

The Military Survey (Geo) Branch

Winter Newsletter 2015 – issue 58

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MILITARY SURVEY ASSOCIATION ANNUAL GENERAL MEETING

1800hrs for 1900hrs FRIDAY THE 18th OF MARCH 2016

Location: SGTS MESS - DENISON BARRACKS - HERMITAGE

Our next AGM is to be held in the spring again next year and will take place on the evening of the 18th March 2016 and we would encourage all members to attend.

Please do try to attend and support your committee

None of our meetings are boring and anyone who has attended recent meetings will be aware they are short, to the point and entertaining; this will not change. We intend to provide sustenance in a similar vein to that of recent AGMs which were highly commended by the diners. You will be asked to contribute something towards this on the night rather than in advance, any such charge per head is expected to be minimal (Approximately £10) and as you all know the beer is not expensive.

Thus, the Committee with the kind permission of the Commanding Officer and of course the President of the WO & Sgts Mess extends an invitation to members to attend the AGM in the Sgts Mess Hermitage at 1900hrs on Friday night the 18th March 2016.

FURTHER DETAILS AND THE RETURN FORM ARE AT THE LAST PAGE

PLEASE SEND IN YOUR RETURNS NOW

OR AT THE LEAST, BEFORE 29TH FEBRUARY 2016

Surveying the Military Demarcation Line within the Demilitarized Zone between North and South Korea

42 Engineer Regiment (Geographic)



A typical setup within the confines of a Guard Post

By SSgt Neil Dicken RE

Introduction

A 4 man team from 42 Engineer Regiment (Geographic) has just completed one of the most challenging and exciting tasks the unit has been requested to support for a number of years. The mission appeared to be a relatively simple undertaking; to assist United Nations Command Military Armistice Commission (UNCMAC) personnel with both survey and Geographic Information Systems (GIS) support with the aim of accurately defining the Military Demarcation Line (MDL) that divides North and South Korea. A standard cadastral survey, I thought to myself, when the task first appeared on the radar back in February 2015. I was soon to discover just how wrong I could be!

Background

At this stage of the article, it is probably a good idea to go over a little bit of the background history that led to the Regiment becoming involved in a task of this nature. Given that the Korean War of 1950-1953, has also become known over the years as “The Forgotten War”, it would come as no surprise if many people’s knowledge on the subject was somewhat hazy.

A brief synopsis of the conflict, along with the subsequent Armistice Agreement signed in 1953, would probably serve the reader well in understanding why, over 60 years later, there are still frequent tensions and indeed hostilities between the two sides, concerning the exact location of the MDL.

The seeds of the conflict were sown at the end of World War Two when, after the defeat of Japan, Korea was divided along the 38th parallel, with the Soviet Union taking responsibility for the surrender of Japanese forces north of the line and US forces accepting the surrender of any Japanese forces south of the line.

With the onset of the Cold War, this temporary division took on a more permanent nature, with the inevitable outcome being the outbreak of war on 25th June 1950, when North Korean forces led by Kim Il Sung launched a surprise attack on the South. They quickly overwhelmed much of the country forcing the Republic of Korea (ROK) army back into a small enclave around Busan in the far south of the peninsula. The UN, desperate to stop the spread of communism in Asia, unilaterally condemned the invasion and entered the war in support of the South, swiftly pushing the North Korean forces back deep into their own territory, whereupon China entered the war in support of the North and tipped the scales once more.



SSgt Dicken and SSgt Havenhand at the Bridge of No Return

What followed was three years of bitter fighting, with neither side able to tip the balance in their favour and an effective stalemate ensuing in and around the area of the 38th parallel. Initial peace talks were initiated in 1951, but fell through mainly due to the thorny issue of repatriation of Prisoners of War. Two more years of fighting followed, with tens of thousands of lives being sacrificed to gain a few kilometres of ground, very much reminiscent of the fighting in World War One. This effort was expended to capture some of the strategic high ground in the mountainous terrain around the area in which the current MDL is situated, in order to gain an advantage when the final Peace Talks took place in 1953 to establish the terms of a cease-fire. No formal peace treaty has ever been signed ending the war.

The DMZ and the MDL

The Demilitarized Zone (DMZ) is a four-kilometer-wide corridor with a two kilometer buffer on side, north and south, of the MDL. The MDL, as established by the 1953 Armistice, was demarcated by 1,292 metal markers placed in the ground along the 151 miles through the middle of the DMZ.

“On the question of fixing a military demarcation line and establishing a demilitarized zone, both sides have already agreed that the actual line of contact between both sides at the time when the Armistice Agreement becomes effective shall be made the military demarcation line and that 'both sides shall withdraw two kilometers from this line so as to establish a Demilitarized Zone between the opposing forces ... as a buffer zone to prevent the occurrence of incidents which might lead to a resumption of hostilities.’”

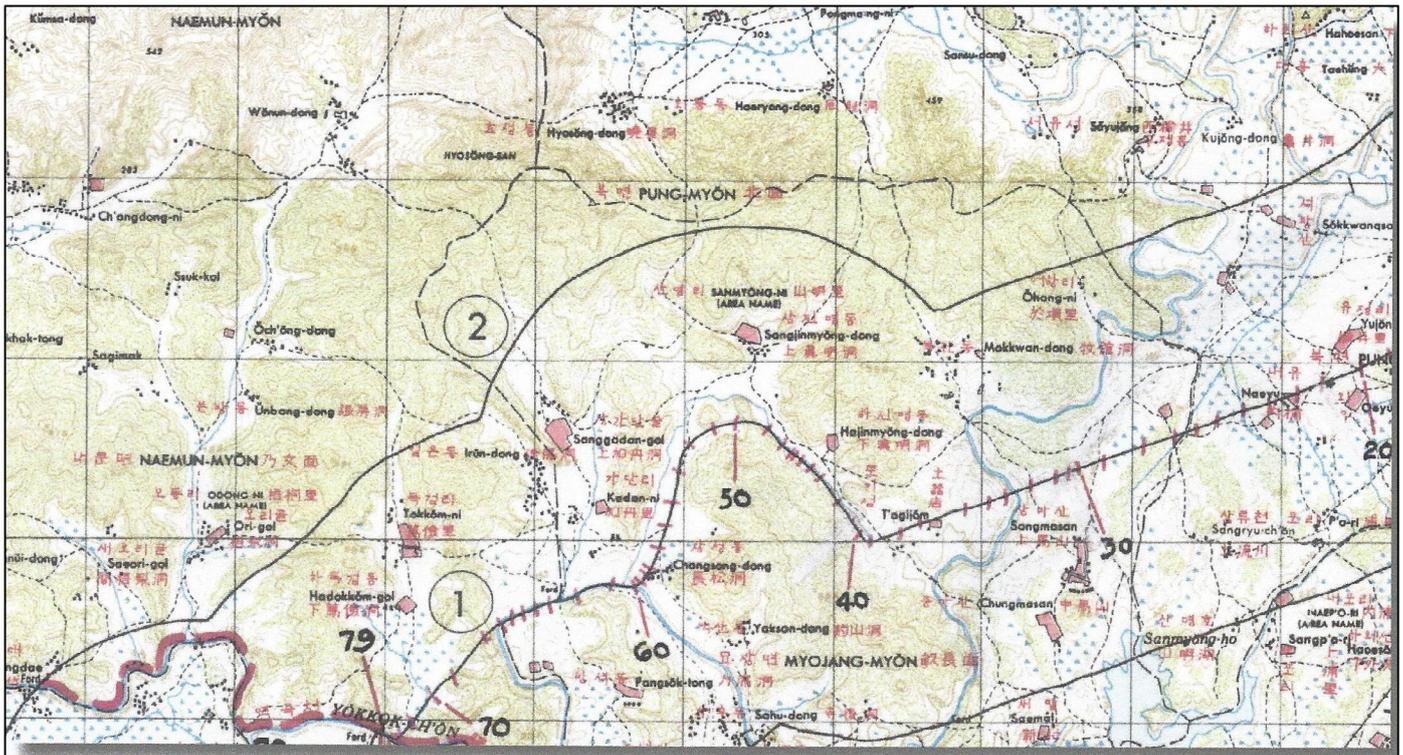
Liaison Officers Meeting, General Headquarters United Nations Command (Advance) Memorandum for the Record, Subject: Liaison Officers' Meeting held at Panmunjom between Col Murray, USMC, and Col Huang, KPA, 2 April 1953.

