have been dedicated to the Royal British Legion, which will heighten the interest of the military reader in this revealing account of the author's 13 years as leader of the Labour party, Prime Minister and international ambassador at large. Also of relevance is that he is forever associated with military operations in Kosovo, Sierra Leone, and Iraq, where our Corps was involved.

Although set out broadly in time sequence, the narrative occasionally jumps forward to include an exchange or an episode taking place in the future, a technique which enlivens the account and gets away from a purely historical sequence of events. The volume is thus highly readable, and sustains the reader's interest rather better than many other political memoirs.

The author's part in the resurrection of the Labour party from its disarray after the 1992 election was evidently crucial in the revival of its fortunes, and the manner in which he gains acceptance for his views, through discussions, meetings and use of the party organisation is illuminating. The author saw the Labour party as comprising three groups; Old Labour, which could never win an election, New Labour which could win and keep winning, and plain Labour which would win only once, basically as a reaction to an unpopular Conservative government. He is a firm proponent of New Labour, a conviction which drove his decision-making and effectively liberated him almost totally from self-doubt in his future actions.

In particular, a key series of meetings at this stage led to his leadership accommodation with Gordon Brown, the details of which were to provoke so much media interest in the years ahead. It is interesting to learn that after the celebrations following the Labour landslide election victory in 1997, the author's main emotion on entering number 10 Downing Street was fear, rather than elation. The Labour party had been in Opposition for 18 years, and very few of their number had any experience of Government. Many changes were implicit in their policy documents, some of which were fundamental and far-reaching, and as the author subsequently makes clear, not always fully endorsed by his own party.

The author considers himself a progressive, by which he means a belief in social justice, something which he contends was not shared by the Conservative party, although he admits that latterly many on the right had come round to adopt at least some of his views. As an abstract strategy, this was commendable, but it is clear from the book that many initiatives flowing from this were not thought through, and the law of unintended consequences came into effect. He recognises that in this respect, subjects such as human rights, multiculturalism and education went off in undesirable directions.

The reader may consider that this is inevitable while we have a prime ministerial, rather than a presidential office, with Ministers running their own departments. In particular, although never failing to laud the fiscal achievements of his Chancellor, he obviously found the coterie of advisers and staff at the Treasury to be particularly troublesome, and on occasions actively briefing against his policies. Much of this he considers due to the personality of the Chancellor himself, something which the author believes made later higher office very difficult for him to contend with.

The author is frank in assessments of other members of his staff, the party and the opposition. His closest staff were evidently highly loyal, and he acknowledges the contributions made by his Chief of Staff, (an innovation which the Civil service found difficult to come to terms with), political and diary secretaries, and his media and policy advisers. He describes with candour his relationships with Peter Mandelson, John Prescott, Alastair Campbell, Robin Cook, Claire Short and others, only occasionally glossing over some of the franker exchanges reported elsewhere. He takes care not to express personal dislike, and instead professes sadness or disappointment when dealings became rancorous. This did not inhibit him from removing those who were

becoming an embarrassment, were not performing or whose role had become superseded. Even his old friend and mentor, Derry Irvine, was not spared. The nice guy could be a butcher when needed.

In foreign affairs dealings, the author struck a strong rapport with Bill Clinton, whom he rates as a consummate politician, and who underlined to him the importance of communication: “..say it once, say it twice, and keep saying it...when you’ve finished, you’ll know you still haven’t said it enough...” He acknowledges the part played by Hilary Clinton in her husband’s success, and the importance of her support throughout marital and political upheavals. Perhaps surprisingly to some, he treats George Bush very fairly, rating him as far cleverer than he is given credit for, and acknowledges his hospitality, kindnesses and support when they were needed.

Among his party’s most significant achievements in office he cites the establishment of the Department for International Development (against Foreign Office opposition), the independence of the Bank of England, Scottish and Welsh devolution, the Human Rights Act and measures to tackle health inequality. He laments that once descending into the details of discussion, consensus and decision making, he met a morass of competing vested interests, professional, financial and sectoral, which did not “fight cleanly”, in his words. This led him to recognise the lessons of political courage: think anew, be prepared to lead and decide, and to take the calculated risk. Not too different from the military scenario.

His approach to military intervention set him apart from other Labour politicians. He had been much affected by events in Bosnia, Croatia, and Rwanda, where non-intervention brought about murder, genocide and desolation. He formed the view that not to intervene was to be complicit in the outcome. Over 100 pages of the book is dedicated to the war in Iraq, its causes, conduct and the aftermath. The author goes into great detail about the efforts to secure UN resolutions, and how the actions of France in notifying its opposition to a second resolution effectively drove the UK and US down the path it adopted. He is adamant that the right choice was made, irrespective of the existence of WMD, and that the removal of Saddam Hussein had as much implications for the peace of the Middle East as for the western world. The parts played by the UN inspectors, President Bush, the other western allies and the role of Russia are fully analysed and discussed. He acknowledges the lack of any plan for post-war reconstruction, which he ascribes to a disconnect between the US Department of Defence and the State Department.

A similarly detailed treatment is accorded the Northern

Ireland peace talks, where he placed his personal credibility at stake in leading the negotiations. The frustrations of dealing with adversaries who continually changed tack, reneged on previous commitments and seized on every trivial aspect to stall progress were monumental. The author freely admits to being an arch-manipulator, and believes that this talent was to serve him in good stead in bringing about the Good Friday agreement.

