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Radar in Scotland

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Chapter 2

The Control and Reporting System in Scotland

The Control and Reporting System was the organisation set up to defend Britain from air attack and was gradually developed and perfected from 1936 onwards. In operation the system started with the early warning radar stations detecting an incoming air raid. This information was reported to a filter room, where it was used to produce an estimated true picture of aircraft movements. This true picture was passed from the filter room to the operations rooms at Fighter Command Headquarters, Group and Sectors simultaneously. In the operations room, decisions were made on how to deal with the attack and instructions would then be given to the fighter squadrons to take off and intercept the raid, or 'scramble'. The fighters would be directed from the operations room until the hostile aircraft were spotted visually, at which point the fighter leader would give the instruction 'Tally ho', signalling that the enemy had been sighted and that instruction from the ground would cease (Mason, 1969: 95).

This system of control worked well during daylight and good weather, when fighters could see individual bombers some distance away. However, at night it was necessary for fighters to get much closer to their target before they

could make visual contact, and in fact they had to get closer than filtered plots could provide, with all the delays inherent in processing the information. Consequently, at night, fighters would be controlled directly from GCI radar stations and directed on to individual enemy bombers until within range of the fighter's airborne radar, when the fighter would close on its prey until near enough to identify it as a hostile and open fire (Robinson, 1988: 33–5).

The foregoing is a summary of how the UK Control and Reporting System worked by day and by night. In the context of radar, it is the filtering element of this system which is of primary interest. The work of the filter room was highly skilled and involved the use of a map table marked with the locations of radar stations, with range arcs radiating outward from each station at 10 mile intervals. Plotters would place coloured counters on the table in the grid location given to them over the telephone line by the Radar Operator (each radar station having a different colour for the counters used for its plots). It was the job of the filterers to look at these lines of counters, ideally plotted by several stations, and estimate the true position of the aircraft, placing an arrow with its tip indicating the location and

heading of the aircraft. The grid reference at the tip of the arrow then became the true plot (Flint, 1996: 14–15), and this was passed to the Group and Sector Operations Rooms, other Group Filter Rooms and Fighter Command Operations Room (HRA, RDF in Northern Scotland and the Islands).

A good impression of the work carried out by filter plotters is given in the following account by Alison Catto (Manson) of her time at No 14 Group Filter Room, Inverness:

We tracked aircraft over land and sea by CH and CHL radar stations, comparing responses given by these stations – distance, height, direction, average speed, number of aircraft and whether friend or foe. We were supervised and watched by the RAF officers upstairs. When not busy we spoke to the boys who manned those stations – even made dates with them and met them later. We wrote letters, did knitting, sewing. Duties were to keep our Rest Room clean and tidy. Floors swept with wet, used tea covers to keep dust down. During a watch period we had so long off duty for tealcoffee break. (Alison Catto, pers comm)

Another of the plotters at Inverness was Joy Moore (Wallden), who was a Clerk SD (Special Duties) there in 1944. She recalls:

plotting could be one or two radar stations at the same time, and usually different each watch ... There were RAF and WAAF plotters – I think one or two relieving. Plotters on the table would say, 'Inverness changing over,' and the relief would plug in her headset to your socket on the table and say, 'Inverness changed over.' I think the breaks were about twenty minutes; there was a small rest room with a tealcoffee bar and buns. On our watch it was always the same RAF bod who served in there, but on other watches it varied.

Numbers on watch – cannot be absolutely certain but I think about twenty plus. There were plotters on the radar table, the observer corps table plus four–six in the balcony (MLS – FC etc.) [Movements Liaison Section, keeping track of friendly aircraft movements, Fighter Command and others] plus two or three relieving ... I think two [filter officers were on duty each watch] on the table, but not necessarily at one time. We sometimes saw the same officers on watch ... we didn't get to know them well ...

