

**60 SIGNALS GROUP**  
**FIGHTER COMMAND**  
**ROYAL AIR FORCE**

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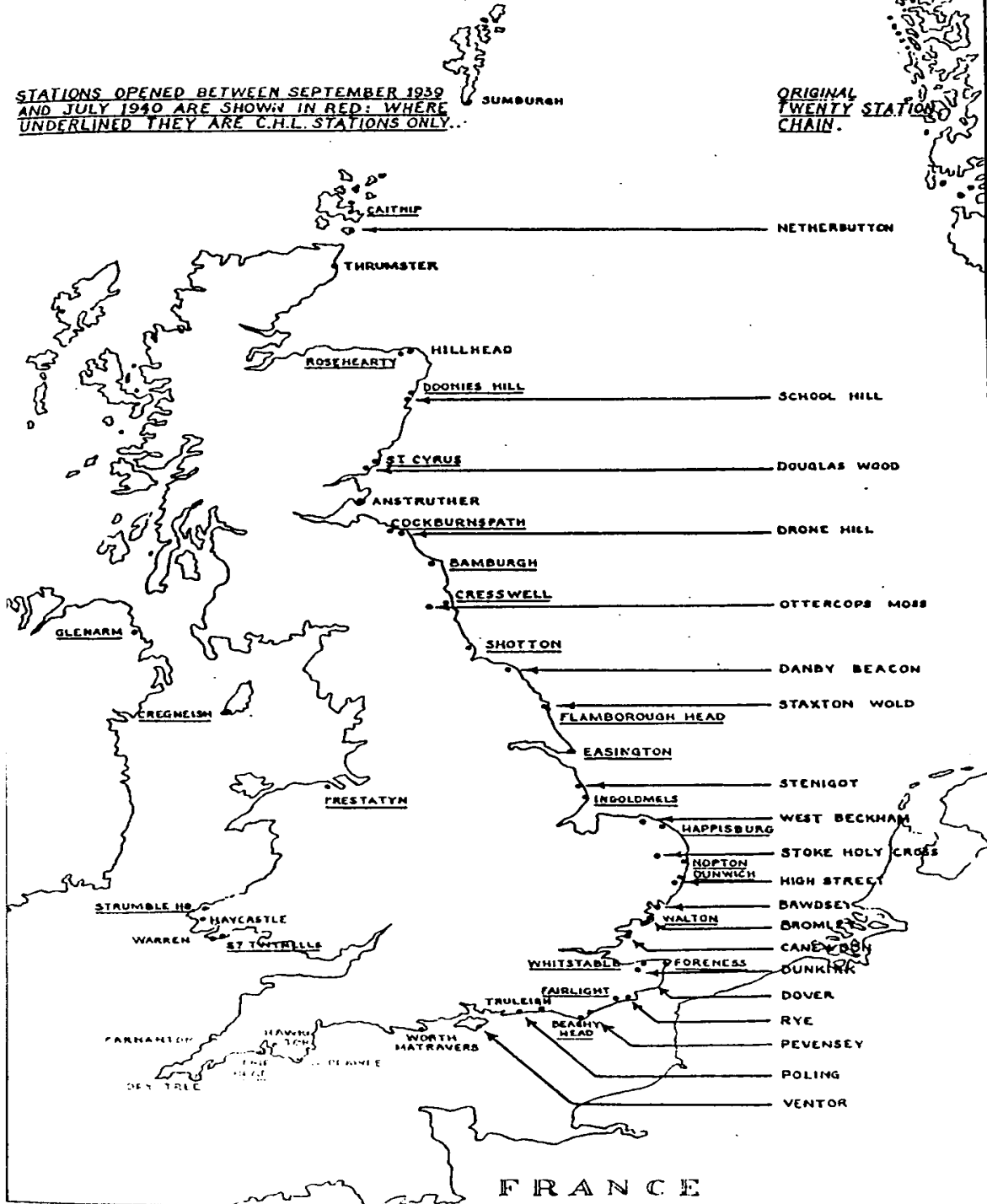
60 Signals Group

THE R.D.F. HOME CHAIN  
DURING THE BATTLE OF BRITAIN

MAP No. I.

STATIONS OPENED BETWEEN SEPTEMBER 1939 AND JULY 1940 ARE SHOWN IN RED: WHERE UNDERLINED THEY ARE C.H.L. STATIONS ONLY...

ORIGINAL TWENTY STATION CHAIN.



Courtesy "60 Group Radar Bulletin"

## 60 Signals Group

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## **60 Signals Group**

### **A Brief History of No.60 (Signals) Group**

#### **Introduction**

During World War II "Number 60 Group" (60 Grp) was the technical, administrative and coordinative heart of the Royal Air Force radar (RDF). In its time it was by far the largest organization of its kind, anywhere, although similar - but much smaller - agencies served naval and army RDF needs. 60 Group emerged relatively late in the evolutionary history of radar (six months after the declaration of war) but rapidly, and in the face of seemingly insurmountable difficulties, it soon assumed full control of Britain's "electronic home defence". In addition, it nurtured all of the overseas radar systems and, finally, became a leading player in carrying the offensive back to the German heartland through the use of radio navigation aids (RNA). This abbreviated overview can merely highlight a few of the major steps in 60 Grp's development.