The Military Demarcation Line was drawn by draftsmen onto a 1:50,000 scale map, initially with pencil and then later overdrawn with a ball point pen. The width of this line, when measured at this scale can equate to nearly a fifty metre wide corridor on the ground!

As seen in the example below the MDL was defined by cartographically placing the geographic location of each marker along a drawn line. The Combat Engineer teams given the responsibility of placing the physical markers were given a number of guidelines to follow:

“Two guiding principles were observed: a) the line would conform to main terrain features which could be observed from the ground when not inconsistent with the combat situation, and b) the line would not pass through populated places if it could be avoided, since civil administration during the armistice would be fixed according to the line..... Top of sign to be not less than six feet above ground. Signs to be erected at intervals of not more than 500 meters and more frequently where required for intervisibility. Each sign to be visible from adjacent sign.”

Command Reports July 1953, Armistice Negotiations, Records of the Adjutant General's Office.



Example Section of UNCMAC AA Map (Sheet 5)

They were also given a certain degree of flexibility on where to place the markers in order to avoid the MDL cutting through the middle of farmer's fields, villages, cemeteries or other cultural features. Also, if the reality on the ground differed from that depicted on the map, teams could follow the terrain to best effect when deciding the best position for the markers to be placed. Clearly, there was ample scope here for the final location of the MDL to deviate markedly from that depicted on the Armistice Maps.

Unsurprisingly then, the actual final location of the MDL and the location of the 1292 markers along its length deviates frequently from the intended line drawn on the map and in a number of cases by several hundred metres.

This was before we took into consideration any datum issues that arose with the advent of GPS technology and the widespread use of WGS84, but I will let the GIS team explain how they dealt with that issue later on in the article.

The Survey Task

Back to the present day and the likelihood of a team deploying from the UK had become an imminent reality with the OC 13 Squadron, Major Alex Harris, conducting a week long recce in Korea to scope out the plausibility of a task taking place. Upon his return, the information he came supplied with soon banished any notions this was to be the simple cadastral survey I had anticipated in the opening paragraph.

It transpired that of the 1292 original MDL markers, only 171 were reported as still visible by the ROK army. Not a problem I thought, if we can acquire the list of the original co-ordinates for all of the marker locations, we can simply use known locations (either those of the MDL markers that still exist or temporary control points we GPS in ourselves) to conduct a simple Stakeout using the Leica Total Station to re-establish where the missing markers should be. I swear I saw the ghost of a smile play across the OC's lips before he informed me this would not be possible due to the following reasons:

1. There either never was a proper survey conducted at the time to produce a list of co-ordinates of the MDL markers, or it has been lost to posterity since 1953.
2. The entire DMZ is a veritable minefield and as such is pretty much out of bounds except for a precious few safe lanes or reconnaissance trails that the ROK army patrol along.
3. If the survey team could gain access to the MDL markers we would stand a very high chance of being shot by the Korean People's Army (KPA) soldiers who manned one of the multitude of Guard Posts (GP's) that spanned

If the survey team could gain access to the MDL markers we would stand a very high chance of being shot by the Korean People's Army (KPA) soldiers who manned one of the multitude of Guard Posts (GP's) that spanned the entire length of the DMZ.

Great! That had just ruled out my back up plan of positioning the markers by using either Real Time Kinematic (RTK) or Rapid Static GPS positioning techniques. Look at it as a challenge, the OC quipped amicably. I was still scratching my head and wondering what I'd let myself in for as I boarded the plane for Korea a couple of weeks later.

The team consisting of SSgt Dicken, Cpl Gardner, Spr Morris and Spr Crew finally arrived in Seoul on the 19th April 2015; SSgt Havenhand was to join us halfway through the task as a replacement for Cpl Gardner who had to return to the UK for compassionate reasons. We were met at the airport by an immediately likeable New Zealand officer, Squadron Leader Russell Kennedy, the DMZ Operations Officer. He was to be our main Point of Contact throughout the duration of the task and was heading up the effort to firmly establish the accurate locations of the MDL markers. His enthusiasm and dedication to the project was evident from Day One.

We were introduced to the rest of the UNCMAC team, whose job it is to ensure that the terms of the Armistice Agreement are adhered to by the ROK army. There was an interesting mix of personnel from several nations including America, New Zealand, Canada, Denmark and even Columbia. There was of course, also a contingent from the host nation making up the Republic of Korea Advisory Group (ROKAG). Everyone we met was extremely welcoming and throughout the task were impeccable hosts.

The first challenge was to establish a number of Control Points along the border, from which all our subsequent survey work could be based on. Fortunately we discovered at a meeting with the Korean Defence Geospatial Agency (KDGA) that they had already established a number of well monumented points along the whole length of the DMZ, saving us a considerable amount of time and effort.

When we finally got out on the ground, the complexities of the task soon became evident. For the reasons already mentioned, most of the MDL markers could only be observed from the safe confines of one of the GP's or Observation Posts (OP's) that stretched along the entire length of the DMZ.

The main challenges that faced the team consisted of the following:

1. The majority of markers were a considerable distance away from the GP, often in excess of 1km, which ruled out being able to use the Electronic Distance Measurement (EDM) function of the Total Station to record an angle and distance to the markers.
2. The availability of locations within the confines of the GP where we could set up the equipment and which had Line of Sight to the markers was often severely limited to just a couple of choices.
3. On a number of occasions these sites were far from ideal to set up on from a survey perspective. Obscurity problems, chain link fences and razor wire with their associated multi-path issues and unstable surfaces were all factors that I was painfully aware would have had some of my old instructors at the Royal School of Military Survey, metaphorically turning in their graves!