[There was little hostile activity at that time, but it included] regular German met flight off the coast of Norway. Attacks on Scapa? No, only panic when I plotted in the wrong square once! [We plotted] anything that flew – sometimes flocks of birds until the radar stations realised what the blips were ... I also worked in MLS. Airfields rang up with estimated time of departure, number of aircraft, height and estimated time of arrival. Aircraft also showed IFF [Identification Friend or Foe]. (Joy Moore, pers comm)

The full story of the filtering system in Scotland is somewhat more complex than the outline given above, not least because it evolved throughout the war in the face of the changing demands placed upon it. When the first radar station in Scotland, Drone Hill, became operational in September 1938 it acted as its own filter room (Air Ministry, 1950 (1): 46) until Stanmore Filter Room, at Headquarters, Fighter Command, at Bentley Priory in Middlesex, became operational on 8 November 1938 (Wood with Dempster, 1990: 89). Stanmore Filter Room was the centre of the national air reporting system, receiving plots from radar stations throughout the country. However, it was quickly realised that as the Home Chain expanded, the flow of information to Stanmore would also increase, eventually becoming too much for Stanmore

to cope with. It was recommended in 1940 that decentralisation of filtering should take place and each Fighter Group should have its own filter room (Air Ministry, 1963: 16–17).

To an extent, this decentralisation was pioneered in Scotland. The decision was taken that Netherbutton CH, which became operational in June 1939, would not 'tell' (pass plots) to Stanmore Filter Room, but would instead report to a local filter room where the information would be of direct use. The plots would then be passed for information purposes to Stanmore. The local filter room was set up at Wick, although the Sector Station there did not become operational until December 1939. Netherbutton was, therefore, the only station not plotting directly to Stanmore at the outbreak of war. Plots continued to be passed by Netherbutton (and later Thrumster and Hillhead) to Wick until 25 September 1940, when Kirkwall Filter Room opened. This was attached to the Sector Operations Room and remained in operation, latterly as a Sub-Filter Room (SFR), until 25 July 1945 (TNA, ADM 116/5790, AIR 26/92).

Decentralisation of filtering continued with the opening on 13 August 1940 of the North Western Filter Room at Preston within No 9 Group, to which North Cairn (and three other stations outwith Scotland) immediately began plotting. By September 1941 North Cairn, Port Mor, Saligo and Kilchiaran were all plotting to Preston, the last three via wireless telegraphy (W/T) to North Cairn and by landline from there to the filter room. However, September 1941 saw the new Fighter Group in Northern Ireland, No 82 Group, become operational along with its filter room on the 25th. From that date the four Scottish radar stations began plotting to Dundonald Filter Room instead of Preston (TNA, AIR 29/141).

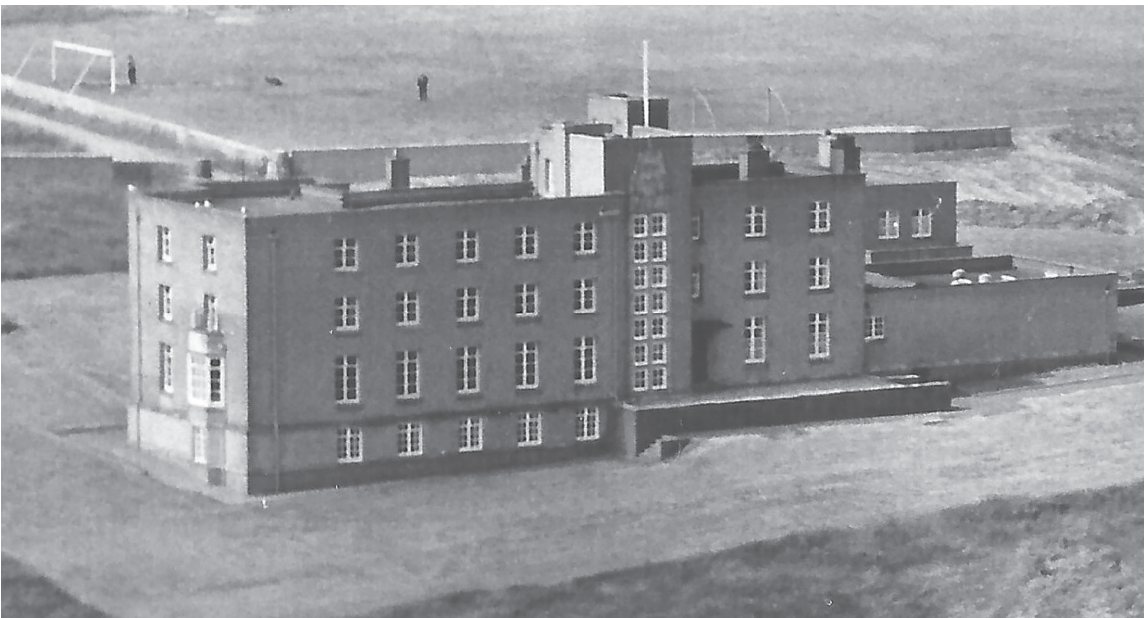
Following the decision to set up filter rooms