#### **Preamble**

The British RDF air defence chain, in its concept, construction and initial operation, was an entirely civilian enterprise contained largely within the Air Ministry. The "Air Defence Committee" of that Department, chaired by Sir Henry Tizard, supplied the initiative, encouragement, political support and arranged huge (for those days) financial backing. The service arm, i.e., The Royal Air Force, had (1935-1939) no managerial, operational or technical authority over radar; pre-war, the RAF supplied little other than a desperate need for assistance, personnel for training, and some air flights required to calibrate and test the system.

Early in January, 1935, reacting to the obvious threat of Germany's expanding Luftwaffe, the Air Ministry sought technical advice concerning the possibility of "stopping" German aircraft engines using radio or infra-red beams. They consulted Mr R.A.W. Watt(1), an experienced atmospheric-research scientist, who dismissed the "stoppage" idea as unworkable but suggested an alternative, based upon his earlier work involving radio-echoes from the stratosphere. There is no need to repeat the story of the "radio-echo" principle; suffice it to say that on 26 February, 1935, Watt tested and proved that radio-echoes from aircraft, indicating at least range and direction, were measurable, and proposed a chain of watch-stations to operate on this principle.

#### **60 Group Conception**

By September of 1935 the far-sighted Watt had recommended the eventual establishment of a centralized, Royal Air Force "new signals unit responsible for the chain". This unit, he proposed, would control all aspects of air force RDF as well as the RAF personnel who would operate it. Here was the seed which, four and a half years later, produced No. 60 (RDF) Group, Fighter Command.

(1) Mr R.A. Watt assumed the hyphenated Watson-Watt form of his name when he was knighted in 1942

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### **60 Group Gestation**

Watt quickly assembled a small research team in Suffolk - briefly at Orfordness (1935) then, in larger quarters, at Bawdsey (1936-1939), an "Air Ministry Research Establishment" (AMRE) was founded. Still under civilian control, all technical developments, as well as the training of RDF mechanics and operators, were well under way at AMRE Bawdsey by early 1937. Not merely new equipment, but entirely novel information processing systems were devised (new vocabulary, plotting and reporting procedures, land lines, information "filter rooms", central plotting and fighter-control operations, etc.) and all were channeled toward Fighter Command Headquarters (FCHQ) at Stanmore but, again, still under civilian control. Four Section Maintenance Units (SMU's) were established to keep the equipment "on the air" and several "CH Installation Groups" roamed the south and east coasts siting and constructing new RDF stations. These were designated as "Chain, Home" (CH) and they were replicated, at least on paper, by a "Chain, Overseas" (CO) system.

There was an embryonic chain of five stations on the air in time to watch Neville Chamberlain fly to Munich in September, 1938, (Bawdsey, Great Bromley, Canewdon, Dunkirk and Dover). On Easter Friday, 9 April, 1939, an extended 15-station chain from the Isle of Wight (Ventnor) to the Firth of Tay (Douglas Wood) - went on continuous 24-hour watch without planned interruption for the next 6½ years. Only destruction by direct enemy attack put any of these stations off the air for an appreciable time..

### **60 Group Labour Pains**

Complete handover of the system to RAF control, although long "on the back burner", was abruptly precipitated by the declaration of war, (September 3, 1939) with a "panic plan" to re-locate all RDF research facilities away from Bawdsey in anticipation of direct German air or commando attack. The organization was split into at least eight components, seven of which had been, or immediately were, re-located. Bawdsey's RDF installation remained on site but became "Air Ministry Experimental Station (AMES) Bawdsey" (C/O, S/L J. A. Tester) and was No.1 of the chain of, by now, 18 incomplete but operational CH stations. Detailed histories of seven of the eight "spin-off" sections are outside the scope of this chapter but their major functions are listed here to indicate the roots from which No. 60 Group finally emerged:

1. AMES Bawdsey, later became RAF Station Bawdsey.
2. The founding superintendent, R.A.W. Watt had already assumed an over-all RDF supervisory role at the Air Ministry ("Director of Communications Development").
3. The earlier transfer of the Central Filter Room and Operations Control Centre to FCHQ, Stanmore, was consolidated and now placed under RAF control.

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4. The group responsible for analyzing the effectiveness of the RDF system (Mr H. Larnder, Director) was also re-located at FCHQ and, ultimately, developed into Fighter Command's famous "Operations Research" section (ORS).
5. The RDF technical research groups (AMRE), working on invention and improvement of all ground and airborne radar, were moved to the University of Dundee. These groups, later - and in other locations - developed into "The Telecommunications Research Establishment" (TRE). Mr A.P. Rowe was the Chief Superintendent throughout the war.
6. Dr.E.T.Paris' army-oriented research group ("The War Office Cell") moved to Christchurch, later to Great Malvern, Worcs. Ultimately, with Sir John Cockcroft as its Director, it became the army's equivalent to TRE.
7. A small group of radar mechanics and operators trained by S/L Raymund Hart at Bawdsey formed the founding nucleus for the RDF Training Centre at Yatesbury (January, 1940), while a similar group (under F/L D.H. Preist) organized the original mobile RDF units which accompanied the British Army in France (September, 1939-June, 1940).
8. The 60 Group Embryo. A group of seventeen of the Bawdsey staff previously engaged in research became the "Base Maintenance Headquarters" for all RDF stations. Enlarged with fifty more technicians from government communications departments (notably BBC radio and television, GPO telephones), this group moved to Leighton Buzzard, Bedfordshire, in late 1939. The Director was Mr H. Dewhurst, a civilian electrical engineer who had worked with Watt since 1935 as a specialist in RDF antennae and mobile-CH design.