There are various reasons for political memoirs. A desire to set the record straight, personal vanity, settling old scores and preaching the way ahead are common. This book cannot so be classified so easily. The more prurient will be interested in his dealings and assessments of Princess Diana (“a fellow manipulator”), his puzzlement in dealing with Royal protocols, the relations of his wife with royalty, the media and President Bush, and the challenge of squaring these accounts with those from other sources. This is an informative, frank and highly personal account, in which the author resolutely defends his record, but acknowledges the times when he got things wrong, and those episodes he regrets. The book is long at 718 pages, but is well referenced and illustrated. Recommended.

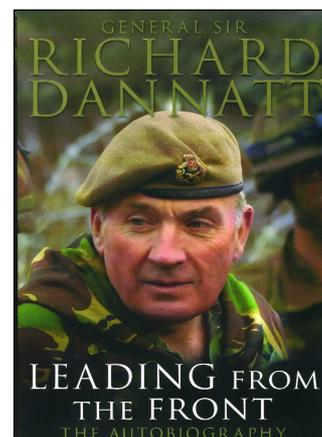
Colonel (Retired) Tom Moncur

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LEADING FROM THE FRONT

The Autobiography

By General Sir Richard Dannatt



It may seem a little strange to be reviewing an autobiography in the Journal of the Royal Signals Institution. A book on cloud computing or internet security perhaps, or even at a stretch, the autobiography of the founder of the internet. Aside from the fact that the autobiography is by our recently departed CGS, notably a CGS who was at the centre of controversy from time to time, there is another good reason. Some might remember a common theme of Major General (Retired) Bill Robins, probably the last effective senior leader of CIS that we have had in Defence – he made the point that if you were to deliver useful CIS then you had to get the balance right in addressing the people, process and technology aspects. Sadly Defence is littered with examples when that has not been the case. It is therefore important for we who deliver CIS support – the nervous system of Defence, to really understand the decision makers that we serve.

The first point to make about the book is that it is a swift read and does not disappoint. The first part of the book charts the career that you would expect of someone who rose to be the head of the Army: adjutant, early company command, Staff College, command of his battalion, Higher Command and Staff Course, key MOD staff appointment, brigade, divisional and Corps command. Two other clues to his future conduct also start to emerge – his very strong attachment to his soldiers and his Christian moral compass. A couple of incidents also illustrate his determination to do what is right even when it is breaking or bending a ‘rule’. The early part of the book is also a reminder of how intense the fighting could be in NI – Sir Richard is dismissive of his own award for gallantry. You also learn why he uses his second rather than first name!?

The middle part of the book serves as a reminder of just how busy the British Army has been since the end of the Cold War. A new and personal perspective on a number of operations is fascinating for those who have experienced them in a different location or context. It all helps to fill in the ‘big picture’ and the very fact that there are such different views of the same situation is a useful lesson in itself. For the signaller reader there is very little reference to communications other than when they don’t work! So no surprises there. The latter part of the book is perhaps the most interesting where Sir Richard explains his rationale for what he did and gives a very high level view of decision making in the Ministry of Defence. His analysis of the FRES debacle is perhaps a little charitable to the Army which in my view was not as consistent as portrayed – but then that is the value of reading different perspectives. He might also have drawn out the singular challenge in the Land environment where capability is delivered by a

multitude of relatively small and short duration programmes which have small industrial impact with the corresponding temptation to ‘blob’ them up into a larger programme which is harder to cut once under contract.

It was interesting to read his appreciation of the Directorate General of Doctrine and Development and indeed his thoughts on the nature of future conflict reflect a great deal of what was being written in Upavon some 15 years or so ago. Sadly there was something of a disconnect between Upavon and London and time will tell whether or not the new structures will work. His views on what should come out of the current Security and Defence Review are trenchant and what one would expect. He rightly considers the land environment as a whole i.e. including the Royal Marines and relevant parts of the RAF and makes the point that this it is quite incredible that it has taken the MOD so long to make even a tentative step in rebalancing resource to the area which has been doing the ‘heavy lifting’, the fighting and dying, for so long. Sir Richard’s views on healthcare and welfare provision are exactly what I would expect and the Army Recovery Capability and the investment in rehabilitation are very welcome as is the new Military Ward in Birmingham. The achievement of Help for Heroes is rightly applauded. Other than its tremendous fund raising it strikes me that it raised the game for all the other Service Charities. I found it refreshing but unsurprising for those who have worked for him that he is quick to ‘put his hand up’ when he felt that the fault was his. He acknowledges that some might view his stance as naïve and that more might have been achieved with working ‘behind the scenes’. However, it seems to me that the Army has not enjoyed such a positive, public profile for some considerable time and the MOD did eventually get around to declaring Afghanistan the ‘Main Effort’. There is another thing, to repeat a quote from Kipling:

‘For it’s Tommy this, an’ Tommy that, an’ ‘Chuck ‘im out, the brute!’
But it’s ‘Saviour of ‘is country’ when the guns begin to shoot;
An’ it’s Tommy this an’ Tommy that, an’ anything you please;
An’ Tommy ain’t a bloomin’ fool – you bet that Tommy sees!

Thanks to Sir Richard’s stance Tommy could see that they had a Head of the Army, a senior officer, who stood up for them and fought for a fair deal; all very much in character for a man with such a strong moral compass.

Lieutenant General (Retired) Robert Baxter

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