within each Fighter Group, No 13 Group Filter Room opened in Newcastle on 5 September 1941 (TNA, AIR 26/103) and No 14 Group Filter Room in Inverness in October 1941 (TNA, AIR 26/92). Douglas Wood CH station was almost on the dividing line between the two group areas and was instructed to pass plots below the line to Newcastle and above the line to Inverness (TNA, AIR 26/100). It was not, however, as simple as drawing a line between the two groups. No 14 Group covered a huge area, extending from the northern approaches to the Shetland Islands to approximately the River Tay in the south, and from the approaches to the Western Isles to the approaches to the east coast of Scotland. This area included around 45 radar stations, many of which were distant from Inverness Filter Room, and in order to avoid the filter room becoming congested, sub-filter rooms (SFRs) were established at Kirkwall, Lerwick, Stornoway, and Tiree. Kirkwall and Lerwick SFRs handled plots from stations in Orkney and Shetland respectively. Stornoway SFR received information from stations in Lewis and Harris (Eorodale, Habost, Islivig, Brenish, Broad Bay and Rodel Park), Borve Castle on Benbecula, Kendrom on Skye, and Point of Stoer and Sango on the mainland. Benbecula SFR. Tiree SFR handled information from Port Mor, Kilkenneth, Ben Hough and Barrapol on Tiree itself, as well as Carsaig on Mull, Greian Head on Barra, and Saligo and Kilchiaran on Islay (TNA, AIR 26/92, WO 199/534).

Information from the filter rooms was passed to Group and Sector Operations Rooms, from where decisions were made about what action to take, fighter aircraft to be ordered to take off to intercept and so on (Mason, 1969: 95). The role of the Sector Station, and in particular the Sector Controller, in deciding how to respond



7 Aerial view of Raigmore, with Inverness Filter Room under construction in the clearing in the trees at top right of the photograph, taken on 9 May 1942. (© Historic Environment Scotland)



8 Boy's Hostel, Lerwick, used as Lerwick Fighter Sector Headquarters and between January 1941 and August 1945 for Lerwick SFR. (© Dennis Coutts)

to the information and which units to allocate was therefore of great importance in the air defence system. Fighter Sector Headquarters operated at Sumburgh (January 1941–January 1942), Lerwick (January 1942–August 1945), Kirkwall (October 1940–March 1946), Wick (February 1940–October 1940), Tain (October 1941–November 1942), Peterhead (May 1942–July 1944), Dyce (May 1940–May 1942), Turnhouse (September 1939–April 1946), Prestwick (January 1941–April 1941), Ayr (April 1941–May 1943), Ouston (March 1941–July 1943) and Usworth (September 1939–March 1941). Additional information on these stations, as well as the fighter stations and units under their control, is given in Smith (1983) and Rawlings (1993).

A reorganisation of Fighter Command led to No 13 Group being amalgamated with No 14 Group, and Newcastle Filter Room closing on 15 July 1943 (although it remained in use for other purposes). No 13 Group Headquarters were established at the former 14 Group HQ in Inverness, and Inverness Filter Room was responsible for plotting aircraft across Scotland and its sea approaches. On 15 March 1946 Inverness Filter Room closed down (TNA, AIR 26/93).

In addition to radar stations passing aircraft plots to the filter rooms, CHL (including CDU) and centimetric stations were also passing on information on ships and surfaced submarines. For stations in Shetland, Orkney and the north of Scotland, this was via W/T to the destroyer depot ship HMS *Greenwich* at Lyness in Scapa Flow (HRA, Naval Shore Radar). Later, dedicated Naval Plotting Rooms (NPRs) at Aberdeen, Invergordon, Lerwick,

Lyness, Pitreavie and Stornoway all received radar information from Scottish radar stations, as did Belfast NPR, to which Kilchiaran plotted from July 1943 until 8 June 1945. Ships were plotted in the NPRs from information passed directly from the radar stations, with no filtering of plots taking place (TNA, AIR 26/92).