### **60 Group Birth**

On 23 February, 1940, Dewhurst's unit (BMHQ) was combined with the several CH installation units and formalized as "No. 60 Group" within the Directorate of Signals ("Signals-4, RDF"), Royal Air Force. The Group also took in the RDF Training Centre at Yatesbury, No.2 Installation Unit, Kidbrooke, the RDF Special Calibration Flight, Martlesham Heath, and a chain of 22 CH and 15 CHL working RDF stations. (CHL: For detection of low-flying aircraft).

At the time of 60 Grp's formation, the chain of Command was: A.O.C-in-C, Fighter Command, Air Chief Marshal Sir Hugh Dowding; Director-General of Signals, Air Vice Marshal Nutting; A.O.C. 60 Group, Air Commodore A.L. Gregory.

Group Headquarters was established, and remained throughout the war, at Oxendon, Plantation Road, Leighton Buzzard, Beds. This location was selected by Edward Fennessy, already experienced in the siting and construction of CH stations. Later, he was the head of Radar Navigation Aids.

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Thus, nearly five years after Watt's suggestion, control of RDF-but by no means the technical initiative- passed from the experienced civilian pioneers to the uniformed newcomers, a mixture fraught with predictable bureaucratic problems.

As 60 Group was born, its objectives, although seemingly straightforward, were immense in number and, in fact, were unattainable without immediate and major expansion. At the time, only ground stations existed but 60 Group assumed responsibility for all aspects of these (finding suitable new sites and equipment, installation, supplies, maintenance, staffing, training and operational efficiency).

By May, 1940, there were thirty-three CH and forty CHL sites with numbers increasing daily. The group took on, also, commitments towards the CO and COL chains -counterparts to CH and CHL- which were planned for the protection of ports at Gibraltar, Malta, throughout the Middle-East, India, Singapore and Hong Kong. (Although, ultimately no radar was deployed at Hong Kong). While the deployment and operation of the CO system was the responsibility of the Regional RAF commands (Middle-East, India and the Far-East), 60 Grp was the main resource-body for RDF technical expertise and it was continuously bled of its trained personnel and forced to compete for equipment and spare parts.

Simultaneous with "Sixty"s establishment, mobile MB-1's (for CO) were already on site at Alexandria, Aden and Dingli (Malta). Demand increased daily; some personnel and very much equipment was lost en route to the overseas sites or destroyed to prevent capture (France, Singapore, Crete, Greece, and North Africa). This wastage was an enormous impediment to 60 Grp's rapid development at home.

From its inception, 60 Grp was held responsible for ensuring the supply and training of all RDF personnel and the provision of up-to-date technical information to the chain (e.g., maintenance and repair manuals). If this were not enough of "extra duty", the Grp was charged, in addition, to perform any "heavy maintenance work which is beyond the capability of the Radio Maintenance Units" and, even, "to fabricate all replacement parts not available elsewhere". Tall order! This necessitated the recruitment of many more electrical and radio engineers from government agencies and industry, and scientists and technicians of all kinds from the universities. Many biologists and chemists found themselves learning electronics.

Born in crisis, the 60 Grp's nascent facilities were at once strained by a series of extraordinary tactical demands resulting from:

1. The Allied Expeditionary Force dispatched to Norway in April, 1940. Mobile RDF support-units were ordered and readied but not shipped before the Force had to be evacuated.
2. The supply, manning, and then evacuation (or destruction) of all RDF equipment with the BEF from France (mid-June, 1940). Personnel were also diverted to the lost cause of training the French Allies in the use of British radar. One AI-trained squadron (but not equipped) - No 600 Squadron-

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was lost in assisting the Finns against the Russians (February, 1940).

3. The Battle of Britain (beginning in July and proceeding through day, then night, phases for the following ten months). Six CH stations (Dover, Dunkirk, Rye, Pevensey, Poling and Ventnor) were primary targets of vicious Luftwaffe attacks during the week 12-19 August, 1940. In spite of much damage, Group repair and maintenance efforts, with use of reserve mobile CH equipment, kept the down-time at most of these stations to a matter of 3 to 4 hours. Only Poling and Ventnor, suffering repeated assaults, were kept off the air for several days as quick repair was hindered by the presence of un-exploded delayed-action bombs. The Germans, noting the quick recovery in CH transmissions, were deceived into thinking that the damage was slight and did not justify their own losses. They failed to persevere with these nearly fatal attacks on British RDF, and this was one of their greatest blunders of the war, costing them any chance of winning the Battle of Britain. This was 60 Grp's first significant victory.