As a result of our inability to use EDM it was decided the only plausible option would be to observe the markers from 2 locations, or if possible 3, within the GP and then post process the co-ordinates later using the Coordinate Geometry (COGO) application on the Leica Geomatics Office (LGO) software. The following PS and TPS techniques were used throughout the survey:

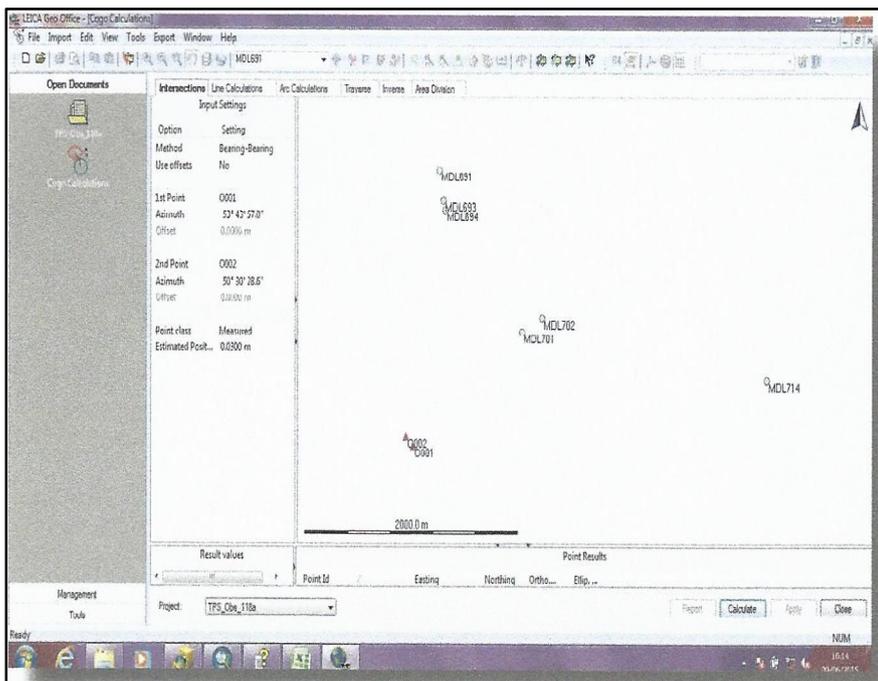
1. **Static Differential.** Static Differential requires prolonged static GPS observations using dual frequency carrier phase observables. These are differentially corrected by simultaneous GPS observations on a known station. GPS collection time is determined on the baseline length, with typical accuracies at the mm level. This method was used on our Control Points.
2. **Rapid Static.** Rapid Static surveying is a modification of the static GPS surveying technique, again using dual frequency carrier phase observations to determine the position of a point. GPS collection time using this process is dependent on the geometry and the number of satellites in view and can range from 10-40 minutes. Accuracies were typically better than 5cm.

- Total Positioning System (TPS).** Observations using an electronic Theodolite (or TPS) were used to coordinate inaccessible, high or ‘obscured to GPS’ points. Each point was coordinated a minimum of 2 times and where possible 3, thereby providing independent observations and redundancy. The temporary control stations for these observations were positioned using Rapid Static techniques.



A less than ideal set up in close proximity to a chain fence and coils of razor wire

All of the data was post-processed later in the office using the LGO software. At the time of writing the team has just finished the last of the field work and is busy computing the results. The number of MDL markers sighted has now risen to 189 confirmed visible markers during the course of our surveys. During the deployment the team managed to survey a total of 74 MDL markers. Between the KDGA surveys and the UK team surveys, a total of 136 MDL markers have now been captured.



A screenshot of the COGO application processing coordinates of MDL markers

Of the 74 markers we have surveyed, we were able to observe an angle and distance for only 10. These have been processed and coordinates calculated to cm level accuracy relative to the temporary control stations. For the remainder, a 2 ray intersection was calculated using COGO to triangulate the position of the MDL markers. This result will be combined with the results from a number of other surveys conducted by the KDGA, coordinates captured using the Thermal Optical Device (TOD) equipment held at each GP and coordinates derived from analysis of imagery/photography of the markers. The majority of these various techniques position the markers within several metres of each other and the challenge now is to mathematically combine these results to extract a Most Probable location for each individual marker.



One of the many stunning views of the DMZ as seen from a typical GP

GIS Support

By Spr Crew and Spr Morris

Our initial task as the GIS team was to support the UNCMAC DMZ OPSO Squadron Leader Russ Kennedy of the Royal New Zealand Air force in establishing the reliability of the data in the area. The main Priority was to rectify the Armistice Agreement Mapping Vol 2 that was hand drawn in 1953 by the draftsman section of the armistice commission consisting of 3 Chinese, 3 Koreans and 2 Americans. It depicted the MDL and the 2km buffer north and south for the DMZ. We began by rectifying the mapping independently to check the accuracy; we found that our version and the NGA versions were very similar with only slight differences. We attempted to rectify the mapping using grid coordinates and using elevation values but found that the mappings age and generalisations did not allow for a perfect fit. The other issue we had with this mapping was that it only showed the intent of the DMZ and MDL not the actual position of the markers, this lead to great ambiguity in the perception of the area, for instance in some places the line would appear to follow a ridge line but the imagery and elevation data would show two possible ridge lines and the original would only show one.

We were tasked with looking into the accuracy of the colour imagery provided by DigitalGlobe dated January to March 2015, we learnt that the imagery for the month of February compared to January and March was up to 100m out which was the only month we had full coverage for. Yet they all have the same accuracy statements. We later crossed checked this with CIB 2 imagery to confirm that Februarys imagery was the most inaccurate. This allowed us to check some of the previously completed UNCMAC work and give us a start point to proceed with further tasking.

On our visit to the KDGA we were told that the North Koreans do not recognise WGS 84 and are still potentially using the Tokyo 1918 datum or Beijing 1954 datum. To that end we began by re-rectifying the armistice agreement mapping into Tokyo B Datum using the latitude and longitude grid printed on the map. It was found that this was more accurate to other data we cross checked it with and the previously rectified mapping that was rectified to terrain



Comparison of a 3D model and photograph depicting MDL markers in the DMZ

While providing support to UNCMAC we were also providing support to the survey team; this involved creating overlays showing the KDGA control point locations and intervisibility analysis to show likely markers that could be surveyed. To create these we used the High-Resolution Terrain Elevation 3 data provided by the NGA. To review its accuracy we used arc scene to create 3D models of specific areas that incidents had occurred over the past 12 months, we then compared this to photos taken from the guard posts (GPs) in the area and found that although the elevation data was good the intervisibility study would be misleading due to the massive growth in vegetation over the spring/summer months. To try and combat this we looked into modelling the vegetation in small areas from the imagery but we found this to be far too time consuming a process when the models would not be able to be disseminated to the GPs.

Our final task as the GIS team was to draw a new MDL to be used by UNCMAC for future talks. Our guidance for this line was to maintain the intent of the original line but to update it to more accurate sources. We were also to use easily identifiable features in particularly ambiguous areas to make the line more easily recognizable on the ground. We undertook the task by initially using a combination of surveyed points and imagery from the guard towers coupled with our elevation data, we found this gave us a good start and were pleased with the resulting line. From here we consulted the DMZ OPSO and then created several subsequent versions using these methods and coupled in the imagery to identify more recognizable features on the ground. It is hoped that this line will be used to go forward and hold talks with both the ROK and KPA so future surveys of the line can be carried out with the final goal being to mark a new line on the ground.

