

BUILDINGS AT RISK

A chain of radars: the legacy of island's wartime defences

Dave Martin of the Isle of Man Natural History and Antiquarian Society continues looking at some of the structures associated with Second World War radar, which potentially saved thousands of lives.

Last time, we looked at the introduction of Chain Home (CH) radar stations on the island, how they helped save lives, and in particular at the station at Bride which is the best remaining example in the whole of the British Isles, yet is currently unprotected.

Modern radar systems, as seen on ships and at aerodromes such as Ronaldsway, have modest-sized rotating aerials which sweep and scan all-around, but this was not the case for early air-warning radars.

Prior to the invention of the 'magnetron', to get worthwhile range, the transmitters were on bands similar to those used for broadcasting in what we know as medium- or short-wave bands.

The size of the aerial has to be in proportion to wavelength, so the Chain Home stations used aerials which were more akin to the Manx Radio masts at Archallagan than what we think of as a radar scanner nowadays.

The transmitter aerial arrays were suspended between two guyed steel masts reaching up to 335ft and the receiving aerials were mounted on wooden towers some 240ft tall. Because of their size, these fixed transmitting aerials had fixed radiation patterns – they couldn't sweep round like a modern rotating radar scanner.

The only precision measurement available from basic 'AMES Type 1' Chain Home radar was how long it took for a radio pulse to get to the aircraft and the echo to return.

Knowing that time, the operator could find the distance



Location of WWII radar installations on Meayll Hill

(Jon Wornham)

that the contact was from the station, and they could estimate the speed at which the range was closing or opening (incoming or departing aircraft).

The receiving aerial towers were fitted with pairs of an-

tennae at right angles, and by switching between them, an approximate direction could also be estimated.

The stations, and our own aircraft, were fitted with a system known as IFF (Identification Friend or Foe) which allowed the operators to differentiate between friendly and hostile aircraft. The size of the echo gave a hint as to possible size of a formation, and by judicious switching between different elements within the transmitting and receiving antennae, they could get an impression of the height of a contact.

Limited though this all was, it allowed the general movement of a formation to be assessed and allowed both air-raid sirens to be sounded in good time to allow use of air-raid shelters, and fighters to scrambled to an area.

The 'chain' of Chain Home

stations round the coast increased the chance of detecting incoming aircraft, and allowed adjacent station's data to be used to verify any faint contacts. Crucially though because their coverage overlapped, if common contacts could be identified it allowed more accurate target position to be calculated.

By plotting a sequence of positions, the targets' course and speed could be ascertained, and vectors to intercept could be calculated and appropriate fighters scrambled. Key to this was the network of plotting rooms at which information was collated and common targets identified, filtered and distilled.

CHAIN HOME ON THE ISLE OF MAN

By the start of the Second World War in September 1939, 20 Chain Home stations cov-

ered the East Coast of Britain from Scotland to the Isle of Wight.

By 1941 the chain had been extended to the West Coast of Britain, with only remote north-west Scotland unprotected.

After the fall of France,

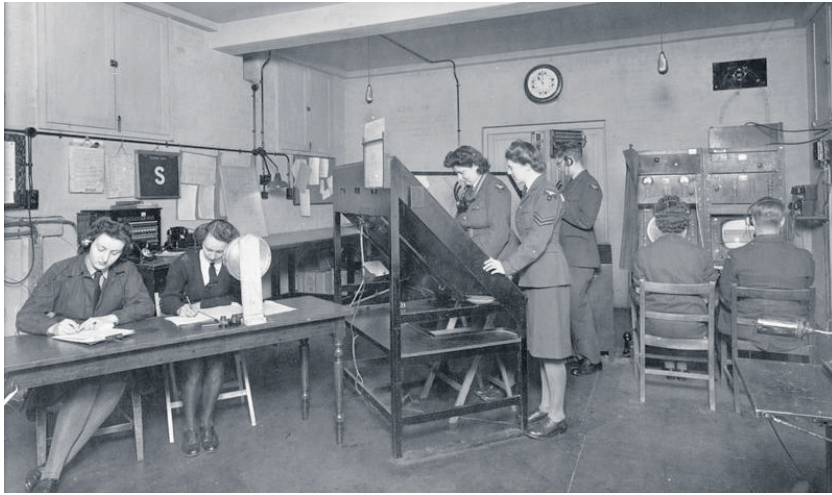
German bombers were based in France. From there, as well as raiding the Channel ports and southern England, they also came north to attack areas around and beyond the Irish Sea – ports and shipyards such as Liverpool and the Mersey, Belfast, and Glasgow and the



A war artist's impression of an AMES type 2 CHL station, similar to one of those installed at Cregneash (Imperial War Museum)



Chain Home Dalby in 1949 – metal lattice transmitter masts on the left, wooden receiving-aerial towers on the right (John C Hall)



Chain Home Low operators with Plan Position Indicator and an Air Plotting Board at a station similar to that at Cregneash (Imperial War Museum)

Clyde; and industrial targets inland in North-West England and on Clydeside.