4. The very real threat of imminent German invasion of the United Kingdom (August, 1940 until June, 1941).

5. The rapidly developing Battle of the Atlantic.

Concurrently, the steady expansion, improvement and support of the RDF chains, both at home and overseas, never let up. Crash programmes ("flaps") were the daily norm and these quickly revealed a deficiency of personnel in Britain who were trained, or suitable for training, in electronics. This manpower shortage was critical and was a prime factor in looking to the Commonwealth for "Radio Mechanics".

Enter Canada! Experienced radio servicemen from Canada began training at the Yatesbury RDF school in January, 1941, and 60 Grp was active in setting up No.31 Radio School, RAF Clinton, Ontario, in the summer of 1941. The disposition of all RCAF radio mechanics, as they arrived or graduated in the UK, was handled by 60 Grp through the Records Centre at RAF Innsworth.



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### 60 Group Re-Organization:

#### The Radio Service Wings (later, "Signals Wings").

In attempts to cope with these immense demands for operational assistance, the group was re-structured many times during the war. Beginning in July, 1940, there was an extensive de-centralization and the Base Maintenance functions, as well as much administrative authority, was delegated to several "Radio Service Wings" (originally ten, No.s 70 to 79, later reduced to eight, No.s 70 to 77), each to perform and to be accountable for all 60 Grp responsibilities within its own particular region of the UK. Then, adapting again, in response to weaknesses exposed by the Battle of Britain, most of the design and installation work on the chain was contracted out to private industry and the eight Service Wings were yet again adjusted several times. After May, 1944, and until war's end, four Wings (No.s 70, 73, 75, and 78) serviced the ground RDF chain throughout the United Kingdom. No.72 Wing was re-activated (see Radar Navigation Aids). These were now called "Signals Wings".

#### Ultimate Wing Boundaries (1944-46).

Number 70 Wing encompassed all RDF ground stations in Scotland including the Western Isles as well as the Orkneys, Shetlands, Fair Isle and, eventually, Northern Ireland. In late 1942, to assist in the Battle of the Atlantic, a chain of five small early-warning sites (Type-6, "ASV-pack sets") was established in the Faroe Islands between Iceland and Norway. This chain reported air and sea plots to both Coastal Command (18 Grp) and to the Royal Navy, but all personnel and equipment (except one naval 10-cm set) were provided by 60 Group.

Number 73 Wing was responsible for the northern two-thirds (approx.) of the land mass of England plus North Wales, Anglesey and the Isle of Man. Its southern boundary was an east-west line extending from mid-Suffolk to mid-Wales and passing just south of Cambridge and Worcester.

The southern one-third of England was divided between 75 Wing which took in the south-east ("Hellfire") corner, westward to and including the Isle of Wight and the mainland area to the north of it as far as the 73 Wing boundary; and No.78 Wing which included the remainder of southern England (all of south-west England, South Wales and the Scillies). Although No.75 Wing was the smallest in area, it was by far the busiest in terms of radar traffic and, throughout the war, it suffered more than its fair share of jamming and much actual enemy attack from aircraft and long-range artillery. (see map Home Chain March, 1945)

### Division of Responsibility:

#### Air vs Ground RDF

As new types of ground installations were introduced (e.g. GCI, Types 100 ("H", later GEE-H), 7000 (GEE), 9000 (OBOE), 15, 16, and 24 (Fighter Directors), Loran, Shoran, Rebecca-H, radar beacons and ground-Mandrel jammers), 60 Group naturally assumed prime responsibility (see also Radar Navigation Aids). From its beginning, 60 Grp also supervised the entire protective system based upon the various Marks of IFF.

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In development and deployment of airborne counterparts (e.g., AI, ASV, H2S, Monica, Boozler, Fishpond and jammers such as air-Mandrel and Jostle), the initiative remained largely with TRE, the University scientists and industrial engineers. All of these worked together and directly with the RAF squadrons through the "RDF Directorates" of the user commands (Fighter, Bomber and Coastal) and, later with No.100 (Radio Counter Measures) Group. Nevertheless, all of these activities required the full technical involvement of 60 Group with its never-ending responsibility for supply of RDF-trained personnel, manuals, and administrative back-up. This sharing of ground/air development began in earnest as the Battle of Britain passed from daylight to night-time phases (in October, 1940) and a crash programme for GCI (ground) and its complementary airborne equipment (AI) developed in concert. While this addressed the needs of Fighter Command, 60 Group's attention was soon required by Coastal (ASV) and Bomber (navigation aids) Commands.

In March, 1942, the original A.O.C. of 60 Group, A/C A.L. Gregory, was succeeded by A/C R.S. Aitken. The group had absorbed some 100 naval and army radar stations in addition to expansion of its own facilities. By mid-September, 1942, the personnel of 60 Group now numbered "786 RAF officers, 315 WAAF officers, 90 USA officers and approximately 12,000 airmen and 5,000 WAAF, WRNS and ATS, together with 300 civilians making a total of over 18,000". **Regrettably, although 90 Americans are mentioned, many hundreds of RCAF personnel are not given recognition distinct from the RAF.**

In acknowledgement of the growth of 60 Group's responsibilities the A.O.C.-establishment was raised and, in October, 1942, A/C Aitken was promoted to Air Vice-Marshal. By mid-1944, AVM Theak held this position.