Summary

The task has been without a doubt, one of the most challenging and rewarding jobs I have undertaken in my military career and I believe that is a sentiment shared by the entire team. It was the first time in the Far East for all of us and was an experience we will never forget. I would like to express my gratitude to all of the personnel at the British Embassy, UNCMAC HQ and the ROKAG for hosting us in such a fantastic manner and making the visit so memorable and enjoyable. I hope that our contribution will assist them all in opening up negotiations with the KPA and establishing an accurate record of where exactly the MDL is, so that hostilities between the two sides can be averted due to doubts over the location of the line. If future tasking is a viable option I would have no hesitation in visiting this wonderful country again and would whole-heartedly recommend it to anyone fortunate enough to be offered the opportunity.

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Subsequent Agreement to the Korean Armistice Agreement: Agreement that MDL has been Marked, 3 November 1953.

Armistice Agreement Volume II: Maps, 1 April 1954.

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Rado, John, "Where is the Korean Military Demarcation Line?" 2007.

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(Previously published in The Ranger Volume 4 Number 2)



Formation of No 1 Air (Survey) Liaison Section Royal Engineers War Diaries – History – Captain W W Williams RE - November 1942

This section was officially established on 12th November 1942. It had in fact been in existence for some months in circumstances which are described below.

While in France there was a special flight of the Royal Air Force, whose function it was to provide photographs for survey purposes. This was a flight of No 53 Squadron (Bristol Blenheim MK IV). This unit photographed a considerable area of Belgium.

When the British Expeditionary force returned to England in 1940, this squadron was transferred to Coastal Command for non-photographic duties; the special Survey Flight was lost to the mapping authorities, and has never been replaced. Thus GEOGRAPHICAL SECTION, GENERAL STAFF (GSGS) was deprived of any special resources for getting Air Photographs.

Photographs were being taken, however, for intelligence purposes. The PHOTGRAPHIC RECONNAISSANCE UNITS had a large programme of photography concerned largely with shipping, industry, bomb damage assessment, airfields etc., and it was obvious that these photographs were better than nothing.

But Intelligence photographs are not survey photographs: the principle differences are as follows:-

INTELLIGENCE	SURVEY
Of local, or 'pinpoint' interest	Essentially an 'area' interest
Generally of the largest scale possible	Usually a smaller scale required approximating to the map scale: but uniformity of scale desirable
Mathematically correct pictures not essential	Mathematical accuracy of prime importance i.e. tilt and other distortions must be minimised
Speed imperative, even at expense of quality of pictures.	Speed not necessary, as subsequent operations in mapping are necessarily slow. Good quality of pictures essential.

Between the summer of 1940 and July 1942, these PRU pictures were the only photographs available to GENERAL HEADQUARTERS for preparing maps of the continent. They covered only about 5% of the area in which the Army was interested; elsewhere the maps had perforce to remain out of date and inaccurate.

It was in these circumstances that a GENERAL STAFF OFFICER 3 was established to deal with the supply of Air Photographs for Survey purposes. Captain W W Williams Royal Engineers, was recruited to fill this post and reported for duty on 1st April 1941. Pending a decision as to where he should work, he was attached for a month to ASSISTANT DIRECTORATE INTELLIGENCE (MAPS) AIR MINISTRY.

According to the MANUAL of ARMY CO-OPERATION, one of the functions of Army Co-operation Squadrons was to take photographs for Survey. For this reason, Captain Williams was attached to the headquarters of this Command. On enquiring into the machinery for supplying Survey photographs, he learned that the necessary equipment (planes, cameras etc) was not in the squadrons, and furthermore, was told categorically by AIR MARSHALL SIR ARTHUR BARRATT that he did not accept responsibility for taking Survey photographs, although the handbook of his Command dealt with the subject in some detail.

No reason for this change in policy was ever given. Two possible reasons are, firstly the general distaste for the accurate flying which survey requires, and secondly the development of the MERTON gridded oblique photography which was receiving considerable attention at this time.

This latter was a disturbing development, for it showed so clearly how inadequately those in authority appreciated the Survey problem.

In brief, it was this: That roughly 12 squadrons of planes – and their ancillary units – were equipped to work for a system which required 1:25,000 maps, while not a single theatre of war to which our forces might be sent was mapped on that scale, and not a single plane was made available for producing such maps.

Clearly, then it was going to be difficult to get survey photographs if such an anomaly went unnoticed. In fact for 12 months, no real progress was made.

During this time, Captain Williams collected all usable photographs from the CENTRAL INTERPRETATION UNIT, and from squadrons who returned from France. He also maintained or established contact between GSGS and:

DEPUTY DIRECTOR PHOTOS
ASSISTANT DIRECTOR INTELLIGENCE PHOTOS
CENTRAL INTERPRETATION UNIT
PHOTOGRAPHIC RECONNAISSANCE UNIT, COASTAL COMMAND
PHOTOGRAPHIC RECONNAISSANCE UNIT, BOMBER COMMAND (now extinct)
I.A. (5) GHQ HOME FORCES
ROYAL NAVAL PHOTOGRAPHIC SCHOOL
ROYAL AIRCRAFT ESTABLISHMENT FARNBOROUGH (photos)

For the progress of mapping nothing more useful emerged than sifting the CENTRAL INTERPRETATION UNIT photographic library for such material as could be used for revising existing map series. This revision was naturally a patchwork affair, and it was possible for the date of a French map sheet to be 1879 in some places, and 1942 in others.

BEACH GRADIENTS

In January 1942 Captain Williams was consulted by MAJOR VENOUR, MANCHESTER REGIMENT, O/C ARMY SECTION, CENTRAL INTERPRETATION UNIT on the problem of determining the gradients of enemy beaches. Attempts to solve this problem by the usual parallax measurements failed for obvious reasons.

Captain Williams suggested that a possible solution would be to photograph the beaches at different states of the tide, the horizontal distance between the various edges could be measured from the photographs, and the tide heights could be computed from the time of photography. Thus the gradient could be assessed.

Two experiments were made for this purpose: the first at LITTLEHAMPTON; photographs were taken in February 1942 a ground survey was made about 3 weeks later. The results could be called only fairly satisfactory. The second experiment, at BARRY on 4th April 1942 yielded close agreement between the 'Air' result and a ground survey made on the same day. These results were submitted to the B G S (I) GHQ Home Forces on 10th April 1942 and it was decided to go into production forthwith. During these experiments much valuable assistance was received from MAJOR W B R KING OBE MC ROYAL ENGINEERS, and MR VAUGHAN LEWIS of the Department of Geography Cambridge University. The former for his geological advice; and the latter for his description of beach formations and coast erosion.

The first task in beach gradient work was to assess the gradients enemy beaches on which our troops might be required to land. For this purpose, Captain Williams had 12 attached other ranks, chiefly topographic draughtsman: they began work at GHQ Home Forces (rear) on 30th April 1942.