Rather than the more direct, but dangerous, over-land routes, bombers often echoed many centuries of use of sea routes by flying around the South Coast, across the Bristol Channel and then up St George's Channel and then passing one side or the other of the Isle of Man.

From very early on, the Isle of Man was identified as a location for RDF (Radio Direction Finding, later known as RADAR) to detect these approaching enemy aircraft.

Sites at Bride and Scarlett were surveyed on January 12, 1940, and shortly thereafter started operations with Advanced Chain Home (ACH) equipment – shorter wooden masts and hut or caravan-based equipment – whilst the full Chain Home stations were being built around them.

Even whilst building, concerns started to be expressed about the impact of the tall Chain Home aerial masts on nearby aerodromes – RAF Andreas for CH Bride, and RAF Ronaldsway / HMS Urley for CH Scarlett.

Nevertheless both these Chain Home stations were commissioned; but it was decided to look for an extra, or alternative, site as well, which resulted in the establishment of a third Chain Home station at Dalby, starting in 1941 and operational in 1942.

CH radar stations were positioned so as to provide a clear view over the sea. They used large static aerials, which illuminated a wide area like a floodlight, looking slightly up from the horizon, with a lower cut-off so echoes from the ground/sea didn't provide spurious echoes or 'clutter' to obscure aircraft returns. This meant that aircraft which hugged the sea could fly, literally, 'beneath the radar'.

At the same pre-war time as the Air Ministry was developing Chain Home for early air-raid warning, the Admiralty had been developing

shorter-range Coastal Defence (CD) radar, principally for gun control – similar to that fictionalised in 'The Guns of Navarone'.

The new, shorter wavelength meant much smaller aerials – described as 'bedsteads' – which were both directional and could be rotated like a searchlight sweeping an area – allowing better target bearings.

CD radar couldn't estimate target height – there was no need, as all the targets of interest were at sea level!

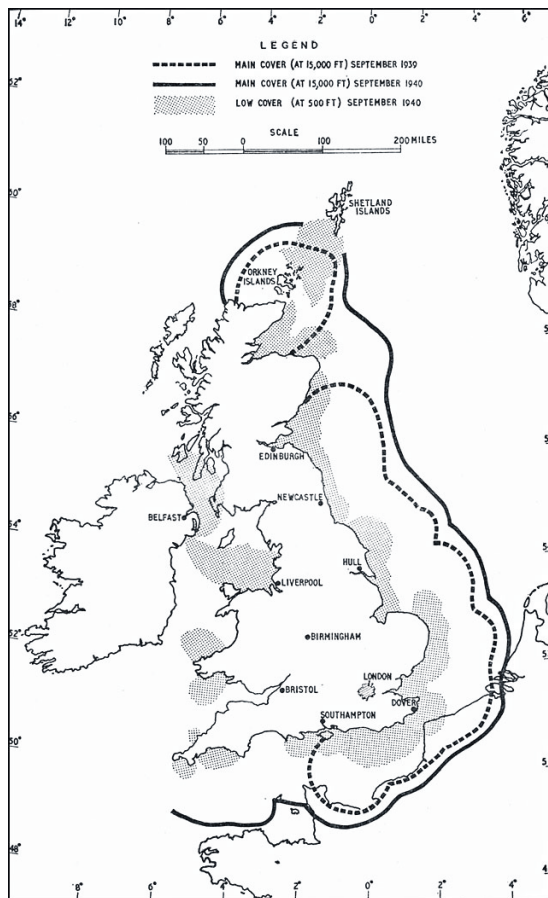
However, it soon was realised that this CD radar could also pick up low-level aircraft, so it was adopted as Air Ministry Experimental Set type 2

(AMES Type 2), in a new network known as Chain Home Low (CHL).