### **Bureaucratic Conflicts**

For historical integrity it must be mentioned, once and briefly, that 60 Group at times exhibited the darker side common to all huge organizations. Over-regulation, "Empire Building", seeming insensitivity of centralized command to realities faced "out on the chain", poor co-ordination between departments, personal jealousies, office politics, arrogance and, occasionally, outright ignorance - all made their presence known. These were the predictable human failings ever present in any large group. As always, they caused un-needed problems and delayed progress.

Some unfortunate personality clashes occurred very soon after the Group's formation in early 1940 when control of the entire system was handed over to the RAF. The "Founding Fathers" (Boffins) were mostly creative, free-spirited scientists accustomed to the personal and academic freedom of University life. These were brought, overnight, into the stiffly regulated, uniformed, atmosphere of the military. Due to their precedence and personal enthusiasm in the building of the chain, the "civvies" attempted to carry on as before, freely coming and going at all hours, happily disregarding any dress codes, doing necessary but "un-authorized" technical modifications, innocently getting in

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the way of the spit and polish and doing all sorts of things which were abhorrent to the "uniforms". The latter regarded this as prejudicial to good order and discipline and they reacted quickly to establish their new-found authority. Acting on grounds of "Security", the Director General of Signals ordered that entry to all RDF stations be forbidden to anyone without the specific approval of 60 Grp Headquarters. There was some bitterness when Boffins had to ask for a pass in order to see their own inventions and to be told, in some cases, that they were "interfering" with the work ! Several of the top radar pioneers were lost to the army and naval research services at this time. Fortunately, the civilian scientists who worked directly with the operational squadrons encountered little of this "attitude".

Within the RAF itself, the pettier side of "Group" and "Wing" H.Q.'s was sometimes perceived at outstations as more hindrance than help, arousing exasperation in already overly-stressed Station Commanders. Constant re-organization, bringing increasing levels of authority demanding more and more trivial reports and form filling, caused wails of "When are they going to join!" and "Get off our backs and let us get on with the war!".

In retrospect, with the picture more complete, it is obvious that, overall, 60 Grp performed magnificently and was a keystone in the victory won by radar. It was the framework upon which all ground-based RDF was supported and, through its responsibility for the supply of trained technicians, it was essential to all airborne radar as well. It is unfortunate that 60 Group's contribution is little-known today outside of its own loyal membership. Indeed, it has received less than fair acknowledgement in the memoirs of the "Giants" of radar history, even those of its originator, Watson-Watt, or in the writings of some of its principal beneficiaries such as the A.O.C-in-C. Bomber Command, Air Marshal A.T. Harris and the A.O.C. of 8 Group (The Pathfinder Force), Air Vice-Marshal D.C.T. Bennett.

In September of 1943 universal adoption of the American name "Radar" in place of "RDF" generated much comment, not all of it favourable. Among thousands of other changes, 60 Group's RDF technical News periodical was re-named "The Radar Bulletin". It began publishing classified news of the Group in April, 1941 and, with restricted circulation, continued until October, 1945.

### **Radar Navigation Aids (RNA)**

With no let-up in the continuing development of defensive radar, 1941 saw stirrings in the introduction of pulsed "radar-like" systems (Watson-Watt's definition) to be used for offensive purposes. These were the radar navigational aids (RNA) which provided accurate guidance towards an enemy target in the air (GCI), or a target on the ground (GEE), followed with a more precise target indication on arrival (AI, ASV, H2S, OBOE, GEE-H). RNA also included LORAN, SHORAN, REBECCA-H, REBECCA-EUREKA, and other interrogator-responder beacon systems.

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In addition to "blind" bombing and air interceptions, RNA also served in pin-pointing for photo-reconnaissance, for dropping airborne troops and supplies and selections of landing-sites for seaborne assaults. Of all the systems mentioned, only GCI, AI, ASV and H2S were "true" (echo) radar; the others relied on a triggered radio response. Semantics aside, all were treated as radar and 60 Group was fully involved in the establishment and operation of the systems, the ground-station components in particular.

The Group History records that these efforts "covered a great part of 60 Group's activity for the last three years of the war...(and) played a vital part in the destruction of the German war machine". Eventually, a special section, "60 Group Radar Navigational Aids Section, Cambridge" was devoted to the technical and operational aspects (only) of the Types 100, 7000, and 9000 static ground stations in the UK. In preparation for the invasion of France, the previously disbanded No.72 Wing was re-activated (15 May, 1944) to exercise 60 Grp's technical control of the fleet of GEE, GEE-H and OBOE mobile stations which, after D-Day, served in the Allied Expeditionary Air Force (AEAF) and were administered by the various user-Groups of the AEAF (See Operation (NEPTUNE-OVERLORD)).