The resultant plans were ADMIRALTY 'Z' CHARTS, which have a limited circulation. The drill for producing these was as follows:-

- (I) The RE section calculated flying programmes, so contrived that the beaches were photographed at high and low spring tide levels, and four uniformly intermediate levels.
- (II) These programmes were passed to 140 Squadron who took the necessary photographs when weather conditions were good enough.
- (III) The RE section made up mosaics from the low water photographs, determined its scale, and transferred waterlines from sorties taken at other times.
- (IV) The RE section sent a statement of the times of photography to the SUPERINTENDENT TIDAL BRANCH HYDROGRAPHIC DEPARTMENT ADMIRALTY, who computed the tide levels. These levels were entered against the water levels on mosaics.
- (V) At this stage the mosaics were sent to the SUPERINTENDENT OF CHARTS ADMIRALTY who drew the cross sections and published the final 'Z' charts.
- (VI) Before publication geological notes on the material of which the beach was built were compiled by MAJOR KING ROYAL ENGINEERS and sent to the SUPERINTENDENT OF CHARTS for inclusion in the final chart. 140 Squadron (Spitfires) undertook photography of beaches between the DUTCH ISLANDS and ST MICHELE, and the PRU flight and ST EVAL south and west of this.
- (VII) Simultaneously with sending the mosaics to the SUPERINTENDENT OF CHARTS, duplicate copies with draft sections were sent to LIEUTENANT COMMANDER STEPHENSON ROYAL NAVY of COMBINED OPERATIONS.

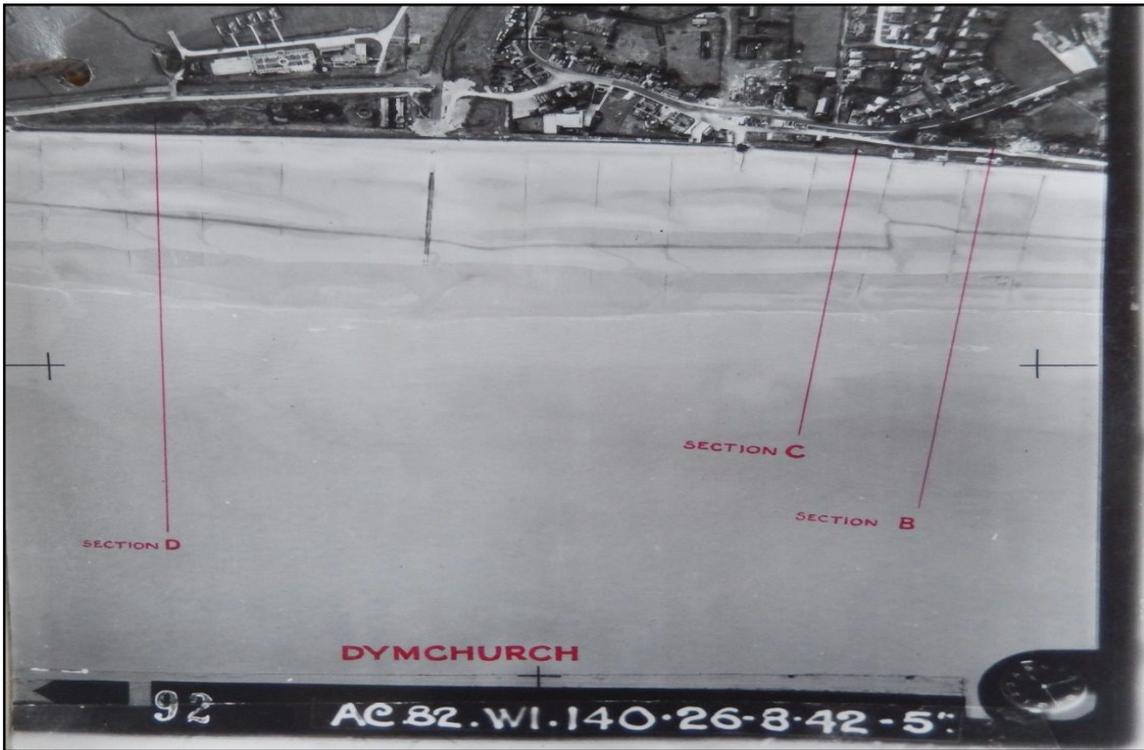
RESEARCH WORK

Two lines of research were undertaken as a result of this beach work.

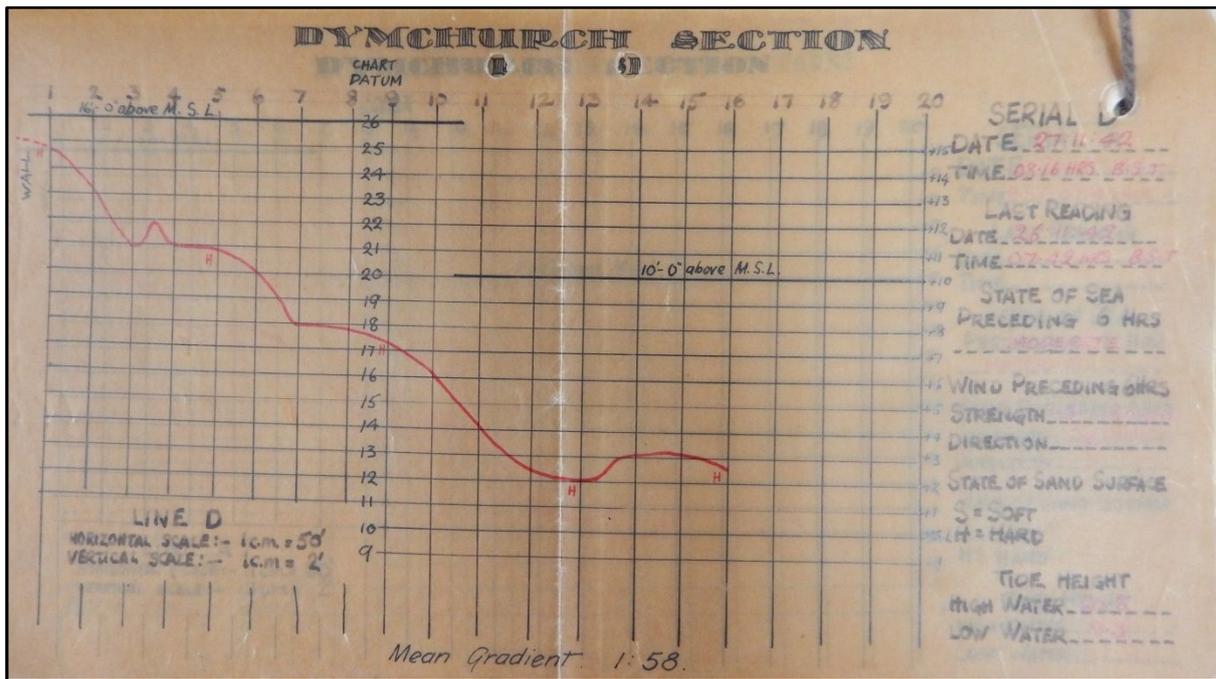
- a) A method of determining water depths from wave velocities.
- b) The causes of runnels and banks on sandy beaches.

These should be described briefly:

- i. It is apparent that the method employed for beach gradient determination made it possible to determine gradients between High and Low Spring tide levels. Generally gradients outside these limits can be reasonably assured by intelligent extrapolation. But this is not always the case, especially where the tidal range is small obviously, wave behaviour depends to some extent upon the nature of the sea bottom, and following up this line of argument a mathematical formula was supplied by DR HAROLD JEFFERIES FRS MA READER IN GEOPHYSICS CAMBRIDGE UNIVERSITY, which gave a relation between water depth, and wave velocities and lengths. Investigations proceed: and it appears that the value of the method depends rather upon the existence of getting suitable waves.
- ii. A feature of some of the beaches on the French coast is a system of undulations running parallel to the shore. This feature is well known in this country, where they vary in size from place to place, and undergo periodic changes. It is necessary to determine, not only how deep these runnels were – which was not difficult – but also, in what conditions they change, and how rapidly and to what extent they are moved. Accordingly experiments were begun at DYMCHURCH in November 1942, which should yield original and valuable observations of this phenomenon.