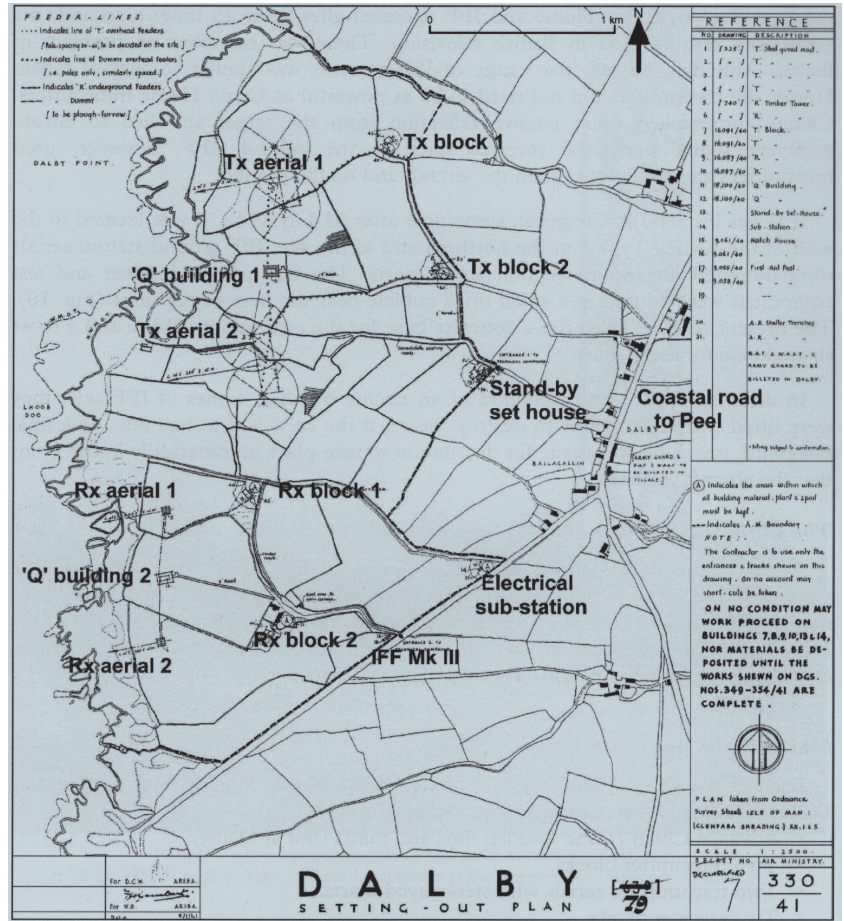
AMES type 2 sets used for Chain Home Low were much smaller and easier deployed, and as a result they were actually the first wartime radars in use on the island.

Two of these AMES Type 2 sets were installed in early 1940 at a new site on Meayll Hill (known by the RAF as 'Cregneish').

Operating on slightly different frequencies so they wouldn't interfere with each other, 'Channel A' principally covered a sector from North-west to South and 'Channel B' principally covered South to North-east.



Coverage of Chain Home (black lines) and Chain Home Low (shaded areas) in September 1940



Plan for CH Dalby

(PRO / Alan Cleary)

An Admiralty CD set was also installed at 'Cregneish', known as AMES type 31 as it was on an RAF-controlled site. Mounted atop the now demolished pillbox at the southern end of the site, it was operated by the Royal Navy to monitor shipping in the southern Irish Sea, a vital route for convoys and their escorts.

When the microwave magnetron was perfected for use in airborne anti-submarine radar, it also found its way into another generation of yet more accurate coastal radar, known as Chain Home Extra Low (CHEL / AMES Type 52). The shorter wavelength allowed the use of the rotating reflector dish aerial, which is now a common sight on ships and at airports.

The Type 52 set was used principally for aerial targets, but it was also hoped it might detect U-boats if they surfaced at night to charge their batteries.

Whilst Chain Home stations tended to have dedicated domestic accommodation, 'Cregneish' only had accommodation on-site for those on duty - personnel were billeted in Port St Mary, men at the Golf Links Hotel (now Carrick Court), WAAFs at the Moorlands Hotel at Four Roads.

POSTWAR

Chain Home and Chain Home Low stations were all given a high security classification and whilst operational

were provided with pill-boxes and machine gun posts, and of course photography was completely forbidden.

However, the locations had been chosen for their good visibility, remember radio waves used for radar normally travel in or near line-of-sight, like visible light.

Also, especially at the Chain Home stations, there were very tall masts, so Manx residents were well aware 'something' was afoot at those locations.

There were rumours – with maybe even official blessing – that these installations were concerned with 'death rays' but that may have been to deter the natives from getting too close!

Residents were strongly warned that even if they overheard careless chat amongst personnel from the stations, they must not pass it on, to do so was described to some residents as being treason.

At the end of the Second World War, CH Bride and CH Scarlett were decommissioned, but CHL 'Cregneish' and the second-generation CH Dalby were mothballed. Attempts were made to re-activate CH Dalby early in the Cold War, but it was (mostly) decommissioned in the 1950s.

I say mostly, as some infrastructure remained, and I have it on good authority that a visitor to the abandoned operations room at Dalby in the 1980s, out of curiosity, picked

up a telephone that was still there and twirled the handle – to be answered by an RAF plotting operator somewhere in England!

Because of the vital role played by Chain Home in the defence of Britain during WWII, and its possible value in the early post-war years, the veil of secrecy remained tight post-war.

It is notable that the Military History of the Isle of Man, published in 1947 and written by Bertram Sargeant, the Government Secretary of the time, completely omits any mention of the Chain Home stations, which all Manx residents must have either seen or heard 'skeeet' about.

The remaining buildings at Scarlett are visible from the coastal footpath, as are those at Dalby from the main and Niarbyl roads.

As well as the technical site to the north of the Niarbyl Road, accommodation for the Dalby staff was constructed between Glen Maye and Raby to house both RAF and WAAF personnel, some of those buildings were bought by the LGB in 1947 for post-war housing.

CHL 'Cregneish' technical buildings at Meayll Hill have disappeared, but the concrete and brick foundations still remain. All of these radar sites played an important part in Britain's defences; the veil of secrecy has long been lifted, and they deserve recognition.