### **Return to Europe via-**

#### **Western Desert**

Within its mandate to support and supply "all things radar", 60 Group was heavily committed to the supply of trained personnel and despatching of early-warning units (MRU), CO and COL radars, GCI-Fighter Directors and other systems to Malta and Egypt, climaxing in the great desert campaign and victory (October 1942 to May 43). There was a great demand for mobile filter-rooms, Fighter-controllers and RDF officers, mechanics and operators which, again, depleted the "home" establishment. It was here that, in essence, the build-up of mobile radar preparatory for the return to Europe really began. Canadian radar technical personnel predominated throughout the Mediterranean theatre of operations.

#### **North-West Africa (Operation Torch, 8 November 1942).**

The Group's involvement surged with the landings in French North-Africa (Algeria and Morocco) and advance into Tunisia. A large number of light-warning sets and GCI mobiles were required and these were assembled and trained in England and were liberally staffed with RCAF radio technicians. There were critical shortages of spare-parts, signals communications gear and, especially, of technical officers to lead the convoys. 60 Group arranged for "Commando Training" and commissioning of many Canadian radar officers from the ranks at this time, preparatory to ultimate posting to the Mediterranean theatre. Unfortunately, the Group could do nothing to alleviate the limitations in shipping to ensure on-time, or safe, delivery.

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The main landings, after North Africa were:

Operation HUSKY, Invasion of Sicily	10 July 43
Operation BAYTOWN, The invasion of mainland Italy (Reggio)	3 Sept 43
Operation AVALANCHE, The invasion of mainland Italy (Salerno)	9 Sept 43
Operation NEPTUNE, Assault phase (Normandy)	6 June 44
Operation DRAGOON (ANVIL) (Southern France)	15 Aug 44

The successful introduction of ship-borne fighter director radar (FDTs; GCI mounted on Tank Landing Ships) was made during HUSKY and the first continental land-based mobile GEE chains (AMES 7600 Series) were set up in Italy within 205 Group.

### **D-Day; Normandy and North-West Europe (NEPTUNE and OVERLORD)**

At TRE it was called "GEE-Day", so widespread was the use of GEE in all activities leading up to and during the landings on the Normandy beaches. In lesser "volume" but nevertheless crucial, OBOE, H2S, the home chain radars, three Fighter Direction tenders (FDTs), and many radar beacons played their roles in the assault. Once the beachhead was established, all forms of mobile early warning radar, A.A. gun-laying, and GCI went into action ashore. The tremendous stabilizing influence contributed by IFF must also be recognized.

Number 60 Group played its usual part, beginning in the earliest planning stages. This was often in spite of, rather than with the co-operation of the Army planners. Specially trained personnel, equipment, spare-parts, maintenance and repair units were marshalled and made available for deployment, as required. Convoys were assembled at many locations in the UK, notably at Renscombe Downs, Bawdsey and Cardington. They were fitted out and waterproofed for wet-shod landings. On the Continent, the mobile radars became the administrative responsibility of the various user-Groups of the Allied Expeditionary Air Force (AEAF), but a special Wing of 60 Group (No.72) was re-activated "to take (technical) responsibility for radar defensive cover in the Base Area" (No.85 Group H.Q.).... (and)...."for the maintenance of all radar navigation ground stations in the operational theatre.....". (See Section on RNA). Early warning radar and fighter direction units deployed in 2nd Tactical Air Force (2, 83 and 84 Groups) were controlled within those groups with 60 Group technical support. Also, within the U.S. 9th Air Force zone, provision of radar was a British responsibility, particularly in regard to OBOE mobile ground stations.

With the increased size of these operations, the number of casualties among highly trained radar personnel became significant, - quite heavy for technical, non-combat troops. To cite only four examples:

1. On D-Day, in the American sector (Omaha Beach), No.15082 GCI was "drowned" when mistakenly landed in too-deep water and the survivors came under heavy enemy fire. (Total casualties, 6 officers and 41 airmen).
2. On 7 July, 1944 FDT No.216 was torpedoed and sunk by a JU-88. (5 radar men were lost).

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3. On 18 September, during Operation MARKET GARDEN, Light Warning Units AMES 6080 and 6341 were sacrificed at Arnhem (2 officers and 39 airmen were lost).

4. Possibly the largest single-unit radar loss of the war occurred off Ostende, Belgium, on 7 November, 1944. An LST carrying No.1 Base Signals and Radar Unit struck a mine and sank quickly. (Fourteen radar officers and 224 other ranks (78% of Unit personnel), and 50 vehicles loaded with electronic equipment were lost). All of these valuable radar people were associated with 60 Grp and replacements had to be found for them and all of their equipment.

60 Group's Continental campaign continued, unabated, until VE-Day. In particular, some RNA mobile units of No.72 wing suffered great danger and inconvenience during the "Battle of the Bulge" in December '44-January, 1945.

### **Final months on the Home Front**

As the war approached its final 18 months, 60 Group found itself, once again, back in the front line of Britain's home defence against attack from the air. Beginning with the "Little Blitz" in early 1944, the enemy exploited "intruder tactics", mixing his fast, conventional bombers in with our returning bomber streams, and using airborne jamming and much Düppel (German "window").