TNA WO 166/15392



'BENSON' SERIES OF MAPS

After protracted deliberations in GSGS and the DIRECTORATE OF SURVEY GHQ HOME FORCES, it was decided to produce a series of 1:25,000 maps of a large portion of the North of France. By arrangement with GHS HOME FORCES 140 Squadron undertook this task. It involved covering very large areas with photographs at or near the scale of 1:25,000. Men were needed to plot the photographs as they were taken, and to arrange their distribution. The same RE section undertook this work, and moved to RAF MOUNT FARM (Dorchester, Oxfordshire), alongside 140 Squadron on 15th July 1942.

It was to regularise the existence of this section that No 1 AIR (SURVEY) LIAISON SECTION was established on 12th November 1942. The ROYAL ENGINEERS section referred to, assumed this title, and continued the duties which have been described above. Its general function is to represent GSGS with the ROYAL AIR FORCE units working for them; but in addition it had a considerable task in beach gradient determination.

No 1 AIR (SURVEY) LIAISON SECTION formed under WOUM 20/ENGRS/6864 (AC 7a).

War Establishment No: - III/202/1

Officer Commanding: - CAPTAIN W W WILLIAMS ROYAL ENGINEERS

Other Rank personnel attached: -

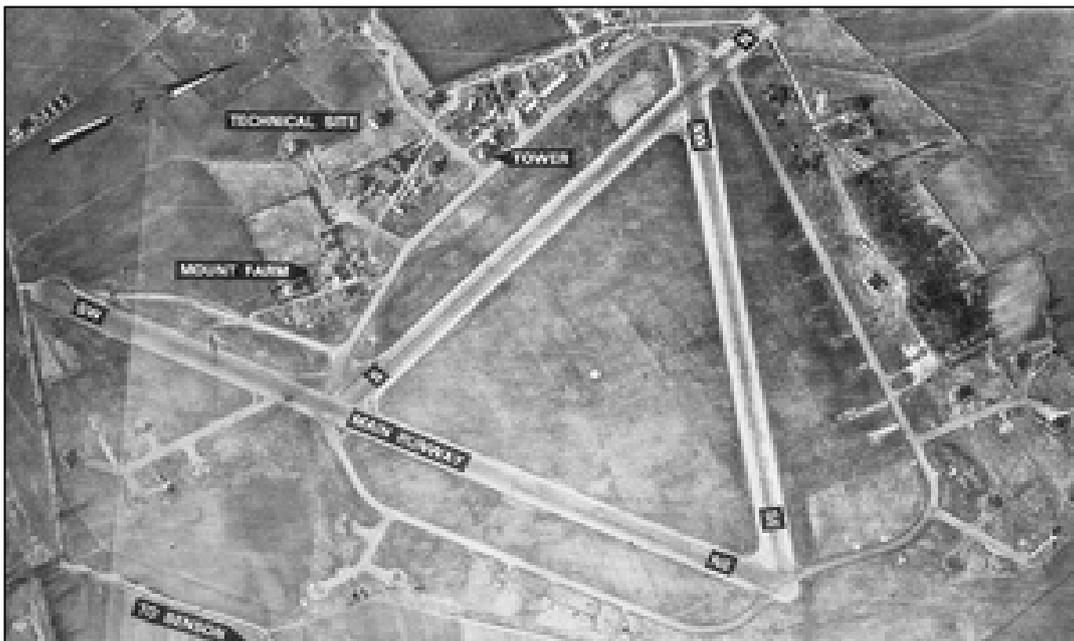
2181608	Cpl.	COFFIN A G	No 1 RE DRAWING SECTION (AIR MINISTRY)
215430	L/Cpl	THEOBALD N H	SURVEY TRAINING CENTRE RE
2001613	Spr	CLOTHIER R J	SURVEY TRAINING CENTRE RE
1951471	Spr	STREET W J	SURVEY TRAINING CENTRE RE
1868422	Spr	WORT E G	14 (CORPS FIELD SURVEY) Coy RE
1952759	Spr	ARMOUR C	SURVEY TRAINING CENTRE RE
1950783	Spr	ROGERS J W	No 3 DRAWING SECTION RE

(Above mentioned seven OR's from attachment to GHQ HOME FORCES)

1951462	Spr	JEAN E H	No 3 GENERAL SURVEY SECTION RE
1942894	Spr	HOBBS R C	No 3 GENERAL SURVEY SECTION RE
2129459	Spr	TAYLOR W H	522 ORDNANCE SURVEY Coy RE
1870019	Sgt	COOK A H	No 5 GENERAL SURVEY SECTION RE

PLACE OF FORMATION: Royal Air Force Station, MOUNT FARM DORCHESTER-ON-THAMES OXON.
(Commanding Officer: Wing Commander LE MESURIER DSO DFC)

Captain J H TAYLER ROYAL ENGINEERS, is in charge of RE Drawing Sections at 'COOMBELANDS' ADDLESTONE Nr WEYBRIDGE SURREY.

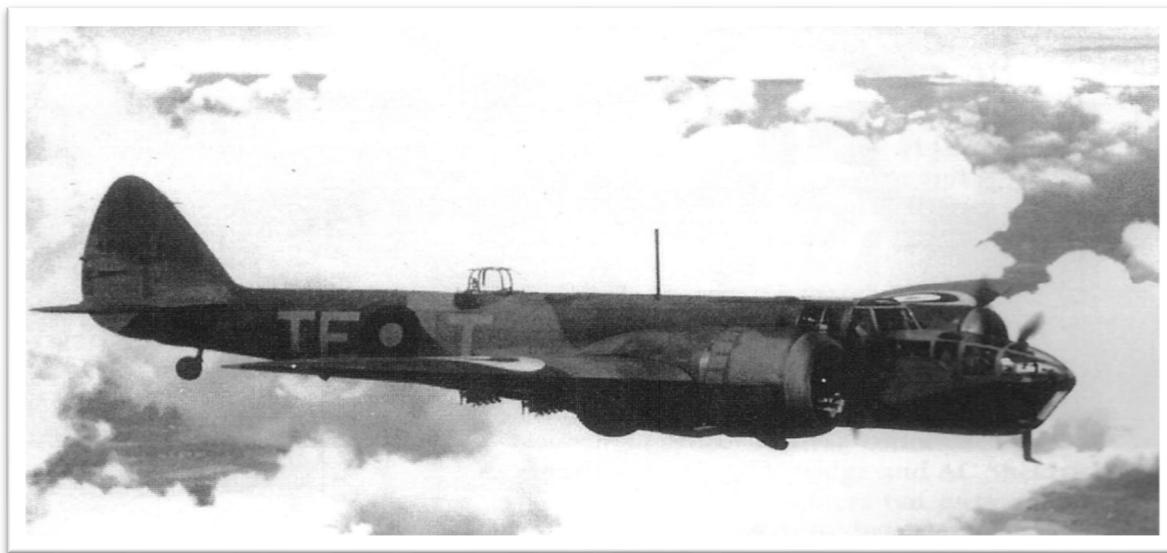


RAF Mount Farm is located 3 miles north of Dorchester in Oxfordshire. It was originally a satellite airfield for the RAF Photographic Reconnaissance Unit (PRU) at RAF Benson. RAF Squadrons 140 & 543 were both based here in 1942/43. The airfield was originally a grass field, but concrete was laid for runway and aircraft parking purposes and for taxiways. In February 1943 it was taken over by the USAAF and used as a photo reconnaissance station.