Filter rooms receiving plots from Scottish radar stations

Stanmore Filter Room

Unit Fighter Command Headquarters
Region Middlesex
NGR TQ 1549 9353
In use 8 November 1938 – April 1968²

Preston Filter Room

Unit No 9 (Fighter) Group Headquarters
Region Lancashire
NGR SD 521 361
In use 13 August 1940 – 25 September 1941³

Newcastle Filter Room

Unit No 13 (Fighter) Group Headquarters
Region Northumberland
NGR NZ 2121 6687
In use 5 September 1941 – 15 July 1943

Wick Filter Room

Unit Wick Sector, No 13 (Fighter) Group,
December 1939 – 1 September 1940
Unit Wick Sector, No 14 (Fighter) Group,
1 September 1940 – 25 September 1940
Region Caithness
NGR ND 3655 5151
NMRS ND35SE 223
In use December 1939 – 25 September 1940

² The date Stanmore Filter Room closed down.

³ The date Scottish stations ceased plotting to Preston and began plotting to Dundonald.

Kirkwall Filter Room

Unit Wick Sector, No 14 (Fighter) Group,
25 September 1940 – 17 October 1940
Unit Kirkwall Sector, No 14 (Fighter) Group,
17 October 1940 – 22 October 1941
Region Orkney
NGR HY 4540 0996
NMRS HY40NE 41.01
In use 25 September 1940 – 22 October 1941

Inverness Filter Room

Unit No 14 (Fighter) Group Headquarters,
22 October 1941 – 15 July 1943
Unit No 13 (Fighter) Group Headquarters,
15 July 1943 – 15 March 1946

Inverness (Drummossie Moor)

NGR NH 7052 4286
NMRS NH74SW 19
In use 22 October 1941 – 28 February 1943

Inverness (Raigmore)

NGR NH 6826 4560
NMRS NH64NE 642
In use 1 March 1943 – 15 March 1946

Benbecula SFR

Region Benbecula
NGR NF 7791 5546
NMRS NF75NE 4
In use dates unknown

Kirkwall SFR

Region Orkney
NGR HY 4540 0996
NMRS HY40NE 41.01
In use 22 October 1941 – 29 January 1944

Kirkwall SFR

Region Orkney
NGR HY 4604 0970
NMRS HY40NE 28
In use 29 January 1944 – 25 July 1945

Lerwick SFR

Region Shetland
NGR HU 4806 4081
NMRS HU44SE 105
In use 17 January 1942 – 5 August 1945

Stornoway SFR

Region Lewis
NGR NB 4381 3320
NMRS NB43SE 60
In use November 1941 – 1945

Sumburgh SFR

Region Shetland
NGR HU 3904 1101
NMRS HU31SE 34.04
In use 29 January 1941 – 17 January 1942

Tiree SFR

Region Tiree
NGR NL 9956 4449
NMRS NL94SE 54
In use April 1942 – 27 May 1943

Dundonald Filter Room

Unit No 82 (Fighter) Group Headquarters
Region County Down
NGR NW 526 300
In use 25 September 1941⁴ – date unknown

Naval Plotting Rooms receiving plots from Scottish radar stations**Aberdeen NPR**

Region Aberdeenshire
NGR NJ 965 056
NMRS NJ90NE 22
In use 1942 – 26 May 1945

Belfast NPR

Region County Antrim
NGR NW 4582 3473
In use July 1943⁵ – 8 June 1945

⁴ See note 3.

⁵ The date Kilchiaran started plotting to Belfast NPR.

Invergordon NPR

Region Ross and Cromarty
NGR NH 8086 6706
NMRS NH86NW 11.01
In use 1942 – circa 1945

Lerwick NPR

Region Shetland
NGR HU 4761 4156
NMRS HU44SE 3
In use May 1942 – 12 June 1945

Lyness NPR

Region Orkney
NGR ND 2940 9446
NMRS ND29SE 2
In use 1942 – 19 February 1945

Pitreavie NPR

Region Fife
NGR NT 1172 8483
NMRS NT18SW 9.06
In use late 1940 – 26 May 1945

Stornoway NPR

Region Lewis
NGR NB 4200 3317
NMRS NB43SW 49
In use date unknown – June 1943