Then came something entirely new - the V weapons, beginning in mid-June, 1944, and continuing through to April, 1945. With traditional "flap", a great deal of special equipment was rushed to 60 Group stations on the coast and new tactics devised against the "Divers" (V-1s) and later against the ballistic missiles (V-2s). Even the old CH was brought into play, specially modified to accomplish "Cathode Ray Direction Finding" (CRDF), used to determine the launch time of the V-2s. This was "Operation BIG BEN", devised in an attempt to grasp at least two minutes warning time. This was barely adequate to be of practical use, but it was more successful in locating launch sites, against which Bomber and Fighter Command were directed.

During this period, to use up the last of his big gun ammunition, the enemy increased his vicious cross-Channel artillery barrages against the Dover area, endangering several of 60 Group's installations. Swingate suffered RAF and WAAF casualties, some fatal, in January 1944, and this station suffered further shelling in February, March and September and several others were attacked by aircraft. Swingate's ordeal was relieved only when the gun emplacements were captured by the 3rd Division, Canadian Army, in September, 1944. Following this relief, and continuing until January, 1945, several hundred "Divers" were air-launched from above the North Sea providing the east coast chain with an added challenge, successfully met.

### **Stand-down**

Months before the war ended many 60 Group stations far from the battle zones were declared redundant and closings were numerous with re-posting of personnel to new units, often on the Continent. By January, 1944, "The Radar Bulletin" was running a "DEATHS" column announcing the demise of such stations. From a maximum of about 250 ground stations under 60 Group's control

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in 1943, there were, by March, 1945, still 189 in operation on the coasts of Britain, most of which housed more than one type of radar equipment. With the victory in May of 1945, 60 Group was able to end the 24-hour watch which began on Easter Friday, 1939.

### Post-war fate of 60 Group

With a final "Victory Souvenir Number", 60 Grp published its last issue of "The Radar Bulletin" in October, 1945. This presaged the closing down of the Group itself, which seems to have been whisked out of existence with unseemly haste and little fanfare, given its indispensable contribution to the victory. In its closing chapter the Bulletin acknowledges a debt of gratitude for the "important part played in 60 Group's effort by the officers and men from the Dominions, Canada, in particular, supplied Technical Officers and Radar Mechanics of the highest quality.....".

Squadron Leader M. Dean of the Historical Radar Archive has supplied the following impression of the Group's disposal:

*"Almost immediately Post-War, No. 60 Group became No.90 Signals Group and was based at Medmenham. The various Wing Headquarters were all dispensed with and the radar organization was centred around just a few maintenance locations as the Chain contracted down to just 26 operational stations ! In the early 1970's, 60 Group ceased to exist and its function was subsumed into the new Support Command Signals Headquarters (SCSHQ) and the RAF Signals Engineering Establishment (RAFSEE). Ultimately the Signals HQ disappeared and only RAFSEE continues, based at RAF Henlow."*

### Acknowledgements and Sources

The historical facts presented here were, mostly, condensed from "The Royal Air Force Signals History: Second World War", Volumes III to VI; the author is grateful to S/L M. S. Dean MBE, to R. F. Linden and F. B. Grahame for making copies available. S/L Dean supplied, also, notes from Vol's I and II as well as his own observations concerning the closing-out of 60 Group.

Among many other sources were:

"The Radar Bulletin" (60 Group);

"Three Steps to Victory" (Sir Robert Watson-Watt);

"One Story of Radar" (A.P. Rowe);

"Bawdsey: Birth of the Beam" (Gordon Kinsey);

"Radar Days" (E.G. Bowen);

"Boffin: A personal story of the early days of radar..." (Robert Hanbury Brown);

and numerous TRE Technical Papers.

Added thanks to S/L Dean for reviewing the manuscript.

**J. R. Robinson**

**London, ON**

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## 60 Signals Group

### CROSS CHANNEL SHELLING

The front line in North-west Europe was there long before D-Day, June 6, 1944. It was the English Channel and the heavy artillery duel between Calais, France and Dover, England. One of the targets was the RAF radar station at Swingate.

*"In August 1944 I was appointed the Commanding Officer at Swingate on the cliffs of Dover. It was one of, if not, the largest radar stations in England: a pre-war CH and a CHL on the same site, an OSWALD set very close and two OBOE radars about ten miles away."*

**R. W. Williamson**  
**Belleville, ON**

*"I did my early hands-on training at Swingate in 1942. At night, we could see the flash of the gun in France and seventy three seconds later we would hear the crash of the shell as it landed. Often with no more damage than a few dead sheep"*

**A. Dubois**  
**Ottawa, ON**

Operations Record Book of R.A.F. 9000 Station Swingate  
ref Air/29/168 Public Records Office, Kew, Richmond, Surrey, U.K.

#### June, 1943

Enemy shelling during daylight. Buildings and equipment were considerably shaken. 2 hits were registered in the near vicinity (75 yards).

#### November, 1943

2/11/43, 22:10 - Shelling experienced for one hour 17 minutes. No damage sustained by this station.

#### February, 1944

##### ENEMY ATTACKS ON THE STATION

On the evening of February 10th, a cross Channel gun duel took place. Shock from British guns dislodged the Mechanical Mouse which fell to the floor. A German shell fell within the compound at a distance of 40 yards from "R" block. A shell splinter weighing several pounds passed completely through the blast wall and, but for the fortuitous circumstances of hitting a support to the false roof, would subsequently have passed through the window into the receiver. Brick splinters from the blast wall smashed the eastern "R" hut window, and slightly damaged the structure.