No 53 Squadron RAF

No 53 Squadron of the Royal Flying Corps was formed at Catterick on 15 May 1916. Originally intended to be a training squadron, it was sent to France to operate reconnaissance in December that year. It returned to the UK in March 1919 to Old Sarum where it was disbanded on 25 October 1919.

The squadron reformed on 28 June 1937 at RAF Farnborough with the Hawker Hector for Army Cooperation specialising in night reconnaissance. The squadron was given the Bristol Blenheim light bomber in January 1939 and moved to France in September. Following the German attack on France in May 1940, the squadron returned to the UK and undertook bombing and reconnaissance missions.



*53 Squadron's L4843 was shot down on 16 May during crew's first operation – a reconnaissance sortie to Belgium.
53 lost four Blenheim's that day, two of them shot down by RAF Hurricanes.*

In February 1941 the squadron changed duties moving to Cornwall from where it flew anti-shipping strikes off the French coast. In July 1941 the squadron converted to the Lockheed Hudson V, and began to fly anti-submarine patrols.

No 140 Squadron RAF

Briefly formed during the First World War on 1 May 1918 at RAF Biggin Hill as a home defence squadron, but in fact the squadron never went operational and was disbanded on 4 July 1918.

The squadron formed again on 17 September 1941 at RAF Benson from 1416 Flight (a pre-existing photo-reconnaissance unit) and was equipped with Supermarine Spitfire 1G's and Bristol Blenheim's both equipped with cameras. The squadron flew photo reconnaissance sorties over northern France, using the Spitfire during the day and the Blenheim at night.

It was later equipped with specialised photo-reconnaissance versions of the Spitfire. In 1942 the squadron operated a detachment at RAF St Eval in Cornwall to photograph the French ports on the Atlantic coast. The Blenheim's had not been very successful in the night role and were replaced in 1943 with Lockheed Venturas.

To support the forthcoming invasion of France the squadron was involved in detailed photography of coastal installations as well as photographing other targets and general mapping.



Spitfire PR 1C flown by Flying Officer S G Wise, approaching Heston

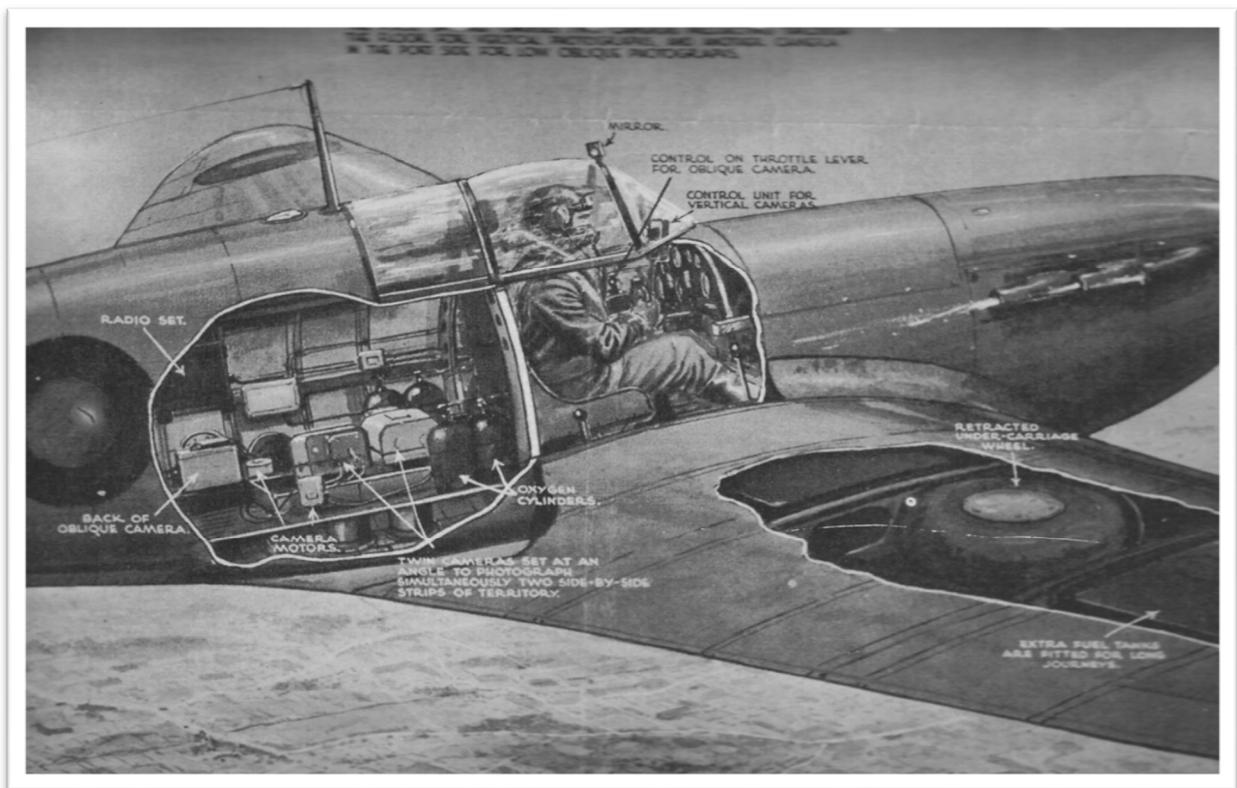


Diagram of a standard PR Spitfire camera fit

The squadron was equipped with Mosquitoes in 1943, which enabled them to cover more ground and fly deeper into France. The squadron moved in to France and Belgium operating throughout the winter of 1944-45. The squadron was disbanded at RAF Fersfield on 10 November 1945.

Sources:

The Bristol Blenheim – A Complete History Graham Warner Crecy Publishing 2002

Photo Reconnaissance – Andrew J Brookes Ian Allan Ltd 1975

Noel Grimmett

Obituary & Memoirs
Brigadier Geoffrey Gathercole 7th March 1931 – 20th November 2015
By Lt Col (Rtd) Mike Stanbridge

Brigadier Geoffrey Gathercole sadly died on 20th November 2015, aged 84, after a long period of deteriorating health, following a stroke in September 2009. He rarely served in UK Survey units so may only be known by name alone to many readers of this REA Geo Newsletter. However, for those that did know him personally, from his tours in 84 Svy Sqn, 42 Svy Engr Regt and 512 STRE, they will be aware that he was a true English gentleman - courteous, methodical and trustworthy of everyone, regardless of rank or nationality, who persevered with his duties and responsibilities until he delivered the results in a timely manner.

His army service in the Corps started in Aug 1951 when he was commissioned from RMA Sandhurst, which he had entered two years previously directly from Whitgift independent boys school in South Croydon. However, it was a further ten years before he entered Military Survey and joined 27 Army Survey Course at Hermitage in 1961. In those ten, non-RE Survey, years he saw service with six Units in eight different locations including Austria, Canada and Christmas Island.

Maj Gen Fagan recalls that he first met Geoff on that Army Survey Course, when Geoff was the course senior and leader. He reports that Geoff soon earned the respect of all the other students, and I quote - *'He was self evidently, a straightforward and honest sort of guy. Those traits were to prove good and show, to good advantage, throughout his military career'*.



No 27 Army Survey Course
20 Feb 1961-19 Apr 1962

Olobobokin Hinges Daramola Obiako Shalwani Ireibi
Fagan Shaubel Gathercole Himbury Mongeau

Following his survey course in 1962, Geoff was posted to 84 Survey Squadron in FARELF as a Captain, and took command of the Tawau detachment in Sabah where it completed observations on Mounts Tannabalu, Madai and Silom for the six Eastern sheets of Brunei. Further planned observations closer to the Indonesian border had to be abandoned for security reasons.

The detachment then moved to Kuching where Geoff was appointed Survey Advisor to Commander British Force (COMBRITFOR) and became responsible for trade training and the upgrading of Field Survey Technicians as the Squadron was slowly being brought up to strength again. He was on active service during this period.

He returned to the UK in September 1963 and was posted to Ordnance Survey. Firstly as the Assistant Regional Officer in Bristol and then on promotion as the OS Regional Officer in Kidderminster. In 1967, he was selected to attend the Advanced Photogrammetry Course at University College, London and, then, to practice what he had been taught, he was posted to BDLS Canada as OC Air Survey Wing.

Following this instructors post he was promoted to Lt Col in 1970 and posted to Feltham as AD Svy 1 with the overall responsibility for the careers and appointments of all RE Svy personnel. He then went onto Barton Stacey in 1973 as CO 42 Svy Engr Regt before going to Washington DC in 1975 as AD Svy/CO 512 STRE. Many readers, like the author, would have met him and served under his command in one or both of the latter two appointments between 1973 and 1977.

His excellent well balanced and considerate liaison capabilities in DMA Washington gained the respect and reports he deserved and he was promoted and posted to SHAPE, Belgium as a full Colonel and, ex officio, Chairman of the annual NATO Geographic Conference. In this post his personal qualities, previously mentioned, came to the fore yet again and in 1983 he was promoted to Brigadier and took up what was to be his last appointment in the Service. A new post at Feltham, entitled Director Survey Operations & Production, which is where I was pleased to meet up with, and serve under him, yet again.

This appointment at Feltham was, unfortunately, to be a very short one as he had, in his own words, "*been made an offer he just couldn't refuse*"; and that was as the Deputy Director & Keeper of the Map Room at the Royal Geographical Society in Kensington. Consequently, he was to remain within the Geographic community and his knowledge and experience would not be lost. He remained with the RGS until his retirement in June 1989.

He enjoyed a happy retirement with plenty of travel in Europe and Britain and enjoyment of his grandchildren. He suffered a stroke in September 2009 and his health and mobility deteriorated over the following years. He was moved to a nursing home, where he remained until his death on 20th November.

To summarise, Geoff had a very successful career in the Geographic community, both military and civilian, and he leaves behind his strong supportive family - his dear wife, Shirley, after 55 years of marriage, together with his two daughters Helen and Sarah, son-in-laws Nigel and Rod and five grandchildren, Emma, James, Ellie, Miles and Ben.

His funeral service took place at Basingstoke Crematorium on 10th December, which was followed by a Thanksgiving Service at Christ Church, Winchester and a Wake at Lainston House in Sparsholt, which was well attended by those who knew and had served with him throughout his military career.

I was saddened to hear of the death of Chris Everett, as reported in the Summer 2015 edition of the Newsletter. Our paths crossed several times and he always struck me as a thoroughly decent man.

The first time that I met him was when I was posted to SMS in 1961 (I think) as a "potential surveyor". I'd come straight from 1 Training Regiment, passed the Trade Training Board tests and had a couple of weeks spare with nothing much to do before being sent to 14 Squadron in Germany to serve as a general dogs body until my A3 Topo Surveyor course started.

To prevent my idle hands causing mischief, I was told to help Chris who, at the time, was the Sergeant Instructor responsible for the Technical Library. I was full of trepidation because, at 1 TRRE, if a sergeant ever spoke to you, very bad things were sure to happen in the near future. My fears were groundless. Chris was a kindly man with an almost schoolmasterly character. Once he'd persuaded me not to stand to attention whenever speaking to him, he explained my duties to me.

These were light and consisted of making both of us a cup of tea twice a day. The rest of the time I was free to explore the Technical Library, which was full of fascinating stuff like 19th Century survey reports from the far reaches of the British Empire and original hand-drawn sketch maps of the Middle East made by Kitchener when he was a young Survey officer.

One morning he arrived to unlock the library office and could not find the key. We checked with the guardroom, but still no key. This was serious, because Chris had left some course material in the office that he needed for that day's instruction. What were we to do? Tentatively, I suggested that we could break the door down.

Chris pondered this for a moment, and then told me to go ahead. As I'd always wanted to break a door down, but never been allowed to, this was my moment. I braced my back against the wall, raised my size 10, steel shod, ammunition boot and slammed the heel into the door near the handle. The door splintered and the door frame ripped out of the wall. We were in! We both agreed that we had done a good job, but I never found out how Chris explained the damage to the authorities.

More than fifty years later, I still remember how much fun it was to break down that door. Sorry to see you go, Chris.

Peter Robinson
Powell River, British Columbia

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Visit www.militarysurvey.org

Preview – Spring Issue – 2016

- Officers of the Boundary Commission – British Columbia 1858
- Formation of No 2 Air Survey Liaison Section RE – 1943
- American Target Perspective Maps of World War Two

MILITARY SURVEY ASSOCIATION ANNUAL GENERAL MEETING

1800hrs for 1900hrs on FRIDAY 18th of MARCH 2016

Please note that the bar will be open from 1800hrs and the committee will be present to welcome you at that time. Food will be served after the AGM is complete (at about 2000hrs) it is hoped that members will be briefed on current and future operations.

Accommodation: We are again hopeful (**but do not promise**) that a small number of rooms will be available; given the barracks are no longer under the command of Mil Svy units this may prove to be too difficult but they will be allocated (if available) on a first come first served basis. **You need to contact me directly should you wish to take up this offer - assuming it becomes available.**

Dress: Smart casual or better if you wish!

It is vital to establish firm attendance figures early and so once again we would request that you return this form ASAP. RETURNS BEFORE 29th February 2016 PLEASE TO:

To: M. Perry, 101 Craven Road, Newbury, Berks, RG14 5NL Any problems please contact me at - mandpdperry@sky.com or Tel: 01635 37510	
From: Forename:.....	Surname:.....
Address: -	Tel No: -
	E-mail: -
Type & Make of transport:.....	Registration No

I *shall/*shall not be attending the AGM on Friday 18 March 2016; I will be bringing the following guests:		
1	2.....	3.....

<p>PLEASE - PLEASE REMEMBER THE GEO SUPPORT FUND</p> <p>I enclose a cheque to support this for £..... payable to "Military Survey Branch REA"</p>
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If you have any special dietary needs or require disabled access please detail these below and every attempt will be made to accommodate them.

NB: Military units do not cater for severely disabled conditions (for obvious reasons) and we apologise in advance for any shortcomings that might cause individual inconvenience.

***Delete as appropriate.**