#### February, 1944

22/2/44 03:30 - 05:40. Shelling experienced for two hours and ten minutes. No damage sustained by this station.

#### May, 1944

Extra thickness of blast wall around the Technical Block completed at the beginning of the month.

## 60 Signals Group

### ENEMY ATTACKS ON THE STATION

On the 5th, enemy shelling of the district around the camp took place for about 21 hours. No damage was caused to the station.

June, 1944

### ENEMY ACTION

Several shelling duels have taken place during the month. No damage has been sustained by this station. There were also several air raid warnings.

August, 1944

There have been frequent air raid warnings and two shelling actions during the month. No damage has been sustained by the 9000 Site.

September, 1944

### ENEMY ACTION

Very little air activity has been experienced here, but shelling has been constant until the last few days of September.

\* \* \* \* \*

### A LOOSE MINE.

*Late 1943 I became the acting C.O. of a CHL radar station on the west coast of England at Hartland Point, Devon. The station had an establishment of four officers and 65 other personnel.*

*One afternoon the Flight Sergeant phoned and said there was a mine floating towards the domestic site. I phoned H.Q. near Exeter and reported the incident. A few minutes later H.Q. phoned back and asked if it was a British or an enemy mine? No one could answer that question.*

*Later the F/Sgt phoned again stating that the mine was about 1/4 mile off shore and could be shot at with a rifle. I phoned H.Q. about such possible action. Back came a NO! not under any circumstances. The mine is a navy responsibility.*

*This caused me to have the domestic site evacuated. Personnel who were on shift duty and sleeping were not too happy. A little later the mine exploded and did considerable damage to the domestic site. Part of the roof was blown off, windows blown in, etc.*

*Also the F/Sgt and another man were standing on a low cliff watching when it exploded. The force of the explosion lifted them off their feet and blew them backwards. The F/Sgt also received a piece of shrapnel between the bones of his lower right arm. He had been told to clear out the area and take everybody with him. The explosion and the only casualty were reported to H.Q.. In a few minutes a call came back and I was asked to give an estimate on the cost of the repair. Eventually had to send out eight signals starting with Air Ministry, Whitehall, The final touch. I met the F/Sgt in Gosport where we were billeted in tents awaiting the Channel crossing. He was wearing a wound stripe. The Air Force had classified it as an enemy mine.*

**W.W. Damen**  
**Vancouver, BC.**

## 60 Signals Group

### Defence Against the V2 Ballistic Missile 1944 - 1945

#### Operation Big Ben

During the bombing on London, the resolve of the people was strengthened when they could hear the bursting shrapnel from their defending anti-aircraft guns. In their shelters they knew that their forces were striking back at the enemy. With the rocket V2 there were no defending guns. Only after the explosion were they aware of the attack.

#### V2 - OSWOLD

*Oswold was a CH type receiver transmitter sited in a small valley. Its purpose was to detect the V2's the Germans were just starting to fire on London. They could not intercept them but if it were possible to locate the firing site then it might be possible to destroy the mobile launches. The design and siting of the radar antennas were such that two main beams of radar coverage at high elevation were developed. A V2 entering the beams sent echoes back from each lobe.*

*We had operations on 24 hours per day but the echo was so fleeting they were seldom seen. However, the trace was photographed continually with date and time recorded continuously. When a V2 came to earth and exploded, the central control had the films from several stations brought in by motor-cycle courier. By triangulation they got a good fix on the projected firing site. The aircraft controller then sent out fighter bombers to the calculated map reference. This whole operation took 3 to 5 hours, however it took the Germans 6 to 8 hours to dismantle and move their launchers and V2 supplies.*

*Many of the fighter bomber sorties were successful and proved a good counter measure until the Allied forces in Europe over-ran the launching sites in Holland and Belgium in late 1944.*

*Both the tracking of V2's and of the Buzz Bombs were ultra secret operations and we had very strict security for all personnel.*

**R. W. Williamson**  
**S/L Officer Commanding**  
**Swingate, Aug., 1944**

\* \* \* \*

#### THE PAPER WAR

In October, 1942, I, a brand new Pilot Officer was posted to RAF Station Fairlight. Fairlight was a CHL station near Hastings, Sussex. This CHL was a very "busy" station and I was appointed Commanding Officer.

In the eight months that I was there I became very proud of my crew's operational capability and our serviceability record. In March, 1943, the Wing Commanding Officer made a spot inspection. In his tour of inspection he pointed to the ground and said "What is that?" I replied; "It looks like paper, don't you think sir?" "Hruump" was the reply and he gave me hell for having bits of paper scattered

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in the compound. Wing Commander Shirley I will not forget. He did not even enter my operations room where our radar was out-performing most others in that critical corner of England.

A few short weeks later I was rewarded with an all expense paid cruise to India with a stopover in South Africa. Albeit, on an overcrowded troopship. Talk about a paper war!

**G. Grande**  
**Aylmer QC**

## **60 Signals Group**